



## Step 1: Data collection and data integration

This part explains how to collect input data and convert it into a format readable by the pipeline. The minimal input for building a refined reconstruction is a KBase draft reconstruction. Recommended inputs include taxonomic information on the target organism, experimental data if the species is not yet found in the already collected data, and comparative genomic analyses.

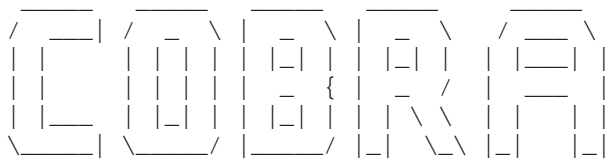
### 1.1. KBase draft reconstructions-required

Create KBase draft reconstruction(s) for the target organism(s) by using the apps at [kbase.us/](https://kbase.us/). A template narrative to facilitate this is available at <https://narrative.kbase.us/narrative/ws.82195.obj.8>. The narrative assumes that the genomes to reconstruct are available as FASTA files and imported into the Staging Area as a zipped file. Alternatively, genomes available in KBase can be directly imported into the Narrative. Note that it will not be possible to reconstruct organisms without a sequenced genome. Export the generated draft reconstructions by downloading them.

Next, please place all draft reconstructions that you want to refine into one folder. For the sake of this tutorial, we will use four AGORA2 strains as well as six example strains that were randomly chosen from genomes present at KBase and are not present in AGORA2. Draft reconstructions for these strains have already been retrieved from KBase and placed into the folder `cobratoolbox/papers/2021_demeter/exampleDraftReconstructions`. Alternatively, they are available in the template narrative <https://narrative.kbase.us/narrative/81207>.

% Start DEMETER by initializing the COBRA Toolbox.

```
initCobraToolbox
```



CONstraint-Based Reconstruction and Analysis  
The COBRA Toolbox - 2021

Documentation:  
<http://opencobra.github.io/cobratoolbox>

```
> Checking if git is installed ... Done (version: 2.30.1).
> Checking if the repository is tracked using git ... Done.
> Checking if curl is installed ... Done.
> Checking if remote can be reached ... Done.
> Initializing and updating submodules (this may take a while)... Done.
> Adding all the files of The COBRA Toolbox ... Done.
> Define CB map output... set to svg.
> TranslateSBML is installed and working properly.
> Configuring solver environment variables ...
- [*---] ILOG_CPLEX_PATH: /Applications/CPLEX_Studio129/cplex/matlab/x86-64_osx
- [*---] GUROBI_PATH: /Library/gurobi912/mac64/matlab
- [----] TOMLAB_PATH: --> set this path manually after installing the solver ( see instructions )
- [----] MOSEK_PATH: --> set this path manually after installing the solver ( see instructions )
Done.
> Checking available solvers and solver interfaces ... 0

0

Check osense*c - A'*lam - w = 0 (stationarity):
0
0
```

```

> [gurobi] Primal optimality condition in solveCobraLP satisfied.
> [gurobi] Dual optimality condition in solveCobraLP satisfied.
Original LP has 1 row, 2 columns, 1 non-zero
Objective value = 0
OPTIMAL SOLUTION FOUND BY LP PRESOLVER

```

```

> [glpk] Primal optimality condition in solveCobraLP satisfied.

```

```

-----
pdco.m                      Version pdco5 of 15 Jun 2018
Primal-dual barrier method to minimize a convex function
subject to linear constraints Ax + r = b,  bl <= x <= bu

```

```

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Contributors:              Byunggyoo Kim (SOL), Chris Maes (ICME)
                           Santiago Akle (ICME), Matt Zahr (ICME)
                           Aekaansh Verma (ME)
-----

```

```

The objective is linear
The matrix A is an explicit sparse matrix

```

```

m      =      1      n      =      2      nnz(A) =      1
max |b| =      0      max |x0| = 1.0e+00      xsize  = 1.0e+00
max |y0| =      1      max |z0| = 1.0e+00      zsize  = 1.0e+00

x0min   =      1      featol  = 1.0e-06      dlmax   = 1.0e-04
z0min   =      1      opttol  = 1.0e-06      d2max   = 5.0e-04
mu0      = 1.0e-01      steptol =      0.99      bigcenter= 1000

```

```

LSMR/MINRES:
atoll   = 1.0e-10      atol2   = 1.0e-15      btol    = 0.0e+00
conlim  = 1.0e+12      itnlim  =      10      show   =      0

```

```

Method   =      2      (1 or 11=chol  2 or 12=QR  3 or 13=LSMR  4 or 14=MINRES 21=SQD(LU)  22=SQD(MA57))
Eliminating dy before dx

```

```

Bounds:

```

```

[0,inf] [-inf,0] Finite bl Finite bu Two bnds Fixed Free
      0      0      0      0      0      2      0
[0, bu] [bl, 0] excluding fixed variables
      0      0

```

```

Itn  mu stepx stepz Pinf Dinf Cinf Objective nf center QR
  0      -6.6 -99.0 -Inf 1.2500000e-07      1.0
  1 -1.0 1.000 1.000 -99.0 -99.0 -Inf 0.0000000e+00 1 1.0      1
  2 -3.0 1.000 1.000 -99.0 -99.0 -Inf 0.0000000e+00 1 1.0
  3 -5.0 1.000 1.000 -99.0 -99.0 -Inf 0.0000000e+00 1 1.0
  4 -7.0 1.000 1.000 -99.0 -99.0 -Inf 0.0000000e+00 1 1.0
Converged

```

```

max |x| =      0.000      max |y| =      0.000      max |z| =      0.000 scaled
max |x| =      0.000      max |y| =      0.000      max |z| =      0.000 unscaled
max |x| and max |z| exclude fixed variables
PDitns  =      4      QRitns =      0      cputime =      0.2

```

```

Distribution of vector      x      z
[      1,      10 )      0      2
[     0.1,      1 )      0      0
[    0.01,     0.1 )      0      0
[   0.001,    0.01 )      0      0
[  0.0001,   0.001 )      0      0

```

```
[ 1e-05, 0.0001 )      0      0
[ 1e-06, 1e-05 )      0      0
[ 1e-07, 1e-06 )      0      0
[ 1e-08, 1e-07 )      0      0
[ 0, 1e-08 )          2      0
```

Elapsed time is 0.165924 seconds.

> [pdco] Primal optimality condition in solveCobraLP satisfied.

> [pdco] Dual optimality condition in solveCobraLP satisfied.

Elapsed time is 0.001496 seconds.

In 0.0033641 sec, file written to /Users/almut.heinken/Documents/Code/cobratoolbox/binary/maci64/bin/minos  
Done.

> Setting default solvers ... Done.

> Saving the MATLAB path ... Done.

- The MATLAB path was saved in the default location.

> Summary of available solvers and solver interfaces

	Support	LP	MILP	QP	MIQP	NLP	EP		
gurobi	active		1	1	1	1	-	-	
ibm_cplex	active		0	0	0	0	-	-	
tomlab_cplex	active		0	0	0	0	-	-	
glpk	active		1	1	-	-	-	-	
mosek	active		0	-	0	-	-	0	
matlab	active		1	-	-	-	1	-	
pdco	active		1	-	1	-	-	1	
quadMinos	active		1	-	-	-	-	-	
dqqMinos	active		1	-	1	-	-	-	
cplex_direct	active		0	0	0	-	-	-	
cplexlp	active		0	-	-	-	-	-	
qpng	passive		-	-	1	-	-	-	
tomlab_snopt	passive		-	-	-	-	0	-	
lp_solve	legacy		1	-	-	-	-	-	
Total	-		7	2	4	1	1	1	

+ Legend: - = not applicable, 0 = solver not compatible or not installed, 1 = solver installed.

> You can solve LP problems using: 'gurobi' - 'glpk' - 'pdco'

> You can solve MILP problems using: 'gurobi' - 'glpk'

> You can solve QP problems using: 'gurobi' - 'pdco'

> You can solve MIQP problems using: 'gurobi'

> You can solve NLP problems using:

> You can solve EP problems using: 'pdco'

> Checking for available updates ...

> You cannot update your fork using updateCobraToolbox() because this is a development branch.

> The current branch is: demeterFixes

> The last commit to the current branch is: 4fcaac

> You can use MATLAB.devTools (<https://github.com/opencobra/MATLAB.devTools>) to update your fork.

removing: /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/thermo/componentContribution/new

removing: /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/thermo/groupContribution/new

removing: /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/thermo/inchi/new

removing: /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/thermo/molFiles/new

removing: /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/thermo/protons/new

removing: /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/thermo/trainingModel/new

Please ensure that the COBRA/papers folder is up to date and in the MATLAB path as DEMETER depends on files located in COBRA/papers/demeter.

Set a solver (recommended: IBM CPLEX)

```
solverOK=changeCobraSolver('ibm_cplex','LP');
```

```
> changeCobraSolver: Solver ibm_cplex is not installed.
```

```
global CBTDIR
```

To start DEMETER, define the path to the folder where the draft reconstructions are located (required).

```
draftFolder = [CBTDIR filesep 'papers' filesep '2021_demeter' filesep  
'exampleDraftReconstructions'];
```

## 1.2. Taxonomic and strain information

Information on the taxonomic classification and organism properties (e.g., gram status, oxygen status, metabolism type, pathogenicity) has been collected for all 7,302 AGORA2 strains and is available in the file "input/AGORA2\_infoFile.xlsx". It is highly recommended to collect taxonomic information for your organism as this enables the propagation of experimental data from related strains that are already present in AGORA2. Taxonomic information can be retrieved from NCBI Taxonomy: <https://www.ncbi.nlm.nih.gov/taxonomy/>. Note that this step can be skipped, but will prevent informing the refined reconstructions through available experimental data. To provide taxonomic information for your organisms, prepare a file in the same format as `cobratoolbox/papers/2021_demeter/example_infoFile.xlsx`. Please provide the path to the file with taxonomic information as the variable `infoFilePath`.

```
infoFilePath = [CBTDIR filesep 'papers' filesep '2021_demeter' filesep  
'example_infoFile.xlsx'];
```

**IMPORTANT:** The IDs in the column 'MicrobeID' need to match the names of the resulting refined reconstructions exactly. Prepare the file with taxonomic information accordingly. During the pipeline run, the names of draft reconstruction files will be adapted. To find out what the names of the refined reconstructions will be, run the function

```
refinedModelIDs = printRefinedModelIDs(draftFolder);
```

## 1.3. Propagating existing experimental data

The DEMETER pipeline contains experimental data for >1,500 microbial species for (i) carbon sources, (ii) fermentation pathways, (iii) growth requirements, (iv) consumed metabolites, and (v) secreted metabolites. The data are stored in MATLAB-readable format in the input folder as the files `CarbonSourcesTable.txt`, `FermentationTable.txt`, `NutrientRequirementsTable.txt`, `secretionProductTable.txt`, and `uptakeTable.txt`. If a strain related to your organism is already present in the DEMETER resource and has data available, this data can be propagated to your new organism. This requires taxonomic information organized in a table as described in the previous step. Note that you can still adapt the experimental data to strain-specific findings and add new data afterwards as needed. The input file with taxonomic information will also be supplemented with gram staining information if possible, which serves to additionally inform and refine the reconstructions. If no related organisms are already present in DEMETER from which gram status information can be propagated, gram

status can be retrieved from literature searches or by querying the Integrated Microbial Genomes Database (<https://img.jgi.doe.gov/>) [4].

## 1.4. Using comparative genomic data as input data for DEMETER

It is possible to inform the reconstruction with comparative genomics data retrieved from PubSEED. This will require either retrieving publicly available spreadsheets from PubSEED or the generation of such spreadsheets through PubSEED (<https://pubseed.theseed.org/>). Under <https://pubseed.theseed.org/seedviewer.cgi?page=SubsystemSelect>, over 1,000 curated subsystems for thousands of bacteria are available that can serve as input for DEMETER. See "Subsystem Spreadsheet" tab on PubSeed or `cobratoolbox/papers/2021_demeter/spreadsheets` for an example. To map the strains in subsystems to strains to reconstruct, the column PubSeedID needs to contain the translation to the respective IDs in the PubSeed spreadsheets.

Moreover, appropriate reactions in VMH nomenclature need to be mapped to each functional role in the spreadsheet (see "Functional Role" tab on PubSeed). Functional roles need to be provided as columns and mapped to corresponding reactions through the file `cobratoolbox/papers/2021_demeter/input/InReactions.txt`.

If comparative genomics data is available for your organism(s), please place it in a folder and provide the path to the folder as the variable `spreadsheetFolder`. The comparative genomics data for the AGORA2 resource are available at the following path:

```
spreadsheetFolder = [CBTDIR filesep 'papers' filesep '2021_demeter' filesep  
'spreadsheets'];
```

Additionally, the PubSEED IDs for each strain to refine, as well as the annotation version, need to be added to the "PubSeedID" and "Annotation version ID" columns, respectively, in the taxonomic information file as shown in `example_infoFile.xlsx`.

To propagate available gram staining information, comparative genomics data, and experimental data to your organism(s), use the code

```
[infoFilePath,inputDataFolder] =  
prepareInputData(infoFilePath,'spreadsheetFolder',spreadsheetFolder);
```

Warning: Directory already exists.

```
i = 1  
i = 1  
i = 1  
i = 2  
i = 3  
i = 4
```

The variable `adaptedInfoFilePath` contains the path to the taxonomic information file adapted with gram staining information.

## 1.5. Manual gathering of experimental data as input data for DEMETER

In the folder `inputDataFolder`, you will find experimental data for your organism(s) retrieved and propagated from the already available data that had been collected for DEMETER. It is highly recommended that you manually inspect the propagated experimental data for your organism(s) at this point to verify it as organisms may differ

on the strain level. Moreover, it is recommended that you perform additional literature searches to inform the refinement of your organism(s). As you can see from inspection of the newly generated text files, for three of the four new strains used in this tutorial, experimental data could be propagated from already reconstructed strains of the same species. For the fourth strain, *Acetitomaculum ruminis* DSM 5522, no related strain is present in DEMETER. To find experimental data on this organism, we go to PubMed (<https://pubmed.ncbi.nlm.nih.gov/>) and enter "*Acetitomaculum ruminis*" as a search term. This yields a published reference describing the metabolism of this species: PubMed ID 2500921, <https://link.springer.com/article/10.1007/BF00416597>. The paper reports that *A. ruminis* generates acetate through the acetogen pathway and uses formate and glucose as carbon sources. By converting this data into a MATLAB-readable format, we can ensure the associated pathways are present in the refined reconstruction.

To incorporate this data into the files with experimental data, use the following code.

Read the file with carbon source information.

```
data=readInputTableForPipeline([inputDataFolder filesep  
'CarbonSourcesTable.txt']);
```

Add information that glucose is used as a carbon source.

```
findRow=find(strcmp(data(:,1),'Acetitomaculum_ruminis_DSM_5522'));  
findCol=find(strcmp(data(1,:), 'D-glucose'));  
data{findRow,findCol}='1';  
writetable(cell2table(data),[inputDataFolder filesep  
'CarbonSourcesTable'], 'FileType', 'text', 'WriteVariableNames', false, 'Delimiter'  
, 'tab');
```

Read the file with information on consumed metabolites.

```
data=readInputTableForPipeline([inputDataFolder filesep 'uptakeTable.txt']);
```

Add information that formate is consumed.

```
findRow=find(strcmp(data(:,1),'Acetitomaculum_ruminis_DSM_5522'));  
findCol=find(strcmp(data(1,:), 'Formate'));  
data{findRow,findCol}='1';  
writetable(cell2table(data),[inputDataFolder filesep  
'uptakeTable'], 'FileType', 'text', 'WriteVariableNames', false, 'Delimiter', 'tab'  
);
```

Read the file with fermentation product information.

```
data=readInputTableForPipeline([inputDataFolder filesep  
'FermentationTable.txt']);
```

Add information that the acetogen pathway is used.

```
findRow=find(strcmp(data(:,1),'Acetitomaculum_ruminis_DSM_5522'));  
findCol=find(strcmp(data(1,:), 'Acetogen pathway'));  
data{findRow,findCol}='1';
```

```
writetable(cell2table(data),[inputDataFolder filesep
'FermentationTable'], 'FileType', 'text', 'WriteVariableNames', false, 'Delimiter',
'tab');
```

Alternatively, you can inspect the files manually and edit as needed.

To check the experimental data available that will be used for refinement for each strain to reconstruct, run the function:

```
curationStatus = getCurationStatus(infoFilePath,inputDataFolder,false);
```

Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating variable names for the table. The original column headers are saved in the VariableDescriptions property.  
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.

2 indicates that experimental data is available to curate the reconstruction. 1 indicates that published literature is available but contains no usable data. 0 indicates no available experimental data.

## Step 2: Iterative refinement

### 2.1. Running the DEMETER pipeline

With the experimental and comparative genomic data in place, the pipeline can be run. This will result in a refined reconstruction for each strain in the draft reconstruction folder as a mat file and optionally as a SBML file. Moreover, a summary of refinement steps, such as addition and removal of reactions during gap-filling, will be provided. Steps that are automatically carried out during this step include # translation of KBase reaction and metabolite to Virtual Metabolic Human [5] (<https://www.vmh.life>) nomenclature, # expansion of the reconstruction by pathways supported by experimental data, # refinement of pathways and gene rules against comparative genomic data, and # quality control ensuring e.g., thermodynamic feasibility.

Define the number of workers for parallel computing.

```
numWorkers = 4;
```

Define a name for the reconstruction resource (optional)

```
reconVersion = 'TutorialExample';
```

Run the pipeline.

```
[reconVersion,refinedFolder,translatedDraftsFolder,summaryFolder] =
runDemeter(draftFolder, 'infoFilePath', infoFilePath, 'inputDataFolder',
inputDataFolder, 'numWorkers', numWorkers, 'reconVersion', reconVersion);
```

Starting parallel pool (parpool) using the 'local' profile ...  
Connected to the parallel pool (number of workers: 4).

```
ans =
```

```
Pool with properties:
```

```
Connected: true
```



```

    NumWorkers: 4
    Cluster: local
    AttachedFiles: {}
    AutoAddClientPath: true
    IdleTimeout: 30 minutes (30 minutes remaining)
    SpmdEnabled: true

```

Each `model.subSystems{x}` has been changed to a character array.

Warning: Reaction with the same name already exists in the model, updating the reaction

```

> In addReaction (line 129)
  In translateKBaseModel2VMHModel (line 145)
  In refinementPipeline (line 67)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
biol    41.257 h[c] + 0.00719528 thmpp[c] + 0.00719528 ribflv[c] + 0.00719528 nad[c] + 0.00719528 fe2[c] +

```

## Inspection of the output of the pipeline

Let us have a look at the results of the pipeline run. The refined reconstruction in mat format are located in the folder "RefinedReconstructions", and in SBML format in "RefinedReconstructions\_SBML". The folder "TranslatedDraftReconstructions" contains the draft reconstructions with exchange reactions translated (no other changes were made to this version). The folder "RefinementSummary" contains a detailed overview of the gap-filling and expansion performed for each refined reconstruction. If the files "untranslatedMets.txt" and "untranslatedRxns.txt", are present and contain any entries, it is recommended to translate these metabolites and/or reactions. Go to Part 2.3 for more details.

## 2.2. Testing the refined reconstructions

DEMETER includes a comprehensive test suite that was developed to ensure good quality and agreement with known metabolic traits of the reconstructed strains in AGORA2 [3].

To run the test suite, enter the code.

```

[testResultsFolder,curationReport] = runTestSuiteTools(refinedFolder,
infoFilePath, inputDataFolder, reconVersion, 'translatedDraftsFolder',
translatedDraftsFolder, 'numWorkers', numWorkers);

```

Warning: Directory already exists.

Each `model.subSystems{x}` is a character array, and this format is retained.

Each `model.subSystems{x}` is a character array, and this format is retained.

Each `model.subSystems{x}` is a character array, and this format is retained.

Each `model.subSystems{x}` is a character array, and this format is retained.

Model grows on unlimited media (aerobic), flux through BOF: 3.397560e+01 mmol/gDW/h

Model grows on unlimited media (aerobic), flux through BOF: 4.867244e+01 mmol/gDW/h

Model grows on unlimited media (aerobic), flux through BOF: 3.981277e+01 mmol/gDW/h

Model grows on unlimited media (aerobic), flux through BOF: 6.761999e+01 mmol/gDW/h

Warning: Model cannot grow on unlimited media (anaerobic)

```
> In testGrowth (line 72)
```

```
  In parallel_function>make_general_channel/channel_general (line 837)
```

```
  In remoteParallelFunction (line 46)
```

Warning: Reaction EX\_gal(e) not in model

```
> In changeRxnBounds (line 50)
```

```
  In useDiet (line 54)
```

```
  In testGrowth (line 84)
```

```
  In parallel_function>make_general_channel/channel_general (line 837)
```

```
  In remoteParallelFunction (line 46)
```

Warning: Reaction EX\_gal(e) not in model

```

> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fuc_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fuc_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glcN(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glcN(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rmn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rmn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_drib(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_drib(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)

```

```

    In remoteParallelFunction (line 46)
Warning: Reaction EX_rib_D(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rib_D(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_xyl_D(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_xyl_D(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_oxa(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_oxa(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lcts(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lcts(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_strchl(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_strchl(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_melib(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)

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In testGrowth (line 84)
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
Warning: Reaction EX_melib(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cellb(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cellb(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arachd(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arachd(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chsterol(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chsterol(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glyc(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glyc(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdca(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdca(e) not in model

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> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdcea(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdcea(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlc(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlc(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlnc(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlnc(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlncg(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlncg(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ocdcea(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ocdcea(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)

```

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    In remoteParallelFunction (line 46)
Warning: Reaction EX_octa(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_octa(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ttdca(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ttdca(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_l2dgr180(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_l2dgr180(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_26dap_M(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_26dap_M(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2dmmq8(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2dmmq8(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2obut(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)

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In testGrowth (line 84)
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
Warning: Reaction EX_2obut(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_3mop(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_3mop(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4abz(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4abz(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4hbz(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4hbz(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acald(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acald(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acmana(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acmana(e) not in model

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> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acnam(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acnam(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ade(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ade(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_adn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_adn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_akg(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_akg(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_amp(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_amp(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)

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    In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_D(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_D(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chol(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chol(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chor(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chor(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cit(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cit(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_csn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_csn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cytd(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)

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In testGrowth (line 84)
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
Warning: Reaction EX_cytd(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_dad_2(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_dad_2(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_dcyt(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_dcyt(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ddca(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ddca(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_dgsn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_dgsn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_etoh(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_etoh(e) not in model

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> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fald(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fald(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fe3dcit(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fe3dcit(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fum(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fum(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glu_D(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glu_D(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glyc3p(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glyc3p(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)

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    In remoteParallelFunction (line 46)
Warning: Reaction EX_gsn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gsn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gthox(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gthox(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gthrd(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gthrd(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gua(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gua(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_h2(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_h2(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_h2s(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)

```

```

In testGrowth (line 84)
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
Warning: Reaction EX_h2s(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hom_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hom_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_indole(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_indole(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ins(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ins(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lac_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lac_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lanost(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lanost(e) not in model

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> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_mal_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_mal_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_mqn7(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_mqn7(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_mqn8(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_mqn8(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ncam(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ncam(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_nmn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_nmn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)

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    In remoteParallelFunction (line 46)
Warning: Reaction EX_no2(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_no2(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_no3(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_no3(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_orn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_orn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_orot(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_orot(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_pime(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_pime(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_pydam(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)

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In testGrowth (line 84)
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
Warning: Reaction EX_pydam(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_pydx5p(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_pydx5p(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_pydxn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_pydxn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_q8(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_q8(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_sel(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_sel(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_sheme(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_sheme(e) not in model

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> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_succ(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_succ(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_thymd(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_thymd(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_urea(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_urea(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_uri(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_uri(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_duri(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_duri(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)

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    In remoteParallelFunction (line 46)
Warning: Reaction EX_meoh(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_meoh(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Model cannot grow on complex medium (aerobic)
> In testGrowth (line 96)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Model cannot grow on complex medium (anaerobic)
> In testGrowth (line 112)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Model cannot grow on unlimited media (anaerobic)
> In testGrowth (line 72)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gal(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gal(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fuc_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fuc_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glcN(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glcN(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rmn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)

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In testGrowth (line 84)
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
Warning: Reaction EX_rmn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_oxa(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_oxa(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lcts(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lcts(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_strchl(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_strchl(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_melib(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_melib(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arachd(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arachd(e) not in model

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> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chsterol(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chsterol(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glyc(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glyc(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdcea(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdcea(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlc(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlc(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlnc(a) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlnc(a) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)

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    In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlncg(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlncg(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ocdcea(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ocdcea(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_octa(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_octa(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_l2dgr180(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_l2dgr180(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_26dap_M(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_26dap_M(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2obut(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)

```

```

In testGrowth (line 84)
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
Warning: Reaction EX_2obut(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_3mop(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_3mop(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4abz(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4abz(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4hbz(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4hbz(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ac(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ac(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acald(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acald(e) not in model

```

```

> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acmana(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acmana(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acnam(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acnam(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ade(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ade(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_adn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_adn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ala_D(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ala_D(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)

```

```

    In remoteParallelFunction (line 46)
Warning: Reaction EX_amp(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_amp(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_D(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_D(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chor(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chor(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cytd(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cytd(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_dad_2(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_dad_2(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_dcyt(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)

```



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In testGrowth (line 84)
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
Warning: Reaction EX_dcyt(e) not in model
> In changeRxnBounds (line 59)
In useDiet (line 54)
In testGrowth (line 84)
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
Warning: Model cannot grow on unlimited media (anaerobic)
> In testGrowth (line 72)
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
Warning: Reaction EX_gal(e) not in model
> In changeRxnBounds (line 50)
In useDiet (line 54)
In testGrowth (line 84)
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
Warning: Reaction EX_gal(e) not in model
> In changeRxnBounds (line 59)
In useDiet (line 54)
In testGrowth (line 84)
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
Warning: Reaction EX_fuc_L(e) not in model
> In changeRxnBounds (line 50)
In useDiet (line 54)
In testGrowth (line 84)
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
Warning: Reaction EX_fuc_L(e) not in model
> In changeRxnBounds (line 59)
In useDiet (line 54)
In testGrowth (line 84)
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
Warning: Reaction EX_glcN(e) not in model
> In changeRxnBounds (line 50)
In useDiet (line 54)
In testGrowth (line 84)
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
Warning: Reaction EX_glcN(e) not in model
> In changeRxnBounds (line 59)
In useDiet (line 54)
In testGrowth (line 84)
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
Warning: Reaction EX_rmn(e) not in model
> In changeRxnBounds ...
obj =
  Violin with properties:

    ScatterPlot: [1x1 Scatter]
    ViolinPlot: []
    BoxPlot: []
    WhiskerPlot: []
    MedianPlot: []
    NotchPlots: []
    MeanPlot: [1x1 Line]
    ShowNotches: 1
    ShowMean: 1
obj =

```

```

Violin with properties:

ScatterPlot: [1x1 Scatter]
ViolinPlot: []
    BoxPlot: []
WhiskerPlot: []
MedianPlot: []
NotchPlots: []
    MeanPlot: [1x1 Line]
ShowNotches: 1
    ShowMean: 1
obj =
Violin with properties:

ScatterPlot: [1x1 Scatter]
ViolinPlot: []
    BoxPlot: []
WhiskerPlot: []
MedianPlot: []
NotchPlots: []
    MeanPlot: [1x1 Line]
ShowNotches: 1
    ShowMean: 1
obj =
Violin with properties:

ScatterPlot: [1x1 Scatter]
ViolinPlot: []
    BoxPlot: []
WhiskerPlot: []
MedianPlot: []
NotchPlots: []
    MeanPlot: [1x1 Line]
ShowNotches: 1
    ShowMean: 1
obj =
Violin with properties:

ScatterPlot: [1x1 Scatter]
ViolinPlot: []
    BoxPlot: []
WhiskerPlot: []
MedianPlot: []
NotchPlots: []
    MeanPlot: [1x1 Line]
ShowNotches: 1
    ShowMean: 1
obj =
Violin with properties:

ScatterPlot: [1x1 Scatter]
ViolinPlot: []
    BoxPlot: []
WhiskerPlot: []
MedianPlot: []
NotchPlots: []
    MeanPlot: [1x1 Line]
ShowNotches: 1
    ShowMean: 1
obj =
Violin with properties:

ScatterPlot: [1x1 Scatter]
ViolinPlot: []

```

```

    BoxPlot: []
    WhiskerPlot: []
    MedianPlot: []
    NotchPlots: []
    MeanPlot: [1x1 Line]
    ShowNotches: 1
    ShowMean: 1
obj =
Violin with properties:

    ScatterPlot: [1x1 Scatter]
    ViolinPlot: []
    BoxPlot: []
    WhiskerPlot: []
    MedianPlot: []
    NotchPlots: []
    MeanPlot: [1x1 Line]
    ShowNotches: 1
    ShowMean: 1
Report for draft models:
All models are able to produce biomass on rich medium.
10 models are unable to produce biomass on rich medium under anaerobic conditions.
7 models are unable to produce biomass on complex medium.
10 models are unable to produce biomass on complex medium under anaerobic conditions.
Report for refined models:
All models are able to produce biomass on rich medium.
All models are able to produce biomass on rich medium under anaerobic conditions.
All models are able to produce biomass on complex medium.
Warning: Directory already exists.
Each model.subSystems{x} is a character array, and this format is retained.
Testing flux through the ATP demand reaction
Warning: Reaction EX_gal(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gal(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fuc_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fuc_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glcN(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glcN(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)

```

```

In testATP (line 30)
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
Warning: Reaction EX_rmn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rmn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_drib(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_drib(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rib_D(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rib_D(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_xyl_D(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_xyl_D(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_oxa(e) not in model

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> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_oxa(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lcts(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lcts(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_strchl(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_strchl(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_melib(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_melib(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cellb(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cellb(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arachd(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)

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    In remoteParallelFunction (line 46)
Warning: Reaction EX_arachd(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chsterol(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chsterol(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glyc(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glyc(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdca(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdca(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdcea(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdcea(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlc(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlc(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)

```

```

In testATP (line 30)
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlnc(a) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlnc(a) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlncg(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlncg(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ocdcea(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ocdcea(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_octa(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_octa(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ttdca(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ttdca(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_l2dgr180(e) not in model

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> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr180(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_26dap_M(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_26dap_M(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2dmmq8(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2dmmq8(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2obut(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2obut(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_3mop(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_3mop(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4abz(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)

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    In remoteParallelFunction (line 46)
Warning: Reaction EX_4abz(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4hbz(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4hbz(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acald(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acald(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acmana(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acmana(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acnam(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acnam(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ade(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ade(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)

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In testATP (line 30)
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
Warning: Reaction EX_adn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_adn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_akg(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_akg(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_amp(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_amp(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_D(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_D(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chol(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chol(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chor(e) not in model

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> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chor(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cit(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cit(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_csn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_csn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cytd(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cytd(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_dad_2(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_dad_2(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_dcyt(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)

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    In remoteParallelFunction (line 46)
Warning: Reaction EX_dcyt(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ddca(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ddca(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_dgsn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_dgsn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_etoh(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_etoh(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fald(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fald(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fe3dcit(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fe3dcit(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)

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In testATP (line 30)
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
Warning: Reaction EX_fum(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fum(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glu_D(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glu_D(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glyc3p(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glyc3p(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gsn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gsn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gthox(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gthox(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gthrd(e) not in model

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> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gthrd(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gua(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gua(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_h2(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_h2(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_h2s(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_h2s(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hom_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hom_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_indole(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)

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    In remoteParallelFunction (line 46)
Warning: Reaction EX_indole(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ins(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ins(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lac_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lac_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lanost(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lanost(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_mal_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_mal_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_mqn7(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_mqn7(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)

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In testATP (line 30)
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
Warning: Reaction EX_mqn8(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_mqn8(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ncam(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ncam(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_nmn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_nmn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_no2(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_no2(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_no3(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_no3(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_orn(e) not in model

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> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_orn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_orot(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_orot(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_pime(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_pime(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_pydam(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_pydam(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_pydx5p(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_pydx5p(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_pydxn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)

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    In remoteParallelFunction (line 46)
Warning: Reaction EX_pydxn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_q8(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_q8(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_sel(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_sel(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_sheme(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_sheme(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_succ(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_succ(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_thymd(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_thymd(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)

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In testATP (line 30)
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
Warning: Reaction EX_urea(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_urea(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_uri(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_uri(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_duri(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_duri(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_meoh(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_meoh(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Aerobic ATP flux on complex medium: 61 mmol/gDW/h
Anaerobic ATP flux on complex medium: 1.560000e+01 mmol/gDW/h
Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
Testing flux through the ATP demand reaction
Warning: Reaction EX_gal(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gal(e) not in model
> In changeRxnBounds (line 59)

```

```

In useDiet (line 54)
In testATP (line 30)
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
Warning: Reaction EX_fuc_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fuc_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glcN(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glcN(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rmn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rmn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_drib(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_drib(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)

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```

Warning: Reaction EX_rib_D(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rib_D(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_xyl_D(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_xyl_D(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_oxa(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_oxa(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lcts(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lcts(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_strchl(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_strchl(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_melib(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)

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```

    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_melib(e) not in model
> In changeRxnBounds (line 59)
    In useDiet (line 54)
    In testATP (line 30)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_cellb(e) not in model
> In changeRxnBounds (line 50)
    In useDiet (line 54)
    In testATP (line 30)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_cellb(e) not in model
> In changeRxnBounds (line 59)
    In useDiet (line 54)
    In testATP (line 30)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_arachd(e) not in model
> In changeRxnBounds (line 50)
    In useDiet (line 54)
    In testATP (line 30)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_arachd(e) not in model
> In changeRxnBounds (line 59)
    In useDiet (line 54)
    In testATP (line 30)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_chsterol(e) not in model
> In changeRxnBounds (line 50)
    In useDiet (line 54)
    In testATP (line 30)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_chsterol(e) not in model
> In changeRxnBounds (line 59)
    In useDiet (line 54)
    In testATP (line 30)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_glyc(e) not in model
> In changeRxnBounds (line 50)
    In useDiet (line 54)
    In testATP (line 30)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_glyc(e) not in model
> In changeRxnBounds (line 59)
    In useDiet (line 54)
    In testATP (line 30)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_hdcea(e) not in model
> In changeRxnBounds (line 50)
    In useDiet (line 54)
    In testATP (line 30)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_hdcea(e) not in model
> In changeRxnBounds (line 59)

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In useDiet (line 54)
In testATP (line 30)
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlc(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlc(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlnc(a) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlnc(a) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlncg(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlncg(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ocdcea(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ocdcea(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_octa(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_octa(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)

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Warning: Reaction EX_12dgr180(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr180(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_26dap_M(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_26dap_M(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2dmmq8(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2dmmq8(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2obut(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2obut(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_3mop(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_3mop(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4abz(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)

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    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_4abz(e) not in model
> In changeRxnBounds (line 59)
    In useDiet (line 54)
    In testATP (line 30)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_ac(e) not in model
> In changeRxnBounds (line 50)
    In useDiet (line 54)
    In testATP (line 30)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_ac(e) not in model
> In changeRxnBounds (line 59)
    In useDiet (line 54)
    In testATP (line 30)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_acald(e) not in model
> In changeRxnBounds (line 50)
    In useDiet (line 54)
    In testATP (line 30)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_acald(e) not in model
> In changeRxnBounds (line 59)
    In useDiet (line 54)
    In testATP (line 30)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_acmana(e) not in model
> In changeRxnBounds (line 50)
    In useDiet (line 54)
    In testATP (line 30)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_acmana(e) not in model
> In changeRxnBounds (line 59)
    In useDiet (line 54)
    In testATP (line 30)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_acnam(e) not in model
> In changeRxnBounds (line 50)
    In useDiet (line 54)
    In testATP (line 30)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_acnam(e) not in model
> In changeRxnBounds (line 59)
    In useDiet (line 54)
    In testATP (line 30)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_ade(e) not in model
> In changeRxnBounds (line 50)
    In useDiet (line 54)
    In testATP (line 30)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_ade(e) not in model
> In changeRxnBounds (line 59)

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In useDiet (line 54)
In testATP (line 30)
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
Warning: Reaction EX_adn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_adn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_amp(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_amp(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_D(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_D(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
Testing flux through the ATP demand reaction
Warning: Reaction EX_gal(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gal(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fuc_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fuc_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)

```

```

In testATP (line 30)
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
Warning: Reaction EX_glcN(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glcN(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rmn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rmn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_oxa(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_oxa(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lcts(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lcts(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_strchl(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_strchl(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 83...
obj =

```

```

Violin with properties:

    ScatterPlot: [1x1 Scatter]
    ViolinPlot: []
    BoxPlot: []
    WhiskerPlot: []
    MedianPlot: []
    NotchPlots: []
    MeanPlot: [1x1 Line]
    ShowNotches: 1
    ShowMean: 1
obj =
Violin with properties:

    ScatterPlot: [1x1 Scatter]
    ViolinPlot: []
    BoxPlot: []
    WhiskerPlot: []
    MedianPlot: []
    NotchPlots: []
    MeanPlot: [1x1 Line]
    ShowNotches: 1
    ShowMean: 1
obj =
Violin with properties:

    ScatterPlot: [1x1 Scatter]
    ViolinPlot: []
    BoxPlot: []
    WhiskerPlot: []
    MedianPlot: []
    NotchPlots: []
    MeanPlot: [1x1 Line]
    ShowNotches: 1
    ShowMean: 1
obj =
Violin with properties:

    ScatterPlot: [1x1 Scatter]
    ViolinPlot: []
    BoxPlot: []
    WhiskerPlot: []
    MedianPlot: []
    NotchPlots: []
    MeanPlot: [1x1 Line]
    ShowNotches: 1
    ShowMean: 1
Report for draft models:
3 models produce too much ATP under aerobic conditions.
3 models produce too much ATP under anaerobic conditions.
Report for refined models:
All models produce reasonable amounts of ATP under aerobic conditions.
All models produce reasonable amounts of ATP under anaerobic conditions.

> changeCobraSolver: Gurobi interface added to MATLAB path.

> changeCobraSolver: Gurobi interface added to MATLAB path.

> changeCobraSolver: Gurobi interface added to MATLAB path.

> changeCobraSolver: Gurobi interface added to MATLAB path.
obj =
Violin with properties:

```

```

    ScatterPlot: [1x1 Scatter]
    ViolinPlot: []
    BoxPlot: []
    WhiskerPlot: []
    MedianPlot: []
    NotchPlots: []
    MeanPlot: [1x1 Line]
    ShowNotches: 1
    ShowMean: 1
obj =
    Violin with properties:

    ScatterPlot: [1x1 Scatter]
    ViolinPlot: []
    BoxPlot: []
    WhiskerPlot: []
    MedianPlot: []
    NotchPlots: []
    MeanPlot: [1x1 Line]
    ShowNotches: 1
    ShowMean: 1
obj =
    Violin with properties:

    ScatterPlot: [1x1 Scatter]
    ViolinPlot: []
    BoxPlot: []
    WhiskerPlot: []
    MedianPlot: []
    NotchPlots: []
    MeanPlot: [1x1 Line]
    ShowNotches: 1
    ShowMean: 1
obj =
    Violin with properties:

    ScatterPlot: [1x1 Scatter]
    ViolinPlot: []
    BoxPlot: []
    WhiskerPlot: []
    MedianPlot: []
    NotchPlots: []
    MeanPlot: [1x1 Line]
    ShowNotches: 1
    ShowMean: 1
Finished refinement and testing of the project TutorialExample.
10 draft reconstructions have been refined.
Growth requirements were refined for 6 reconstructions.
83.33 % of reconstructions agree with all known media.

```

## Biomass production

Test and plot whether all reconstructions can produce reasonable amounts of biomass on the Western diet and on "rich" medium (consisting of every metabolite the model can consume) aerobically and anaerobically.

You can see that for the examples, all refined reconstructions produce biomass under anaerobic conditions and on Western diet while no draft reconstruction can grow anaerobically. If the refined reconstructions for your own organisms are unable to produce biomass under any conditions, proceed to Step 2.3 of the pipeline.

## ATP production

% Test and plot whether all reconstructions produce reasonable amounts of ATP on the Western diet aerobically and anaerobically.

You can see that for the examples, all refined reconstructions produce realistic amounts of ATP on Western diet while the draft reconstructions produce near unlimited amounts of ATP. If the refined reconstructions for your own organisms produce too much ATP, proceed to Step 2.3 of the pipeline below.

## QC/QA and test against available experimental and comparative genomic data

The variable `curationReport` contains a summary of the results of performed quality control and quality assurance tests.

The folder "TestResults" contains information on tests against the available experimental data that passed or failed the test suite. Carefully inspect these results. If there are any false negative predictions for your organism(s), proceed to Step 2.3 of the pipeline below.

To view the results for the tutorial example, run the following code.

### Sensitivity of reconstructions for capturing the experimental data

```
testResults1 = readtable([testResultsFolder filesep reconVersion '_refined'
filesep 'TutorialExample_Properties.xls'], 'ReadVariableNames', false);
testResults1 = table2cell(testResults1);
```

### Fraction of refined reconstructions that agree with all experimental data

```
testResults2 = readtable([testResultsFolder filesep reconVersion '_refined'
filesep 'TutorialExample_PercentagesAgreement.xls'], 'ReadVariableNames',
false);
testResults2 = table2cell(testResults2);
```

The test suite also reports any cases of leaking metabolites, mass- and charge-imbalanced reactions, incorrectly formulated gene rules. Inspect these cases. Note that some mass- and charge-imbalanced reactions currently cannot be corrected.

## 2.3. Debugging the refined reconstructions

### 2.3.1. Translation from KBase to VMH nomenclature

For the tutorial example, all metabolites and reactions have been translated. For your own reconstructions, check the files "untranslatedMets.txt" and "untranslatedRxns.txt", if present, for any KBase metabolites and reactions that are not yet translated to VMH nomenclature. This requires the reconstruction tool rBioNet [6]. To prepare the use of rBioNet, run the function

```
createRBioNetDBFromVMHDB
```

## Translating metabolites

If the files 'untranslatedMets.txt' contains metabolites, run the code

```
if isfile([summaryFolder filesep 'untranslatedMets.txt'])
[translatedMets]=translateKBaseToVMHMets('untranslatedMets.txt');
end
```

Carefully inspect the output 'translatedMets.txt'. If you are satisfied with the translation, add the KBase IDs with the corresponding VMH IDs to the file `cobratoolbox/papers/2021_demeter/input/MetaboliteTranslationTable.txt`.

Metabolites that could not be translated this way will need to be inspected manually. Try finding them in the VMH database by consulting KEGG (<https://www.genome.jp/kegg>) [7] or HMDB (<https://hmdb.ca>) [8] IDs. For metabolites that are not yet present in the VMH database, formulate a metabolite ID following the standards of the field as described in Thiele and Palsson [9]. Afterwards, add the new metabolites to the file `cobratoolbox/papers/2021_demeter/input/MetaboliteDatabase.txt` while ensuring that the format of the file is kept. Also add the KBase to VMH metabolite translation to the file `cobratoolbox/papers/2021_demeter/input/MetaboliteTranslationTable.txt`.

## Translating reactions

If the files 'untranslatedRxns.txt' contains reactions, run the code

```
if isfile([summaryFolder filesep 'untranslatedRxns.txt'])
[translatedRxns]=propagateKBaseMetTranslationToRxns('untranslatedRxns.txt');
end
```

When translated from KBase to VMH nomenclature, some reactions will afterwards be mass-and charge-imbalanced. Especially the proton in the reaction will need to be adjusted. To test if any translated reactions are now unbalanced, use the reconstruction tool `rBioNet` [6].

Afterwards, run the command

*ReconstructionTool*

This opens an interface. Choose File -> Add Text File -> With Reactions -> Load text file.

Choose the text file `translatedRxns.txt` that was just generated. When it says "Metabolites not in Database", choose Yes. When it says "Unbalanced reactions", carefully inspect every reaction with unbalance charge or atoms. Adjust the formulas in the file `translatedRxns.txt` accordingly and save the file afterwards. Note that some mass- and charge-imbalanced reactions currently cannot be corrected.

Now we will check if the mass-and charge-balanced but untranslated reactions are already present in the VMH database but not yet translated. To check which of the translated reactions are already present in the VMH reaction database, run the function

```
if isfile('translatedRxns.txt')
[sameReactions,similarReactions] =
mapKBaseToVMHReactions('translatedRxns.txt');
end
```

After verifying the content of the output variable `sameReactions`, add the KBase reaction IDs with the corresponding VMH reaction IDs to the file `cobratoolbox/papers/2021_demeter/input/ReactionTranslationTable.txt`

Note that multiple KBase reactions may translate to the same VMH reaction. Now inspect the content of the output variable `similarReactions`. Typically, this will contain reactions that are reversible in KBase but irreversible in VMH. It is optional but recommended that you also add these reactions to `ReactionTranslationTable.txt`.

For reactions that are not yet present in the VMH database, formulate a reaction ID following the standards of the field as described in Thiele and Palsson [9]. Import the reactions in ReconstructionTool as described above to ensure they are mass-and charge-balanced. Afterwards, add the new reactions to the file `cobratoolbox/papers/2021_demeter/input/ReactionDatabase.txt`

while ensuring that the format of the file is kept. Also assign subsystems to the reactions following the existing nomenclature in the database. Also add the KBase to VMH reaction translation to `cobratoolbox/papers/2021_demeter/input/ReactionTranslationTable.txt`.

## 2.3.2 Debugging the reconstructions

After performing the data-driven refinement, there may still be reconstructions that cannot grow anaerobically and/or on Western diet, produce unrealistic amounts of ATP on Western diet, or do not agree with experimental data. Since DEMETER was built on the principle of inspecting patterns of reactions across many reconstructions, there may still be reconstructions (especially of non-gut organisms) with previously unobserved patterns that are not yet caught by the gap-filling functions in DEMETER.

To inspect and attempt to correct these reconstructions, a suite of debugging tools is available. The suite will gap-fill the reconstructions that fail tests and re-test them afterwards.

To run the debugging suite, enter the code

```
[debuggingReport, fixedModels,
failedModels]=runDebuggingTools(refinedFolder,testResultsFolder,inputDataFolder,infoFilePath,reconVersion,'numWorkers',numWorkers);
```

```
Starting parallel pool (parpool) using the 'local' profile ...
Connected to the parallel pool (number of workers: 4).
```

```
ans =
```

```
Pool with properties:
```

```
    Connected: true
    NumWorkers: 4
    Cluster: local
    AttachedFiles: {}
    AutoAddClientPath: true
    IdleTimeout: 30 minutes (30 minutes remaining)
    SpmdEnabled: true
```

```
Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
```



```

Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
biol      0.0071953 10fthf[c] + 0.0071953 2dmmq8[c] + 0.0071953 5mthf[c] + 0.0071953 ACP[c] + 0.0018061 PGP[
Warning: Directory already exists.
Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
Model grows on unlimited media (aerobic), flux through BOF: 3.705852e+01 mmol/gDW/h
Model grows on unlimited media (anaerobic), flux through BOF: 3.705852e+01 mmol/gDW/h
Warning: Reaction EX_gal(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gal(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fuc_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fuc_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glcN(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glcN(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rmn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rmn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)

```

```

    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_L(e) not in model
> In changeRxnBounds (line 59)
    In useDiet (line 54)
    In testGrowth (line 84)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_drib(e) not in model
> In changeRxnBounds (line 50)
    In useDiet (line 54)
    In testGrowth (line 84)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_drib(e) not in model
> In changeRxnBounds (line 59)
    In useDiet (line 54)
    In testGrowth (line 84)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_rib_D(e) not in model
> In changeRxnBounds (line 50)
    In useDiet (line 54)
    In testGrowth (line 84)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_rib_D(e) not in model
> In changeRxnBounds (line 59)
    In useDiet (line 54)
    In testGrowth (line 84)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_xyl_D(e) not in model
> In changeRxnBounds (line 50)
    In useDiet (line 54)
    In testGrowth (line 84)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_xyl_D(e) not in model
> In changeRxnBounds (line 59)
    In useDiet (line 54)
    In testGrowth (line 84)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_oxa(e) not in model
> In changeRxnBounds (line 50)
    In useDiet (line 54)
    In testGrowth (line 84)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_oxa(e) not in model
> In changeRxnBounds (line 59)
    In useDiet (line 54)
    In testGrowth (line 84)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_lcts(e) not in model
> In changeRxnBounds (line 50)
    In useDiet (line 54)
    In testGrowth (line 84)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_lcts(e) not in model
> In changeRxnBounds (line 59)

```

```

In useDiet (line 54)
In testGrowth (line 84)
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
Warning: Reaction EX_strchl(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_strchl(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_melib(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_melib(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cellb(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cellb(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arachd(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arachd(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chsterol(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chsterol(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)

```

```

Warning: Reaction EX_glyc(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glyc(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdca(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdca(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdcea(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdcea(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlc(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlc(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlnc(a) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlnc(a) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlncg(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)

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    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlncg(e) not in model
> In changeRxnBounds (line 59)
    In useDiet (line 54)
    In testGrowth (line 84)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_ocdcea(e) not in model
> In changeRxnBounds (line 50)
    In useDiet (line 54)
    In testGrowth (line 84)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_ocdcea(e) not in model
> In changeRxnBounds (line 59)
    In useDiet (line 54)
    In testGrowth (line 84)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_octa(e) not in model
> In changeRxnBounds (line 50)
    In useDiet (line 54)
    In testGrowth (line 84)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_octa(e) not in model
> In changeRxnBounds (line 59)
    In useDiet (line 54)
    In testGrowth (line 84)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_ttdca(e) not in model
> In changeRxnBounds (line 50)
    In useDiet (line 54)
    In testGrowth (line 84)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_ttdca(e) not in model
> In changeRxnBounds (line 59)
    In useDiet (line 54)
    In testGrowth (line 84)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_cys_L(e) not in model
> In changeRxnBounds (line 50)
    In useDiet (line 54)
    In testGrowth (line 84)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_cys_L(e) not in model
> In changeRxnBounds (line 59)
    In useDiet (line 54)
    In testGrowth (line 84)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_ser_L(e) not in model
> In changeRxnBounds (line 50)
    In useDiet (line 54)
    In testGrowth (line 84)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_ser_L(e) not in model
> In changeRxnBounds (line 59)

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In useDiet (line 54)
In testGrowth (line 84)
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
Warning: Reaction EX_arg_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arg_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lys_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lys_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_asn_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_asn_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_asp_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_asp_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_thr_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_thr_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)

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Warning: Reaction EX_glu_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glu_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_tyr_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_tyr_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gly(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gly(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_l2dgr180(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_l2dgr180(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_26dap_M(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_26dap_M(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2dmmq8(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)

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In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
Warning: Reaction EX_2dmmq8(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2obut(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2obut(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_3mop(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_3mop(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4abz(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4abz(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4hbz(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4hbz(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acald(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acald(e) not in model
> In changeRxnBounds (line 59)

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In useDiet (line 54)
In testGrowth (line 84)
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
Warning: Reaction EX_acmana(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acmana(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acnam(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acnam(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ade(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ade(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_adn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_adn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_akg(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_akg(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)

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Warning: Reaction EX_amet(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_amet(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_amp(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_amp(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_D(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_D(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chol(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chol(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chor(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chor(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cit(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)

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    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_cit(e) not in model
> In changeRxnBounds (line 59)
    In useDiet (line 54)
    In testGrowth (line 84)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_csn(e) not in model
> In changeRxnBounds (line 50)
    In useDiet (line 54)
    In testGrowth (line 84)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_csn(e) not in model
> In changeRxnBounds (line 59)
    In useDiet (line 54)
    In testGrowth (line 84)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_cytd(e) not in model
> In changeRxnBounds (line 50)
    In useDiet (line 54)
    In testGrowth (line 84)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_cytd(e) not in model
> In changeRxnBounds (line 59)
    In useDiet (line 54)
    In testGrowth (line 84)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_dad_2(e) not in model
> In changeRxnBounds (line 50)
    In useDiet (line 54)
    In testGrowth (line 84)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_dad_2(e) not in model
> In changeRxnBounds (line 59)
    In useDiet (line 54)
    In testGrowth (line 84)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_dcyt(e) not in model
> In changeRxnBounds (line 50)
    In useDiet (line 54)
    In testGrowth (line 84)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_dcyt(e) not in model
> In changeRxnBounds (line 59)
    In useDiet (line 54)
    In testGrowth (line 84)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_ddca(e) not in model
> In changeRxnBounds (line 50)
    In useDiet (line 54)
    In testGrowth (line 84)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_ddca(e) not in model
> In changeRxnBounds (line 59)

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In useDiet (line 54)
In testGrowth (line 84)
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
Warning: Reaction EX_dgsn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_dgsn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_etoh(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_etoh(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fald(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fald(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fe3dcit(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fe3dcit(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fum(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fum(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)

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Warning: Reaction EX_glu_D(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glu_D(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glyc3p(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glyc3p(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gsn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gsn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gthox(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gthox(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gthrd(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gthrd(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gua(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)

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In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
Warning: Reaction EX_gua(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_h2s(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_h2s(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hom_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hom_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_indole(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Model grows on unlimited media (aerobic), flux through BOF: 6.068227e+01 mmol/gDW/h
Model grows on unlimited media (aerobic), flux through BOF: 6.429268e+01 mmol/gDW/h
Model grows on unlimited media (anaerobic), flux through BOF: 6.429268e+01 mmol/gDW/h
Warning: Reaction EX_gal(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gal(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fuc_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fuc_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)

```

```

    In remoteParallelFunction (line 46)
Warning: Reaction EX_glcN(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glcN(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rmn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rmn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_drib(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_drib(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rib_D(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rib_D(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_xyl_D(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_xyl_D(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lcts(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)

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In testGrowth (line 84)
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
Warning: Reaction EX_lcts(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_strchl(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_strchl(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_melib(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_melib(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cellb(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cellb(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arachd(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arachd(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chsterol(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chsterol(e) not in model

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> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glyc(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glyc(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdcea(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdcea(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlc(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlc(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlnc(a) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlnc(a) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlncg(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlncg(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)

```

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    In remoteParallelFunction (line 46)
Warning: Reaction EX_ocdcea(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ocdcea(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_octa(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_octa(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cys_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cys_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_thr_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_thr_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gln_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gln_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_l2dgr180(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)

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In testGrowth (line 84)
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr180(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_26dap_M(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_26dap_M(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2dmmq8(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2dmmq8(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2obut(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2obut(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_3mop(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_3mop(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4abz(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4abz(e) not in model

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> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acmana(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acmana(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acnam(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acnam(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_adn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_adn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_amet(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_amet(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_amp(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_amp(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)

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    In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_D(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_D(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chor(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chor(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Model grows on unlimited media (aerobic), flux through BOF: 5.042479e+01 mmol/gDW/h
Model grows on unlimited media (anaerobic), flux through BOF: 5.040614e+01 mmol/gDW/h
Warning: Reaction EX_gal(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gal(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fuc_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fuc_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glcN(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glcN(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rmn(e) not in model

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> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rmn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_xyl_D(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_xyl_D(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lcts(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lcts(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_strchl(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_strchl(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_melib(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)

```

```

    In remoteParallelFunction (line 46)
Warning: Reaction EX_melib(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arachd(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arachd(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chsterol(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chsterol(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdca(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdca(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdcea(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdcea(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlc(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlc(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)

```

```

In testGrowth (line 84)
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlnc(a) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlnc(a) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlnc(g) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlnc(g) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ocdca(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ocdca(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ocdcea(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ocdcea(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_octa(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_octa(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ttdca(e) not in model

```



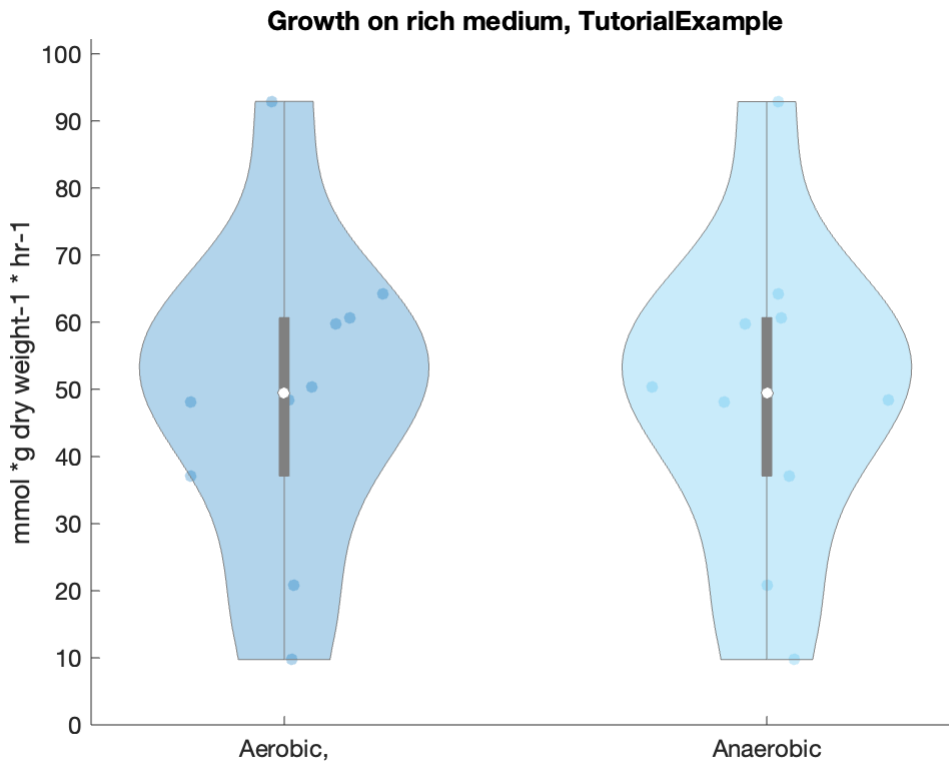
```

> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ttdca(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)...
obj =
  Violin with properties:

    ScatterPlot: [1x1 Scatter]
    ViolinPlot: []
      BoxPlot: []
    WhiskerPlot: []
    MedianPlot: []
    NotchPlots: []
      MeanPlot: [1x1 Line]
    ShowNotches: 1
    ShowMean: 1
obj =
  Violin with properties:

    ScatterPlot: [1x1 Scatter]
    ViolinPlot: []
      BoxPlot: []
    WhiskerPlot: []
    MedianPlot: []
    NotchPlots: []
      MeanPlot: [1x1 Line]
    ShowNotches: 1
    ShowMean: 1

```



```
obj =
  Violin with properties:

    ScatterPlot: [1x1 Scatter]
    ViolinPlot: []
    BoxPlot: []
    WhiskerPlot: []
    MedianPlot: []
    NotchPlots: []
    MeanPlot: [1x1 Line]
    ShowNotches: 1
    ShowMean: 1
```

```
obj =
  Violin with properties:

    ScatterPlot: [1x1 Scatter]
    ViolinPlot: []
    BoxPlot: []
    WhiskerPlot: []
    MedianPlot: []
    NotchPlots: []
    MeanPlot: [1x1 Line]
    ShowNotches: 1
    ShowMean: 1
```

Report for refined models:

All models are able to produce biomass on rich medium.

All models are able to produce biomass on rich medium under anaerobic conditions.

All models are able to produce biomass on complex medium.

Warning: Directory already exists.

Each model.subSystems{x} is a character array, and this format is retained.

Testing flux through the ATP demand reaction

Warning: Reaction EX\_gal(e) not in model

> In changeRxnBounds (line 50)

In useDiet (line 54)

```

In testATP (line 30)
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
Warning: Reaction EX_gal(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fuc_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fuc_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glcN(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glcN(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rmn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rmn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_drib(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_drib(e) not in model

```

```

> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rib_D(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rib_D(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_xyl_D(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_xyl_D(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_oxa(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_oxa(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lcts(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lcts(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_strchl(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_strchl(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)

```

```

    In remoteParallelFunction (line 46)
Warning: Reaction EX_melib(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_melib(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cellb(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cellb(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arachd(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arachd(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chsterol(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chsterol(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glyc(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glyc(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdca(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)

```

```

In testATP (line 30)
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
Warning: Reaction EX_hdca(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdcea(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdcea(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlc(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlc(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlnc(a) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlnc(a) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlncg(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlncg(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ocdcea(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ocdcea(e) not in model

```

```

> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_octa(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_octa(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ttdca(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ttdca(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cys_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cys_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ser_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ser_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arg_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arg_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)

```

```

    In remoteParallelFunction (line 46)
Warning: Reaction EX_lys_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lys_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_asn_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_asn_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_asp_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_asp_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_thr_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_thr_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glu_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glu_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_tyr_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)

```



```

In testATP (line 30)
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
Warning: Reaction EX_tyr_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gly(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gly(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_l2dgr180(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_l2dgr180(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_26dap_M(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_26dap_M(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2dmmq8(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2dmmq8(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2obut(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2obut(e) not in model

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```

> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_3mop(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_3mop(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4abz(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4abz(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4hbz(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4hbz(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acald(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acald(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acmana(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acmana(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)

```

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    In remoteParallelFunction (line 46)
Warning: Reaction EX_acnam(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acnam(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ade(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ade(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_adn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_adn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_akg(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_akg(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_amet(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_amet(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_amp(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)

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In testATP (line 30)
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
Warning: Reaction EX_amp(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_D(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_D(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chol(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chol(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chor(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chor(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cit(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cit(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_csn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_csn(e) not in model

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```

> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cytd(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cytd(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_dad_2(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_dad_2(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_dcyt(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_dcyt(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ddca(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ddca(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_dgsn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_dgsn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)

```

```

    In remoteParallelFunction (line 46)
Warning: Reaction EX_etoH(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_etoH(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fald(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fald(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fe3dcit(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fe3dcit(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fum(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fum(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glu_D(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glu_D(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glyc3p(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)

```

```

In testATP (line 30)
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
Warning: Reaction EX_glyc3p(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gsn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gsn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gthox(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gthox(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gthrd(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gthrd(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gua(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gua(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_h2s(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_h2s(e) not in model

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> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hom_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hom_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_indole(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_indole(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
Warning: Reaction EX_ins(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ins(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lac_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lac_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lanost(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lanost(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)

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In testATP (line 30)
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
Warning: Reaction EX_mal_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_mal_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_mqn7(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_mqn7(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_mqn8(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_mqn8(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_nac(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_nac(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ncam(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ncam(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_nmn(e) not in model

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> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_nmn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_no2(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_no2(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_no3(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_no3(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_orn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_orn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_orot(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_orot(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_pime(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)

```

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    In remoteParallelFunction (line 46)
Warning: Reaction EX_pime(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_pydam(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_pydam(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_pydx(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_pydx(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_pydx5p(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_pydx5p(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_pydxn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_pydxn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_sel(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_sel(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)

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In testATP (line 30)
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
Warning: Reaction EX_thymd(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_thymd(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_urea(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_urea(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_uri(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_uri(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_duri(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_duri(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_meoh(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_meoh(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Aerobic ATP flux on complex medium: 4.437500e+01 mmol/gDW/h

```

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Anaerobic ATP flux on complex medium: 1.650000e+01 mmol/gDW/h
Testing flux through the ATP demand reaction
Warning: Reaction EX_gal(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gal(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fuc_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fuc_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rmn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rmn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lcts(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lcts(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_strchl(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_strchl(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_melib(e) not in model
> In changeRxnBounds (line 50)

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```

In useDiet (line 54)
In testATP (line 30)
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
Warning: Reaction EX_melib(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arachd(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arachd(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chsterol(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chsterol(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glyc(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glyc(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdcea(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdcea(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlc(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)

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Warning: Reaction EX_lnlc(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlnc(a) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlnc(a) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlncg(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlncg(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ocdcea(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ocdcea(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_octa(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_octa(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cys_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cys_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)

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```

    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_arg_L(e) not in model
> In changeRxnBounds (line 50)
    In useDiet (line 54)
    In testATP (line 30)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_arg_L(e) not in model
> In changeRxnBounds (line 59)
    In useDiet (line 54)
    In testATP (line 30)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_his_L(e) not in model
> In changeRxnBounds (line 50)
    In useDiet (line 54)
    In testATP (line 30)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_his_L(e) not in model
> In changeRxnBounds (line 59)
    In useDiet (line 54)
    In testATP (line 30)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_asn_L(e) not in model
> In changeRxnBounds (line 50)
    In useDiet (line 54)
    In testATP (line 30)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_asn_L(e) not in model
> In changeRxnBounds (line 59)
    In useDiet (line 54)
    In testATP (line 30)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_thr_L(e) not in model
> In changeRxnBounds (line 50)
    In useDiet (line 54)
    In testATP (line 30)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_thr_L(e) not in model
> In changeRxnBounds (line 59)
    In useDiet (line 54)
    In testATP (line 30)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_tyr_L(e) not in model
> In changeRxnBounds (line 50)
    In useDiet (line 54)
    In testATP (line 30)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_tyr_L(e) not in model
> In changeRxnBounds (line 59)
    In useDiet (line 54)
    In testATP (line 30)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_gly(e) not in model
> In changeRxnBounds (line 50)

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In useDiet (line 54)
In testATP (line 30)
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
Warning: Reaction EX_gly(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_l2dgr180(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_l2dgr180(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_26dap_M(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_26dap_M(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2dmmq8(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2dmmq8(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2obut(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2obut(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_3mop(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)

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```

Warning: Reaction EX_3mop(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4abz(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4abz(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4hbz(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4hbz(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acald(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acald(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acmana(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acmana(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acnam(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acnam(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)

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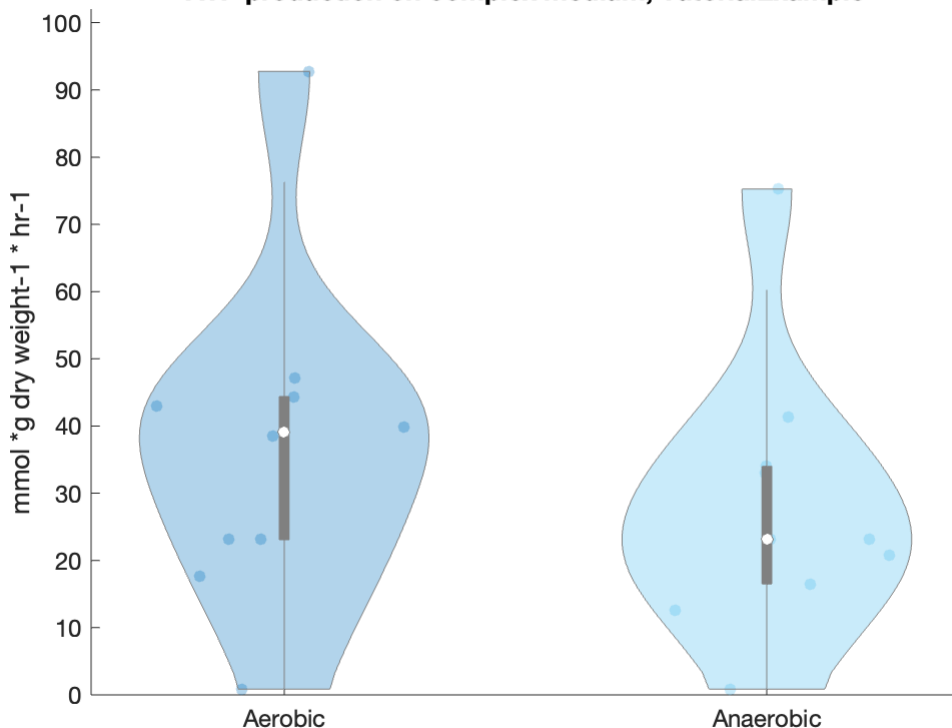
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
Warning: Reaction EX_ade(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ade(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_adn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_adn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ala_D(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
...
obj =
  Violin with properties:

    ScatterPlot: [1x1 Scatter]
    ViolinPlot: []
    BoxPlot: []
    WhiskerPlot: []
    MedianPlot: []
    NotchPlots: []
    MeanPlot: [1x1 Line]
    ShowNotches: 1
    ShowMean: 1
obj =
  Violin with properties:

    ScatterPlot: [1x1 Scatter]
    ViolinPlot: []
    BoxPlot: []
    WhiskerPlot: []
    MedianPlot: []
    NotchPlots: []
    MeanPlot: [1x1 Line]
    ShowNotches: 1
    ShowMean: 1

```

### ATP production on complex medium, TutorialExample



Report for refined models:

All models produce reasonable amounts of ATP under aerobic conditions.

All models produce reasonable amounts of ATP under anaerobic conditions.

> changeCobraSolver: Gurobi interface added to MATLAB path.

> changeCobraSolver: Gurobi interface added to MATLAB path.

> changeCobraSolver: Gurobi interface added to MATLAB path.

> changeCobraSolver: Gurobi interface added to MATLAB path.

> The compatibility can only be evaluated on the following mac OS versions: macOS 10.13+.

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> The compatibility can only be evaluated on the following mac OS versions: macOS 10.13+.

> The solver compatibility is not tested with MATLAB R2019b.

Each model.subSystems{x} is a character array, and this format is retained.

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Each model.subSystems{x} is a character array, and this format is retained.

> The solver compatibility is not tested with MATLAB R2019b.

Each model.subSystems{x} is a character array, and this format is retained.

> The solver compatibility is not tested with MATLAB R2019b.

Each model.subSystems{x} is a character array, and this format is retained.

All metabolites have formulas.

All metabolites have formulas.

All metabolites have formulas.

All metabolites have formulas.

Model contains 0 (0.00%) imbalanced reactions.

Mass imbalanced reactions: 0

Charge imbalanced reactions: 0

L = 1601

L = 1330

L = 1238

L = 1195

```

L = 1168
L = 1140
L = 1113
L = 1086
L = 1070
Model contains 5 (0.37%) imbalanced reactions.
Mass imbalanced reactions: 1
Charge imbalanced reactions: 0
L = 1354
L = 1175
L = 779
L = 751
L = 677
L = 665
L = 653
L = 637
L = 625
L = 616
L = 607
L = 593
L = 586
L = 577
Model contains 0 (0.00%) imbalanced reactions.
Mass imbalanced reactions: 0
Charge imbalanced reactions: 0
L = 1646
L = 1387
L = 932
L = 900
L = 884
L = 858
L = 840
L = 826
L = 817
L = 810
L = 803
L = 796
L = 1050
L = 1040
L = 1032
L = 1026
L = 1014
L = 968
L = 962
L = 958
L = 954
L = 949
L = 945
L = 910
L = 906
L = 893
L = 888
L = 881
L = 869
L = 862
L = 852
L = 844
L = 841
L = 836
L = 584
L = 581
L = 578
L = 576
L = 532

```

```

L = 515
L = 507
L = 500
L = 496
L = 492
L = 488
L = 484
L = 482

```

Model contains 6 (0.61%) imbalanced reactions.

Mass imbalanced reactions: 2

Charge imbalanced reactions: 1

```

L = 983
L = 534
L = 514
L = 501
L = 491
L = 483
L = 479
L = 472
L = 467
L = 460
L = 453
L = 449
L = 442
L = 433
L = 393
L = 387
L = 385
L = 385
L = 385
L = 385

```

Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating Set 'PreserveVariableNames' to true to use the original column headers as table variable names.

> The version of CPLEX is 129.

Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have installed

> In fastFVA>checkFastFVABin (line 778)

In fastFVA (line 130)

In testCarbonSources (line 85)

In runTestsOnModel (line 177)

In parallel\_function>make\_general\_channel/channel\_general (line 837)

In remoteParallelFunction (line 46)

>> Solving Model.S. (uncoupled)

```

L = 569
L = 565
L = 562
L = 559
L = 556
L = 552
L = 549
L = 536
L = 530
L = 527
L = 525
L = 521
L = 512
L = 510
L = 506
L = 504
L = 502
L = 499
L = 497
L = 493
L = 491
L = 480

```

```

L = 474
L = 471
L = 466
L = 465
L = 465
L = 465
L = 463
L = 463
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
No experimental data on growth requirements available for the organism.
L = 480
L = 477
L = 474
L = 474
L = 474
L = 474
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
> The version of CPLEX is 129.
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Microbe "Brevibacillus_laterosporus_GI_9" not found in bile acid product data file.
> In testBileAcidBiosynthesis (line 39)
    In runTestsOnModel (line 248)
        In parallel_function>make_general_channel/channel_general (line 837)
            In remoteParallelFunction (line 46)
L = 780
L = 776
L = 771
L = 763
L = 759
L = 755
L = 672
L = 646
L = 637
L = 626
L = 614
L = 605
L = 603
L = 601
L = 596
L = 593
L = 590
L = 589
L = 588
L = 587
L = 583
L = 583
L = 583
L = 583
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
> The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
    In fastFVA (line 130)
        In testCarbonSources (line 85)

```

```

In runTestsOnModel (line 177)
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
Warning: Microbe "Brevibacillus_laterosporus_GI_9" not found in drug metabolite data file.
> In testDrugMetabolism (line 39)
In runTestsOnModel (line 259)
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Microbe "Brevibacillus_laterosporus_GI_9" not found in putrefaction pathway data file.
> In testPutrefactionPathways (line 37)
In runTestsOnModel (line 270)
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Microbe "Brevibacillus_laterosporus_GI_9" not found in aromatic amino acid degradation data file.
> In testAromaticAADegradation (line 38)
In runTestsOnModel (line 294)
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (963,983)
>> Only 1 reactions of 983 are solved (~ 0.10%).
>> 0 reactions out of 1 are minimized (0.00%).
>> 0 reactions out of 1 are maximized (0.00%).
>> 1 reaction out of 1 is minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

>> The number of reactions retrieved is 1
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time: Mon Sep 27 14:36:36 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
-- Minimization (iRound = 0). Number of reactions: 1. - printLevel 1
-- Maximization (iRound = 1). Number of reactions: 1.
-- End time: Mon Sep 27 14:36:37 2021
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
> The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
In fastFVA (line 130)
In testCarbonSources (line 85)
In runTestsOnModel (line 177)
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
In fastFVA (line 130)
In testFermentationProducts (line 85)
In runTestsOnModel (line 194)
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (963,983)
>> Only 1 reactions of 983 are solved (~ 0.10%).
>> 0 reactions out of 1 are minimized (0.00%).
>> 0 reactions out of 1 are maximized (0.00%).
>> 1 reaction out of 1 is minimized and maximized (100.00%).

```



```

WARNING: The Sequential Version might take a long time.

>> The number of reactions retrieved is 1
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time:      Mon Sep 27 14:36:41 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 1. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 1.
-- End time:      Mon Sep 27 14:36:41 2021
No experimental data on growth requirements available for the organism.

> changeCobraSolver: Gurobi interface added to MATLAB path.
> The compatibility can only be evaluated on the following mac OS versions: macOS 10.13+.
> The solver compatibility is not tested with MATLAB R2019b.
Each model.subSystems{x} is a character array, and this format is retained.
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
> The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVABin (line 778)
    In fastFVA (line 130)
    In testMetaboliteUptake (line 87)
    In runTestsOnModel (line 223)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (963,983)
>> Only 1 reactions of 983 are solved (~ 0.10%).
>> 0 reactions out of 1 are minimized (0.00%).
>> 0 reactions out of 1 are maximized (0.00%).
>> 1 reaction out of 1 is minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

>> The number of reactions retrieved is 1
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time:      Mon Sep 27 14:36:43 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 1. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 1.
-- End time:      Mon Sep 27 14:36:43 2021
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Microbe "Acetitomaculum_ruminis_DSM_5522" not found in bile acid product data file.
> In testBileAcidBiosynthesis (line 39)
    In runTestsOnModel (line 248)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (1392,1601)
>> Only 13 reactions of 1601 are solved (~ 0.81%).
>> 0 reactions out of 13 are minimized (0.00%).
>> 0 reactions out of 13 are maximized (0.00%).
>> 13 reactions out of 13 are minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

>> The number of reactions retrieved is 13
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time:      Mon Sep 27 14:36:40 2021

```

```

>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 13. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 13.
-- End time:      Mon Sep 27 14:36:40 2021
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
> The version of CPLEX is 129.
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (1454,1646)
>> Only 13 reactions of 1646 are solved (~ 0.79%).
>> 0 reactions out of 13 are minimized (0.00%).
>> 0 reactions out of 13 are maximized (0.00%).
>> 13 reactions out of 13 are minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

>> The number of reactions retrieved is 13
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time:      Mon Sep 27 14:36:42 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 13. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 13.
-- End time:      Mon Sep 27 14:36:42 2021
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
> The version of CPLEX is 129.
Warning: Microbe "Acetitomaculum_ruminis_DSM_5522" not found in drug metabolite data file.
> In testDrugMetabolism (line 39)
  In runTestsOnModel (line 259)
    In parallel_function>make_general_channel/channel_general (line 837)
      In remoteParallelFunction (line 46)
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Microbe "Acetitomaculum_ruminis_DSM_5522" not found in putrefaction pathway data file.
> In testPutrefactionPathways (line 37)
  In runTestsOnModel (line 270)
    In parallel_function>make_general_channel/channel_general (line 837)
      In remoteParallelFunction (line 46)
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Microbe "Acetitomaculum_ruminis_DSM_5522" not found in aromatic amino acid degradation data file.
> In testAromaticAADegradation (line 38)
  In runTestsOnModel (line 294)
    In parallel_function>make_general_channel/channel_general (line 837)
      In remoteParallelFunction (line 46)
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
    In testFermentationProducts (line 85)
      In runTestsOnModel (line 194)
        In parallel_function>make_general_channel/channel_general (line 837)
          In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (1392,1601)
>> Only 4 reactions of 1601 are solved (~ 0.25%).
>> 0 reactions out of 4 are minimized (0.00%).
>> 0 reactions out of 4 are maximized (0.00%).
>> 4 reactions out of 4 are minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

>> The number of reactions retrieved is 4
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/

```

```

-- Start time:      Mon Sep 27 14:36:46 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 4. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 4.
-- End time:      Mon Sep 27 14:36:46 2021
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Model grows on at least one carbon source on defined medium for the organism (aerobic), flux through BOF:

> changeCobraSolver: Gurobi interface added to MATLAB path.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVABin (line 778)
    In fastFVA (line 130)
    In testFermentationProducts (line 85)
    In runTestsOnModel (line 194)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (1454,1646)
>> Only 2 reactions of 1646 are solved (~ 0.12%).
>> 0 reactions out of 2 are minimized (0.00%).
>> 0 reactions out of 2 are maximized (0.00%).
>> 2 reactions out of 2 are minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

>> The number of reactions retrieved is 2
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time:      Mon Sep 27 14:36:49 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 2. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 2.
-- End time:      Mon Sep 27 14:36:49 2021
No experimental data on growth requirements available for the organism.
> The compatibility can only be evaluated on the following mac OS versions: macOS 10.13+.
> The solver compatibility is not tested with MATLAB R2019b.
Each model.subSystems{x} is a character array, and this format is retained.
Model grows on at least one carbon source on defined medium for the organism (anaerobic), flux through BOF
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Microbe "Acinetobacter_pittii_TG6411" not found in putrefaction pathway data file.
> In testPutrefactionPathways (line 37)
    In runTestsOnModel (line 270)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
All metabolites have formulas.
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Microbe "Achromobacter_insuaavis_AXX_A" not found in putrefaction pathway data file.

```

```

> In testPutrefactionPathways (line 37)
  In runTestsOnModel (line 270)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Model contains 4 (0.38%) imbalanced reactions.
Mass imbalanced reactions: 1
Charge imbalanced reactions: 0
L = 1056
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.

> changeCobraSolver: Gurobi interface added to MATLAB path.
L = 993
L = 936
L = 909
L = 895
L = 892
L = 889
L = 885
L = 882
L = 880
L = 873
L = 863
L = 853
L = 851
L = 849
L = 847
L = 845
L = 833
L = 831
L = 829
L = 825
L = 819
L = 815
L = 812
L = 807
L = 484
L = 478
L = 477
L = 476
L = 472
L = 471
L = 470
L = 469
L = 465
L = 463
L = 462
L = 461
L = 460
L = 459
L = 457
L = 455
L = 454
L = 446
L = 443
L = 422
L = 418
L = 415
L = 414
L = 413
L = 412
L = 407
L = 403
L = 402

```

```

L = 398
L = 396
L = 393
L = 392
L = 389
L = 388

```

```

> changeCobraSolver: Gurobi interface added to MATLAB path.
> The compatibility can only be evaluated on the following mac OS versions: macOS 10.13+.
> The solver compatibility is not tested with MATLAB R2019b.

```

Each model.subSystems{x} is a character array, and this format is retained.

```

> The compatibility can only be evaluated on the following mac OS versions: macOS 10.13+.
> The solver compatibility is not tested with MATLAB R2019b.

```

Each model.subSystems{x} is a character array, and this format is retained.

```

L = 386
L = 383
L = 381
L = 380
L = 367
L = 366
L = 364
L = 351
L = 341
L = 337
L = 334
L = 334
L = 334
L = 334

```

Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating Set 'PreserveVariableNames' to true to use the original column headers as table variable names.

Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating Set 'PreserveVariableNames' to true to use the original column headers as table variable names.

No experimental data on growth requirements available for the organism.

Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating Set 'PreserveVariableNames' to true to use the original column headers as table variable names.

Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating Set 'PreserveVariableNames' to true to use the original column headers as table variable names.

Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating Set 'PreserveVariableNames' to true to use the original column headers as table variable names.

Warning: Microbe "Streptococcus\_ratti\_FA\_1\_DSM\_20564" not found in bile acid product data file.

```

> In testBileAcidBiosynthesis (line 39)
  In runTestsOnModel (line 248)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)

```

Warning: Microbe "Streptococcus\_ratti\_FA\_1\_DSM\_20564" not found in drug metabolite data file.

```

> In testDrugMetabolism (line 39)
  In runTestsOnModel (line 259)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)

```

Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating Set 'PreserveVariableNames' to true to use the original column headers as table variable names.

Warning: Microbe "Streptococcus\_ratti\_FA\_1\_DSM\_20564" not found in putrefaction pathway data file.

```

> In testPutrefactionPathways (line 37)
  In runTestsOnModel (line 270)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)

```

Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating Set 'PreserveVariableNames' to true to use the original column headers as table variable names.

Warning: Microbe "Streptococcus\_ratti\_FA\_1\_DSM\_20564" not found in aromatic amino acid degradation data file.

```

> In testAromaticAADegradation (line 38)
  In runTestsOnModel (line 294)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)

```

```

> changeCobraSolver: Gurobi interface added to MATLAB path.
All metabolites have formulas.
Model contains 5 (0.37%) imbalanced reactions.
Mass imbalanced reactions: 1
Charge imbalanced reactions: 0
L = 1364
L = 780
L = 679
L = 651
L = 597
L = 559
L = 539
L = 513
L = 489
L = 471
L = 448
L = 429
L = 415
L = 401
L = 397
L = 394
L = 384
L = 378
L = 378
L = 378
L = 378
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
> The version of CPLEX is 129.
All metabolites have formulas.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
In fastFVA (line 130)
In testCarbonSources (line 85)
In runTestsOnModel (line 177)
In parallel_function>make_general_channel/channel_general (line 837)
In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
All metabolites have formulas.
Model contains 0 (0.00%) imbalanced reactions.
Mass imbalanced reactions: 0
Charge imbalanced reactions: 0
L = 1007
Model contains 4 (0.36%) imbalanced reactions.
Mass imbalanced reactions: 1
Charge imbalanced reactions: 0
L = 1100
L = 611
L = 582
L = 529
L = 496
L = 462
L = 440
L = 428
L = 411
L = 405
L = 395
L = 388
L = 376
L = 365
L = 360
L = 354
L = 350
L = 344

```

```

L = 341
L = 340
L = 334
L = 329
L = 328
L = 327
L = 326
L = 324
L = 311
L = 311
L = 311
L = 311
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
> The version of CPLEX is 129.
L = 872
L = 831
L = 781
L = 710
L = 671
L = 657
L = 642
L = 622
L = 615
L = 606
L = 299
L = 294
L = 290
L = 289
L = 286
L = 281
L = 280
L = 263
L = 252
L = 252
L = 252
L = 252
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
> The version of CPLEX is 129.
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (1172,1364)
>> Only 21 reactions of 1364 are solved (~ 1.54%).
>> 0 reactions out of 21 are minimized (0.00%).
>> 0 reactions out of 21 are maximized (0.00%).
>> 21 reactions out of 21 are minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

>> The number of reactions retrieved is 21
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time: Mon Sep 27 14:37:15 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
-- Minimization (iRound = 0). Number of reactions: 21. - printLevel 1
-- Maximization (iRound = 1). Number of reactions: 21.
-- End time: Mon Sep 27 14:37:15 2021
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
> The version of CPLEX is 129.
> The compatibility can only be evaluated on the following mac OS versions: macOS 10.13+.
> The solver compatibility is not tested with MATLAB R2019b.
Each model.subSystems{x} is a character array, and this format is retained.
All metabolites have formulas.
Model contains 0 (0.00%) imbalanced reactions.

```

Mass imbalanced reactions: 0  
Charge imbalanced reactions: 0

L = 1757  
L = 1467  
L = 1384  
L = 1335  
L = 1286  
L = 1255  
L = 1227  
L = 1203  
L = 1184  
L = 1148  
L = 1139  
L = 1101  
L = 1088  
L = 1075  
L = 1063  
L = 1044  
L = 1022  
L = 1014  
L = 1002  
L = 997  
L = 993  
L = 983  
L = 978  
L = 971  
L = 967  
L = 963  
L = 921  
L = 917  
L = 912  
L = 908  
L = 904  
L = 901  
L = 888  
L = 884  
L = 876  
L = 863  
L = 860  
L = 855  
L = 615  
L = 612  
L = 611  
L = 610  
L = 608  
L = 602  
L = 597  
L = 591  
L = 567  
L = 554

Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal

```
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
    In testFermentationProducts (line 85)
      In runTestsOnModel (line 194)
        In parallel_function>make_general_channel/channel_general (line 837)
          In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (1172,1364)
>> Only 9 reactions of 1364 are solved (~ 0.66%).
>> 0 reactions out of 9 are minimized (0.00%).
>> 0 reactions out of 9 are maximized (0.00%).
>> 9 reactions out of 9 are minimized and maximized (100.00%).
```



```

WARNING: The Sequential Version might take a long time.

>> The number of reactions retrieved is 9
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time:      Mon Sep 27 14:37:20 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 9. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 9.
-- End time:      Mon Sep 27 14:37:20 2021
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Model grows on at least one carbon source on defined medium for the organism (aerobic), flux through BOF:
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVABin (line 778)
  In fastFVA (line 130)
  In testCarbonSources (line 85)
  In runTestsOnModel (line 177)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (995,1100)
>> Only 5 reactions of 1100 are solved (~ 0.45%).
>> 0 reactions out of 5 are minimized (0.00%).
>> 0 reactions out of 5 are maximized (0.00%).
>> 5 reactions out of 5 are minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

>> The number of reactions retrieved is 5
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time:      Mon Sep 27 14:37:20 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 5. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 5.
-- End time:      Mon Sep 27 14:37:20 2021
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
> The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVABin (line 778)
  In fastFVA (line 130)
  In testCarbonSources (line 85)
  In runTestsOnModel (line 177)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (955,1007)
>> Only 5 reactions of 1007 are solved (~ 0.50%).
>> 0 reactions out of 5 are minimized (0.00%).
>> 0 reactions out of 5 are maximized (0.00%).
>> 5 reactions out of 5 are minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

>> The number of reactions retrieved is 5
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time:      Mon Sep 27 14:37:20 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 5. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 5.
-- End time:      Mon Sep 27 14:37:20 2021

```

```

Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Model grows on at least one carbon source on defined medium for the organism (aerobic), flux through BOF:
Model grows on at least one carbon source on defined medium for the organism (anaerobic), flux through BOF:
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Microbe "Prevotella_bivia_DNF00320" not found in bile acid product data file.
> In testBileAcidBiosynthesis (line 39)
    In runTestsOnModel (line 248)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Model cannot grow on defined medium for the organism (anaerobic)
> In testGrowthOnDefinedMedia (line 170)
    In runTestsOnModel (line 204)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
    > The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVABin (line 778)
    In fastFVA (line 130)
    In testFermentationProducts (line 85)
    In runTestsOnModel (line 194)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (995,1100)
>> Only 4 reactions of 1100 are solved (~ 0.36%).
>> 0 reactions out of 4 are minimized (0.00%).
>> 0 reactions out of 4 are maximized (0.00%).
>> 4 reactions out of 4 are minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

>> The number of reactions retrieved is 4
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time:      Mon Sep 27 14:37:27 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 4. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 4.
-- End time:      Mon Sep 27 14:37:27 2021
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Model grows on at least one carbon source on defined medium for the organism (aerobic), flux through BOF:
Warning: Microbe "Prevotella_bivia_DNF00320" not found in drug metabolite data file.
> In testDrugMetabolism (line 39)
    In runTestsOnModel (line 259)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Microbe "Prevotella_bivia_DNF00320" not found in putrefaction pathway data file.

```

```

> In testPutrefactionPathways (line 37)
  In runTestsOnModel (line 270)
    In parallel_function>make_general_channel/channel_general (line 837)
      In remoteParallelFunction (line 46)
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Microbe "Prevotella_bivia_DNF00320" not found in aromatic amino acid degradation data file.
> In testAromaticAADegradation (line 38)
  In runTestsOnModel (line 294)
    In parallel_function>make_general_channel/channel_general (line 837)
      In remoteParallelFunction (line 46)

> changeCobraSolver: Gurobi interface added to MATLAB path.
L = 542
L = 531
L = 527
L = 526
L = 525
L = 522
L = 520
L = 517
L = 517
L = 517
L = 517
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
> The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVABin (line 778)
  In fastFVA (line 130)
    In testDrugMetabolism (line 75)
      In runTestsOnModel (line 259)
        In parallel_function>make_general_channel/channel_general (line 837)
          In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (1172,1364)
>> Only 1 reactions of 1364 are solved (~ 0.07%).
>> 0 reactions out of 1 are minimized (0.00%).
>> 0 reactions out of 1 are maximized (0.00%).
>> 1 reaction out of 1 is minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

>> The number of reactions retrieved is 1
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time: Mon Sep 27 14:37:30 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 1. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 1.
-- End time: Mon Sep 27 14:37:30 2021
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
> The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVABin (line 778)
  In fastFVA (line 130)
    In testPutrefactionPathways (line 69)
      In runTestsOnModel (line 270)
        In parallel_function>make_general_channel/channel_general (line 837)
          In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (1172,1364)

```

```

>> Only 4 reactions of 1364 are solved (~ 0.29%).
>> 0 reactions out of 4 are minimized (0.00%).
>> 0 reactions out of 4 are maximized (0.00%).
>> 4 reactions out of 4 are minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

>> The number of reactions retrieved is 4
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time:      Mon Sep 27 14:37:32 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 4. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 4.
-- End time:      Mon Sep 27 14:37:32 2021
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Model cannot grow on defined medium for the organism (anaerobic)
> In testGrowthOnDefinedMedia (line 170)
  In runTestsOnModel (line 204)
    In parallel_function>make_general_channel/channel_general (line 837)
      In remoteParallelFunction (line 46)
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
> The version of CPLEX is 129.
> The compatibility can only be evaluated on the following mac OS versions: macOS 10.13+.
> The solver compatibility is not tested with MATLAB R2019b.
Each model.subSystems{x} is a character array, and this format is retained.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVABin (line 778)
  In fastFVA (line 130)
    In testCarbonSources (line 85)
      In runTestsOnModel (line 177)
        In parallel_function>make_general_channel/channel_general (line 837)
          In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVABin (line 778)
  In fastFVA (line 130)
    In testSecretionProducts (line 86)
      In runTestsOnModel (line 237)
        In parallel_function>make_general_channel/channel_general (line 837)
          In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (995,1100)
>> Only 9 reactions of 1100 are solved (~ 0.82%).
>> 0 reactions out of 9 are minimized (0.00%).
>> 0 reactions out of 9 are maximized (0.00%).
>> 9 reactions out of 9 are minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

>> The number of reactions retrieved is 9
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time:      Mon Sep 27 14:37:34 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 9. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 9.
-- End time:      Mon Sep 27 14:37:34 2021
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Microbe "Lactobacillus_brevis_EW" not found in bile acid product data file.

```

```

> In testBileAcidBiosynthesis (line 39)
  In runTestsOnModel (line 248)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Microbe "Lactobacillus_brevis_EW" not found in drug metabolite data file.
> In testDrugMetabolism (line 39)
  In runTestsOnModel (line 259)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Microbe "Lactobacillus_brevis_EW" not found in putrefaction pathway data file.
> In testPutrefactionPathways (line 37)
  In runTestsOnModel (line 270)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Microbe "Lactobacillus_brevis_EW" not found in aromatic amino acid degradation data file.
> In testAromaticAADegradation (line 38)
  In runTestsOnModel (line 294)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (1506,1757)
>> Only 27 reactions of 1757 are solved (~ 1.54%).
>> 0 reactions out of 27 are minimized (0.00%).
>> 0 reactions out of 27 are maximized (0.00%).
>> 27 reactions out of 27 are minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

>> The number of reactions retrieved is 27
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time:      Mon Sep 27 14:37:35 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 27. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 27.
-- End time:      Mon Sep 27 14:37:35 2021
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Model grows on at least one carbon source on defined medium for the organism (aerobic), flux through BOF:
Model grows on at least one carbon source on defined medium for the organism (anaerobic), flux through BOF:
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
> The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVABin (line 778)
  In fastFVA (line 130)
    In testMetaboliteUptake (line 87)
    In runTestsOnModel (line 223)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (1506,1757)
>> Only 1 reactions of 1757 are solved (~ 0.06%).
>> 0 reactions out of 1 are minimized (0.00%).
>> 0 reactions out of 1 are maximized (0.00%).
>> 1 reaction out of 1 is minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

```

```

>> The number of reactions retrieved is 1
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time:      Mon Sep 27 14:37:44 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 1. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 1.
-- End time:      Mon Sep 27 14:37:44 2021
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creatin..
obj =
    Violin with properties:

        ScatterPlot: [1x1 Scatter]
        ViolinPlot: []
        BoxPlot: []
        WhiskerPlot: []
        MedianPlot: []
        NotchPlots: []
        MeanPlot: [1x1 Line]
        ShowNotches: 1
        ShowMean: 1
obj =
    Violin with properties:

        ScatterPlot: [1x1 Scatter]
        ViolinPlot: []
        BoxPlot: []
        WhiskerPlot: []
        MedianPlot: []
        NotchPlots: []
        MeanPlot: [1x1 Line]
        ShowNotches: 1
        ShowMean: 1
obj =
    Violin with properties:

        ScatterPlot: [1x1 Scatter]
        ViolinPlot: []
        BoxPlot: []
        WhiskerPlot: []
        MedianPlot: []
        NotchPlots: []
        MeanPlot: [1x1 Line]
        ShowNotches: 1
        ShowMean: 1
obj =
    Violin with properties:

        ScatterPlot: [1x1 Scatter]
        ViolinPlot: []
        BoxPlot: []
        WhiskerPlot: []
        MedianPlot: []
        NotchPlots: []
        MeanPlot: [1x1 Line]
        ShowNotches: 1
        ShowMean: 1
obj =
    Violin with properties:

        ScatterPlot: [1x1 Scatter]
        ViolinPlot: []
        BoxPlot: []
        WhiskerPlot: []
        MedianPlot: []
        NotchPlots: []
        MeanPlot: [1x1 Line]
        ShowNotches: 1
        ShowMean: 1
obj =
    Violin with properties:

        ScatterPlot: [1x1 Scatter]
        ViolinPlot: []
        BoxPlot: []
        WhiskerPlot: []

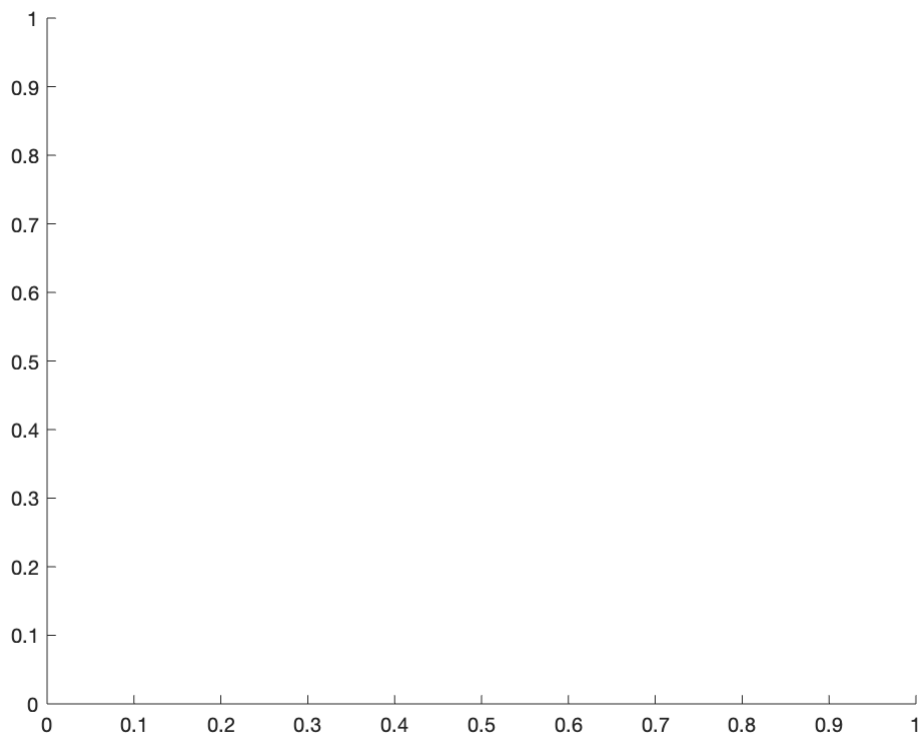
```

```

MedianPlot: []
NotchPlots: []
MeanPlot: [1x1 Line]
ShowNotches: 1
ShowMean: 1
obj =
Violin with properties:

ScatterPlot: [1x1 Scatter]
ViolinPlot: []
BoxPlot: []
WhiskerPlot: []
MedianPlot: []
NotchPlots: []
MeanPlot: [1x1 Line]
ShowNotches: 1
ShowMean: 1

```



```

obj =
Violin with properties:

ScatterPlot: [1x1 Scatter]
ViolinPlot: []
BoxPlot: []
WhiskerPlot: []
MedianPlot: []
NotchPlots: []
MeanPlot: [1x1 Line]
ShowNotches: 1
ShowMean: 1
obj =
Violin with properties:

ScatterPlot: [1x1 Scatter]
ViolinPlot: []

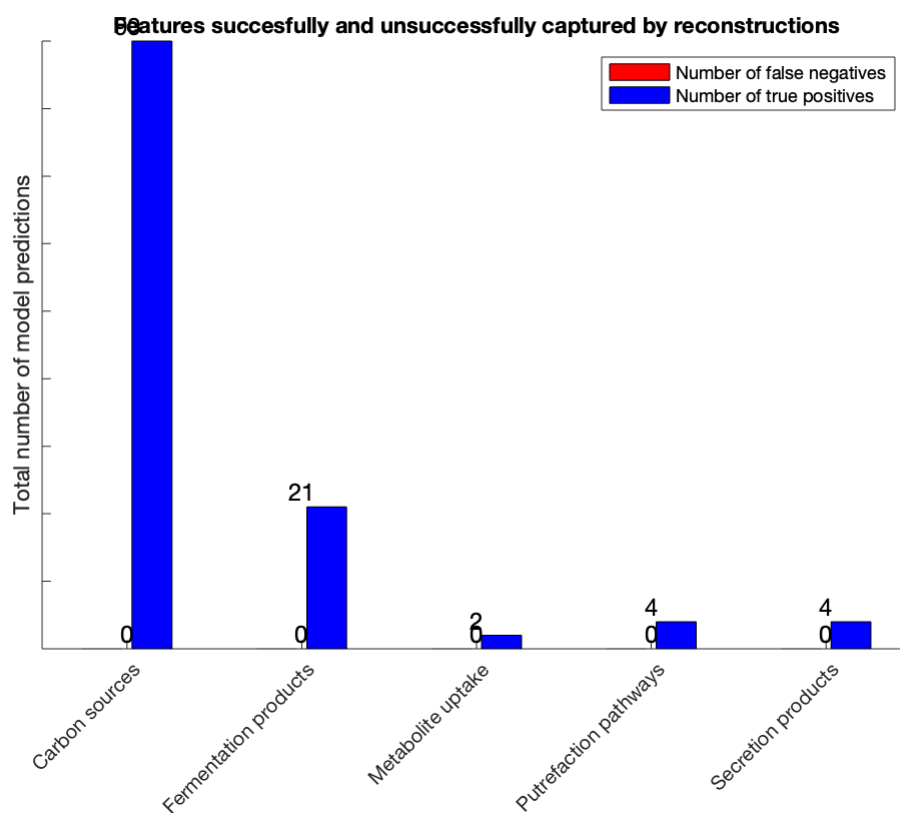
```

```

BoxPlot: []
WhiskerPlot: []
MedianPlot: []
NotchPlots: []
MeanPlot: [1x1 Line]
ShowNotches: 1
ShowMean: 1
obj =
Violin with properties:

ScatterPlot: [1x1 Scatter]
ViolinPlot: []
BoxPlot: []
WhiskerPlot: []
MedianPlot: []
NotchPlots: []
MeanPlot: [1x1 Line]
ShowNotches: 1
ShowMean: 1

```



If any models still fail a test as indicated by the output variable `failedModels`, inspect the results in `debuggingFolder` -> Retest.

For models that still produce too much ATP, run the debugging function

```
futileCycleReactions = identifyFutileCycles(model);
```

Inspect the models that do not agree with experimental data manually to find out which steps of the biosynthesis pathway are blocked.

If this should be unsuccessful, feel free to open an issue at the COBRA Toolbox GitHub.



### 3.1 Analysis and visualization of model properties and features

Once refined reconstructions have been successfully created, the DEMETER pipeline also provides functions to retrieve properties of the reconstructions, e.g., average size and gene count and stoichiometric consistency. Moreover, the pipeline enables the computation of reaction content, uptake and secretion profiles, and internal metabolite biosynthesis profiles per reconstruction and their subsequent clustering by taxon.

Run the computation and visualization of model properties.

```
computeModelProperties(refinedFolder, infoFilePath, reconVersion,
'numWorkers', numWorkers);
```

[illegible]

```
> The version of CPLEX is 129.
```

Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have installed version 12.10.0.0. This may cause some problems.

```
> In fastFVA>checkFastFVABin (line 778)
  In fastFVA (line 130)
    In parallel_function>make_general_channel/channel_general (line 837)
      In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (963,983)
>> Only 102 reactions of 983 are solved (~ 10.38%).
>> 0 reactions out of 102 are minimized (0.00%).
>> 0 reactions out of 102 are maximized (0.00%).
>> 102 reactions out of 102 are minimized and maximized (100.00%).
```

WARNING: The Sequential Version might take a long time.

```
> The version of CPLEX is 129.
```

```
> The version of CPLEX is 129.
```

Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have installed CPLEX version 12.10.0.0. This may lead to unexpected behavior.

```
> In fastFVA>checkFastFVABin (line 778)
  In fastFVA (line 130)
    In parallel_function>make_general_channel/channel_general (line 837)
      In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (1392,1601)
```

```

>> Only 143 reactions of 1601 are solved (~ 8.93%).
>> 0 reactions out of 143 are minimized (0.00%).
>> 0 reactions out of 143 are maximized (0.00%).
>> 143 reactions out of 143 are minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

> The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVABin (line 778)
  In fastFVA (line 130)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of reactions retrieved is 102
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time:      Mon Sep 27 14:41:11 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 102. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 102.
-- End time:      Mon Sep 27 14:41:11 2021
>> The number of reactions retrieved is 143
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time:      Mon Sep 27 14:41:11 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 143. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 143.
-- End time:      Mon Sep 27 14:41:11 2021
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVABin (line 778)
  In fastFVA (line 130)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (1454,1646)
>> Only 140 reactions of 1646 are solved (~ 8.51%).
>> 0 reactions out of 140 are minimized (0.00%).
>> 0 reactions out of 140 are maximized (0.00%).
>> 140 reactions out of 140 are minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

>> The number of reactions retrieved is 140
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time:      Mon Sep 27 14:41:11 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 140. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 140.
-- End time:      Mon Sep 27 14:41:12 2021
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (1164,1354)
>> Only 117 reactions of 1354 are solved (~ 8.64%).
>> 0 reactions out of 117 are minimized (0.00%).
>> 0 reactions out of 117 are maximized (0.00%).
>> 117 reactions out of 117 are minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

>> The number of reactions retrieved is 117
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time:      Mon Sep 27 14:41:11 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 117. - printLevel 1

```

```

-- Maximization (iRound = 1). Number of reactions: 117.
-- End time:      Mon Sep 27 14:41:12 2021
Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
> The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVABin (line 778)
  In fastFVA (line 130)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
> The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVABin (line 778)
  In fastFVA (line 130)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (955,1007)
>> Only 83 reactions of 1007 are solved (~ 8.24%).
>> 0 reactions out of 83 are minimized (0.00%).
>> 0 reactions out of 83 are maximized (0.00%).
>> 83 reactions out of 83 are minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

>> The number of reactions retrieved is 83
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time:      Mon Sep 27 14:41:16 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
  -- Minimization (iRound = 0). Number of reactions: 83. - printLevel 1
  -- Maximization (iRound = 1). Number of reactions: 83.
-- End time:      Mon Sep 27 14:41:16 2021
Each model.subSystems{x} is a character array, and this format is retained.
> The version of CPLEX is 129.
> The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVABin (line 778)
  In fastFVA (line 130)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (1172,1364)
>> Only 162 reactions of 1364 are solved (~ 11.88%).
>> 0 reactions out of 162 are minimized (0.00%).
>> 0 reactions out of 162 are maximized (0.00%).
>> 162 reactions out of 162 are minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

>> The number of reactions retrieved is 162
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time:      Mon Sep 27 14:41:17 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
  -- Minimization (iRound = 0). Number of reactions: 162. - printLevel 1
  -- Maximization (iRound = 1). Number of reactions: 162.
-- End time:      Mon Sep 27 14:41:17 2021
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (995,1100)
>> Only 144 reactions of 1100 are solved (~ 13.09%).

```

```

>> 0 reactions out of 144 are minimized (0.00%).
>> 0 reactions out of 144 are maximized (0.00%).
>> 144 reactions out of 144 are minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

>> The number of reactions retrieved is 144
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time:      Mon Sep 27 14:41:18 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 144. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 144.
-- End time:      Mon Sep 27 14:41:18 2021
> The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVABin (line 778)
  In fastFVA (line 130)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (857,941)
>> Only 132 reactions of 941 are solved (~ 14.03%).
>> 0 reactions out of 132 are minimized (0.00%).
>> 0 reactions out of 132 are maximized (0.00%).
>> 132 reactions out of 132 are minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

>> The number of reactions retrieved is 132
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time:      Mon Sep 27 14:41:19 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 132. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 132.
-- End time:      Mon Sep 27 14:41:19 2021
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVABin (line 778)
  In fastFVA (line 130)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (977,1056)
>> Only 112 reactions of 1056 are solved (~ 10.61%).
>> 0 reactions out of 112 are minimized (0.00%).
>> 0 reactions out of 112 are maximized (0.00%).
>> 112 reactions out of 112 are minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

>> The number of reactions retrieved is 112
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time:      Mon Sep 27 14:41:18 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 112. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 112.
-- End time:      Mon Sep 27 14:41:19 2021
Each model.subSystems{x} is a character array, and this format is retained.
> The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVABin (line 778)
  In fastFVA (line 130)
    In parallel_function>make_general_channel/channel_general (line 837)

```

```

In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (1506,1757)
>> Only 156 reactions of 1757 are solved (~ 8.88%).
>> 0 reactions out of 156 are minimized (0.00%).
>> 0 reactions out of 156 are maximized (0.00%).
>> 156 reactions out of 156 are minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

>> The number of reactions retrieved is 156
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time:      Mon Sep 27 14:41:22 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 156. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 156.
-- End time:      Mon Sep 27 14:41:22 2021
Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
Warning: Directory already exists.
ans =

    3

ans =

    1

Each model.subSystems{x} is a character array, and this format is retained.

ans =

    2

Each model.subSystems{x} is a character array, and this format is retained.

ans =

    4

Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
Warning: Reaction EX_10fthf(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10fthf(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10fthf(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)

```













































```
Warning: Reaction EX_12dgr161(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr161(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr180(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr180(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr181(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr181(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dihdglyc(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dihdglyc(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dipdglyc(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dipdglyc(...
```

## 3.2. Visualization of the features of large-scale reconstruction resources and their subsets

We can also use the properties module in DEMETER to analyze and visualize the features of large-scale reconstruction resources, e.g., AGORA [1]. We can also do this for a subset of AGORA reconstructions. For instance, we can cluster all representatives of a given taxon, e.g., Bacteroidetes, by similarity. Note that this part of the tutorial is time-consuming.

Download all AGORA reconstructions.

```
system('curl -LJO https://github.com/VirtualMetabolicHuman/AGORA/archive/master.zip')
```

% Total	% Received	% Xferd	Average Speed	Time	Time	Time	Current
			Dload Upload	Total	Spent	Left	Speed
0	0	0	0	0	--:--:--	--:--:--	0
0	0	0	0	0	--:--:--	--:--:--	0
100	132	100	132	0	0	267	0
100	3990k	0	3990k	0	0	2912k	0
100	24.5M	0	24.5M	0	0	10.3M	0

100	44.1M	0	44.1M	0	0	13.2M	0	--:--:--	0:00:03	--:--:--	20.4M
100	64.0M	0	64.0M	0	0	14.6M	0	--:--:--	0:00:04	--:--:--	19.9M
100	82.9M	0	82.9M	0	0	15.4M	0	--:--:--	0:00:05	--:--:--	19.8M
100	102M	0	102M	0	0	16.2M	0	--:--:--	0:00:06	--:--:--	19.8M
100	117M	0	117M	0	0	15.9M	0	--:--:--	0:00:07	--:--:--	18.6M
100	121M	0	121M	0	0	14.4M	0	--:--:--	0:00:08	--:--:--	15.3M
100	124M	0	124M	0	0	13.3M	0	--:--:--	0:00:09	--:--:--	12.2M
100	128M	0	128M	0	0	12.4M	0	--:--:--	0:00:10	--:--:--	9345k
100	132M	0	132M	0	0	11.6M	0	--:--:--	0:00:11	--:--:--	5997k
100	135M	0	135M	0	0	10.9M	0	--:--:--	0:00:12	--:--:--	3767k
100	139M	0	139M	0	0	10.4M	0	--:--:--	0:00:13	--:--:--	3755k
100	143M	0	143M	0	0	10.0M	0	--:--:--	0:00:14	--:--:--	3799k
100	148M	0	148M	0	0	9871k	0	--:--:--	0:00:15	--:--:--	4006k
100	152M	0	152M	0	0	9561k	0	--:--:--	0:00:16	--:--:--	4192k
100	156M	0	156M	0	0	9240k	0	--:--:--	0:00:17	--:--:--	4266k
100	160M	0	160M	0	0	8929k	0	--:--:--	0:00:18	--:--:--	4201k
100	163M	0	163M	0	0	8678k	0	--:--:--	0:00:19	--:--:--	4181k
100	167M	0	167M	0	0	8441k	0	--:--:--	0:00:20	--:--:--	4037k
100	171M	0	171M	0	0	8221k	0	--:--:--	0:00:21	--:--:--	3860k
100	175M	0	175M	0	0	8033k	0	--:--:--	0:00:22	--:--:--	3840k
100	179M	0	179M	0	0	7858k	0	--:--:--	0:00:23	--:--:--	3907k
100	182M	0	182M	0	0	7690k	0	--:--:--	0:00:24	--:--:--	3878k
100	186M	0	186M	0	0	7544k	0	--:--:--	0:00:25	--:--:--	3883k
100	190M	0	190M	0	0	7399k	0	--:--:--	0:00:26	--:--:--	3876k
100	193M	0	193M	0	0	7241k	0	--:--:--	0:00:27	--:--:--	3709k
100	197M	0	197M	0	0	7127k	0	--:--:--	0:00:28	--:--:--	3727k
100	201M	0	201M	0	0	7023k	0	--:--:--	0:00:29	--:--:--	3773k
100	204M	0	204M	0	0	6888k	0	--:--:--	0:00:30	--:--:--	3567k
100	208M	0	208M	0	0	6807k	0	--:--:--	0:00:31	--:--:--	3700k
100	212M	0	212M	0	0	6715k	0	--:--:--	0:00:32	--:--:--	3824k
100	215M	0	215M	0	0	6616k	0	--:--:--	0:00:33	--:--:--	3725k
100	228M	0	228M	0	0	6813k	0	--:--:--	0:00:34	--:--:--	5575k
100	243M	0	243M	0	0	7060k	0	--:--:--	0:00:35	--:--:--	8094k
100	256M	0	256M	0	0	7226k	0	--:--:--	0:00:36	--:--:--	9850k
100	273M	0	273M	0	0	7502k	0	--:--:--	0:00:37	--:--:--	12.2M
100	291M	0	291M	0	0	7792k	0	--:--:--	0:00:38	--:--:--	15.2M
100	309M	0	309M	0	0	8035k	0	--:--:--	0:00:39	--:--:--	15.8M
100	328M	0	328M	0	0	8330k	0	--:--:--	0:00:40	--:--:--	16.9M
100	336M	0	336M	0	0	8343k	0	--:--:--	0:00:41	--:--:--	16.1M
100	340M	0	340M	0	0	8235k	0	--:--:--	0:00:42	--:--:--	13.4M
100	344M	0	344M	0	0	8130k	0	--:--:--	0:00:43	--:--:--	10.4M
100	347M	0	347M	0	0	8035k	0	--:--:--	0:00:44	--:--:--	8029k
100	351M	0	351M	0	0	7943k	0	--:--:--	0:00:45	--:--:--	4842k
100	356M	0	356M	0	0	7887k	0	--:--:--	0:00:46	--:--:--	4117k
100	360M	0	360M	0	0	7804k	0	--:--:--	0:00:47	--:--:--	4154k
100	364M	0	364M	0	0	7725k	0	--:--:--	0:00:48	--:--:--	4218k
100	368M	0	368M	0	0	7637k	0	--:--:--	0:00:49	--:--:--	4124k
100	370M	0	370M	0	0	7547k	0	--:--:--	0:00:50	--:--:--	3924k
100	375M	0	375M	0	0	7486k	0	--:--:--	0:00:51	--:--:--	3781k
100	379M	0	379M	0	0	7416k	0	--:--:--	0:00:52	--:--:--	3743k
100	382M	0	382M	0	0	7347k	0	--:--:--	0:00:53	--:--:--	3696k
100	386M	0	386M	0	0	7273k	0	--:--:--	0:00:54	--:--:--	3684k
100	389M	0	389M	0	0	7207k	0	--:--:--	0:00:55	--:--:--	3801k
100	393M	0	393M	0	0	7154k	0	--:--:--	0:00:56	--:--:--	3737k
100	397M	0	397M	0	0	7098k	0	--:--:--	0:00:57	--:--:--	3768k
100	401M	0	401M	0	0	7040k	0	--:--:--	0:00:58	--:--:--	3768k
100	405M	0	405M	0	0	6993k	0	--:--:--	0:00:59	--:--:--	3939k
100	409M	0	409M	0	0	6941k	0	--:--:--	0:01:00	--:--:--	4007k
100	412M	0	412M	0	0	6885k	0	--:--:--	0:01:01	--:--:--	3862k
100	417M	0	417M	0	0	6860k	0	--:--:--	0:01:02	--:--:--	4130k
100	421M	0	421M	0	0	6816k	0	--:--:--	0:01:03	--:--:--	4209k
100	425M	0	425M	0	0	6773k	0	--:--:--	0:01:04	--:--:--	4160k
100	430M	0	430M	0	0	6740k	0	--:--:--	0:01:05	--:--:--	4296k
100	434M	0	434M	0	0	6702k	0	--:--:--	0:01:06	--:--:--	4444k

100	438M	0	438M	0	0	6665k	0	--:--:--	0:01:07	--:--:--	4235k
100	442M	0	442M	0	0	6627k	0	--:--:--	0:01:08	--:--:--	4225k
100	446M	0	446M	0	0	6587k	0	--:--:--	0:01:09	--:--:--	4190k
100	450M	0	450M	0	0	6552k	0	--:--:--	0:01:10	--:--:--	4090k
100	454M	0	454M	0	0	6521k	0	--:--:--	0:01:11	--:--:--	4122k
100	458M	0	458M	0	0	6488k	0	--:--:--	0:01:12	--:--:--	4101k
100	462M	0	462M	0	0	6459k	0	--:--:--	0:01:13	--:--:--	4179k
100	466M	0	466M	0	0	6428k	0	--:--:--	0:01:14	--:--:--	4230k
100	470M	0	470M	0	0	6401k	0	--:--:--	0:01:15	--:--:--	4274k
100	475M	0	475M	0	0	6373k	0	--:--:--	0:01:16	--:--:--	4263k
100	479M	0	479M	0	0	6345k	0	--:--:--	0:01:17	--:--:--	4291k
100	483M	0	483M	0	0	6314k	0	--:--:--	0:01:18	--:--:--	4174k
100	486M	0	486M	0	0	6281k	0	--:--:--	0:01:19	--:--:--	4091k
100	490M	0	490M	0	0	6247k	0	--:--:--	0:01:20	--:--:--	3942k
100	494M	0	494M	0	0	6223k	0	--:--:--	0:01:21	--:--:--	3938k
100	498M	0	498M	0	0	6194k	0	--:--:--	0:01:22	--:--:--	3849k
100	502M	0	502M	0	0	6168k	0	--:--:--	0:01:23	--:--:--	3885k
100	506M	0	506M	0	0	6145k	0	--:--:--	0:01:24	--:--:--	3998k
100	510M	0	510M	0	0	6127k	0	--:--:--	0:01:25	--:--:--	4188k
100	514M	0	514M	0	0	6102k	0	--:--:--	0:01:26	--:--:--	4135k
100	518M	0	518M	0	0	6082k	0	--:--:--	0:01:27	--:--:--	4235k
100	522M	0	522M	0	0	6061k	0	--:--:--	0:01:28	--:--:--	4280k
100	526M	0	526M	0	0	6040k	0	--:--:--	0:01:29	--:--:--	4247k
100	530M	0	530M	0	0	6018k	0	--:--:--	0:01:30	--:--:--	4156k
100	534M	0	534M	0	0	5994k	0	--:--:--	0:01:31	--:--:--	4126k
100	538M	0	538M	0	0	5971k	0	--:--:--	0:01:32	--:--:--	4032k
100	542M	0	542M	0	0	5950k	0	--:--:--	0:01:33	--:--:--	4000k
100	554M	0	554M	0	0	6015k	0	--:--:--	0:01:34	--:--:--	5589k
100	573M	0	573M	0	0	6161k	0	--:--:--	0:01:35	--:--:--	8717k
100	592M	0	592M	0	0	6294k	0	--:--:--	0:01:36	--:--:--	11.4M
100	608M	0	608M	0	0	6395k	0	--:--:--	0:01:37	--:--:--	13.8M
100	627M	0	627M	0	0	6539k	0	--:--:--	0:01:38	--:--:--	17.1M
100	645M	0	645M	0	0	6651k	0	--:--:--	0:01:39	--:--:--	18.1M
100	662M	0	662M	0	0	6764k	0	--:--:--	0:01:40	--:--:--	17.9M
100	682M	0	682M	0	0	6891k	0	--:--:--	0:01:41	--:--:--	18.0M
100	701M	0	701M	0	0	7015k	0	--:--:--	0:01:42	--:--:--	18.7M
100	721M	0	721M	0	0	7145k	0	--:--:--	0:01:43	--:--:--	18.5M
100	737M	0	737M	0	0	7241k	0	--:--:--	0:01:44	--:--:--	18.6M
100	757M	0	757M	0	0	7364k	0	--:--:--	0:01:45	--:--:--	18.9M
100	776M	0	776M	0	0	7473k	0	--:--:--	0:01:46	--:--:--	18.8M
100	787M	0	787M	0	0	7517k	0	--:--:--	0:01:47	--:--:--	17.3M
100	791M	0	791M	0	0	7485k	0	--:--:--	0:01:48	--:--:--	14.1M
100	795M	0	795M	0	0	7450k	0	--:--:--	0:01:49	--:--:--	11.5M
100	799M	0	799M	0	0	7416k	0	--:--:--	0:01:50	--:--:--	8510k
100	802M	0	802M	0	0	7384k	0	--:--:--	0:01:51	--:--:--	5493k
100	806M	0	806M	0	0	7350k	0	--:--:--	0:01:52	--:--:--	3779k
100	809M	0	809M	0	0	7312k	0	--:--:--	0:01:53	--:--:--	3568k
100	813M	0	813M	0	0	7281k	0	--:--:--	0:01:54	--:--:--	3561k
100	816M	0	816M	0	0	7246k	0	--:--:--	0:01:55	--:--:--	3466k
100	819M	0	819M	0	0	7214k	0	--:--:--	0:01:56	--:--:--	3414k
100	822M	0	822M	0	0	7182k	0	--:--:--	0:01:57	--:--:--	3395k
100	826M	0	826M	0	0	7152k	0	--:--:--	0:01:58	--:--:--	3521k
100	830M	0	830M	0	0	7124k	0	--:--:--	0:01:59	--:--:--	3541k
100	833M	0	833M	0	0	7094k	0	--:--:--	0:02:00	--:--:--	3588k
100	837M	0	837M	0	0	7063k	0	--:--:--	0:02:01	--:--:--	3570k
100	840M	0	840M	0	0	7034k	0	--:--:--	0:02:02	--:--:--	3583k
100	844M	0	844M	0	0	7007k	0	--:--:--	0:02:03	--:--:--	3578k
100	847M	0	847M	0	0	6981k	0	--:--:--	0:02:04	--:--:--	3570k
100	851M	0	851M	0	0	6955k	0	--:--:--	0:02:05	--:--:--	3641k
100	855M	0	855M	0	0	6931k	0	--:--:--	0:02:06	--:--:--	3720k
100	859M	0	859M	0	0	6907k	0	--:--:--	0:02:07	--:--:--	3813k
100	863M	0	863M	0	0	6885k	0	--:--:--	0:02:08	--:--:--	3882k
100	866M	0	866M	0	0	6859k	0	--:--:--	0:02:09	--:--:--	3814k
100	870M	0	870M	0	0	6835k	0	--:--:--	0:02:10	--:--:--	3801k

```

100 874M 0 874M 0 0 6813k 0 --:--:-- 0:02:11 --:--:-- 3832k
100 877M 0 877M 0 0 6791k 0 --:--:-- 0:02:12 --:--:-- 3802k
100 881M 0 881M 0 0 6767k 0 --:--:-- 0:02:13 --:--:-- 3730k
100 884M 0 884M 0 0 6743k 0 --:--:-- 0:02:14 --:--:-- 3748k
100 888M 0 888M 0 0 6720k 0 --:--:-- 0:02:15 --:--:-- 3728k
100 892M 0 892M 0 0 6700k 0 --:--:-- 0:02:16 --:--:-- 3731k
100 896M 0 896M 0 0 6682k 0 --:--:-- 0:02:17 --:--:-- 3817k
100 896M 0 896M 0 0 6680k 0 --:--:-- 0:02:17 --:--:-- 3846k

```

```

curl: Saved to filename 'AGORA-master.zip'
ans = 0

```

```

try
    unzip('AGORA-master')
end
modPath = [pwd filesep 'AGORA-master' filesep 'CurrentVersion' filesep
'AGORA_1_03' filesep 'AGORA_1_03_mat'];

```

Define the path to the file with taxonomic information on AGORA.

```

infoFilePath = 'AGORA_infoFile.xlsx';

```

Define the column header which contain the information that should be used to extract a subset.

```

subHeader = 'Phylum';

```

Define the feature for which the subset of reconstructions should be extracted.

```

subFeature = 'Bacteroidetes';

```

Define the folder where the results from the extracted subset should be saved (optional, default folder will be used otherwise).

```

subsetFolder = [pwd filesep 'extractedModels'];

```

Run the extraction of the subset.

```

[extractedSubset, subsetFolder] =
extractReconstructionResourceSubset(modPath, infoFilePath, subHeader,
subFeature, subsetFolder);

```

```

Each model.subSystems{x} has been changed to a character array.
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Each model.subSystems{x} has been changed to a character array.
Each model.subSystems{x} has been changed to a character array.

```

[illegible]





[illegible]



[illegible]



```

> In fastFVA>checkFastFVABin (line 778)
  In fastFVA (line 130)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (1072,1251)
>> Only 155 reactions of 1251 are solved (~ 12.39%).
>> 0 reactions out of 155 are minimized (0.00%).
>> 0 reactions out of 155 are maximized (0.00%).
>> 155 reactions out of 155 are minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

>> The number of reactions retrieved is 155
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time:      Mon Sep 27 14:54:35 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 155. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 155.
-- End time:      Mon Sep 27 14:54:35 2021
Each model.subSystems{x} is a character array, and this format is retained.
> The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVABin (line 778)
  In fastFVA (line 130)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (860,893)
>> Only 95 reactions of 893 are solved (~ 10.64%).
>> 0 reactions out of 95 are minimized (0.00%).
>> 0 reactions out of 95 are maximized (0.00%).
>> 95 reactions out of 95 are minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

>> The number of reactions retrieved is 95
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time:      Mon Sep 27 14:54:38 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 95. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 95.
-- End time:      Mon Sep 27 14:54:38 2021
Each model.subSystems{x} is a character array, and this format is retained.
> The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVABin (line 778)
  In fastFVA (line 130)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (953,1066)
>> Only 97 reactions of 1066 are solved (~ 9.10%).
>> 0 reactions out of 97 are minimized (0.00%).
>> 0 reactions out of 97 are maximized (0.00%).
>> 97 reactions out of 97 are minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

>> The number of reactions retrieved is 97
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/

```

```

-- Start time:      Mon Sep 27 14:54:40 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 97. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 97.
-- End time:      Mon Sep 27 14:54:40 2021
Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
> The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVABin (line 778)
  In fastFVA (line 130)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (1091,1222)
>> Only 108 reactions of 1222 are solved (~ 8.84%).
>> 0 reactions out of 108 are minimized (0.00%).
>> 0 reactions out of 108 are maximized (0.00%).
>> 108 reactions out of 108 are minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

>> The number of reactions retrieved is 108
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time:      Mon Sep 27 14:54:31 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 108. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 108.
-- End time:      Mon Sep 27 14:54:32 2021
Each model.subSystems{x} is a character array, and this format is retained.
> The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVABin (line 778)
  In fastFVA (line 130)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (983,1100)
>> Only 105 reactions of 1100 are solved (~ 9.55%).
>> 0 reactions out of 105 are minimized (0.00%).
>> 0 reactions out of 105 are maximized (0.00%).
>> 105 reactions out of 105 are minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

>> The number of reactions retrieved is 105
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time:      Mon Sep 27 14:54:35 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 105. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 105.
-- End time:      Mon Sep 27 14:54:35 2021
Each model.subSystems{x} is a character array, and this format is retained.
> The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVABin (line 778)
  In fastFVA (line 130)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (1105,1261)

```

```

>> Only 107 reactions of 1261 are solved (~ 8.49%).
>> 0 reactions out of 107 are minimized (0.00%).
>> 0 reactions out of 107 are maximized (0.00%).
>> 107 reactions out of 107 are minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

>> The number of reactions retrieved is 107
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time:      Mon Sep 27 14:54:38 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 107. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 107.
-- End time:      Mon Sep 27 14:54:38 2021
Each model.subSystems{x} is a character array, and this format is retained.
> The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (1114,1306)
>> Only 160 reactions of 1306 are solved (~ 12.25%).
>> 0 reactions out of 160 are minimized (0.00%).
>> 0 reactions out of 160 are maximized (0.00%).
>> 160 reactions out of 160 are minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

>> The number of reactions retrieved is 160
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time:      Mon Sep 27 14:54:41 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 160. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 160.
-- End time:      Mon Sep 27 14:54:42 2021
Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
> The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (996,1101)
>> Only 104 reactions of 1101 are solved (~ 9.45%).
>> 0 reactions out of 104 are minimized (0.00%).
>> 0 reactions out of 104 are maximized (0.00%).
>> 104 reactions out of 104 are minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

>> The number of reactions retrieved is 104
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time:      Mon Sep 27 14:54:31 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 104. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 104.
-- End time:      Mon Sep 27 14:54:32 2021
Each model.subSystems{x} is a character array, and this format is retained.

```

```

> The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVABin (line 778)
  In fastFVA (line 130)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (1042,1192)
>> Only 129 reactions of 1192 are solved (~ 10.82%).
>> 0 reactions out of 129 are minimized (0.00%).
>> 0 reactions out of 129 are maximized (0.00%).
>> 129 reactions out of 129 are minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

>> The number of reactions retrieved is 129
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time:      Mon Sep 27 14:54:35 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 129. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 129.
-- End time:      Mon Sep 27 14:54:35 2021
Each model.subSystems{x} is a character array, and this format is retained.
> The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVABin (line 778)
  In fastFVA (line 130)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (1061,1186)
>> Only 116 reactions of 1186 are solved (~ 9.78%).
>> 0 reactions out of 116 are minimized (0.00%).
>> 0 reactions out of 116 are maximized (0.00%).
>> 116 reactions out of 116 are minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

>> The number of reactions retrieved is 116
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time:      Mon Sep 27 14:54:38 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 116. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 116.
-- End time:      Mon Sep 27 14:54:38 2021
Each model.subSystems{x} is a character array, and this format is retained.
> The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVABin (line 778)
  In fastFVA (line 130)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (973,1085)
>> Only 105 reactions of 1085 are solved (~ 9.68%).
>> 0 reactions out of 105 are minimized (0.00%).
>> 0 reactions out of 105 are maximized (0.00%).
>> 105 reactions out of 105 are minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

```

```

>> The number of reactions retrieved is 105
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time:      Mon Sep 27 14:54:40 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 105. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 105.
-- End time:      Mon Sep 27 14:54:41 2021
Each model.subSystems{x} is a character array, and this format is retained.
> The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVABin (line 778)
  In fastFVA (line 130)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (804,858)
>> Only 91 reactions of 858 are solved (~ 10.61%).
>> 0 reactions out of 91 are minimized (0.00%).
>> 0 reactions out of 91 are maximized (0.00%).
>> 91 reactions out of 91 are minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

>> The number of reactions retrieved is 91
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time:      Mon Sep 27 14:54:31 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 91. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 91.
-- End time:      Mon Sep 27 14:54:31 2021
Each model.subSystems{x} is a character array, and this format is retained.
> The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVABin (line 778)
  In fastFVA (line 130)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (1000,1111)
>> Only 113 reactions of 1111 are solved (~ 10.17%).
>> 0 reactions out of 113 are minimized (0.00%).
>> 0 reactions out of 113 are maximized (0.00%).
>> 113 reactions out of 113 are minimized and maximized (100.00%).

WARNING: The Sequential Version mighttake a long time.

>> The number of reactions retrieved is 113
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time:      Mon Sep 27 14:54:35 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 113. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 113.
-- End time:      Mon Sep 27 14:54:35 2021
Each model.subSystems{x} is a character array, and this format is retained.
> The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVABin (line 778)
  In fastFVA (line 130)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of arguments is: input: 6, output 4.

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>> Size of stoichiometric matrix: (1088,1227)
>> Only 109 reactions of 1227 are solved (~ 8.88%).
>> 0 reactions out of 109 are minimized (0.00%).
>> 0 reactions out of 109 are maximized (0.00%).
>> 109 reactions out of 109 are minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

>> The number of reactions retrieved is 109
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time:      Mon Sep 27 14:54:39 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 109. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 109.
-- End time:      Mon Sep 27 14:54:39 2021
Each model.subSystems{x} is a character array, and this format is retained.
> The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVABin (line 778)
  In fastFVA (line 130)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (1040,1185)
>> Only 130 reactions of 1185 are solved (~ 10.97%).
>> 0 reactions out of 130 are minimized (0.00%).
>> 0 reactions out of 130 are maximized (0.00%).
>> 130 reactions out of 130 are minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

>> The number of reactions retrieved is 130
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time:      Mon Sep 27 14:54:41 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 130. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 130.
-- End time:      Mon Sep 27 14:54:41 2021
Each model.subSystems{x} is a character array, and this format is retained.
> The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVABin (line 778)
  In fastFVA (line 130)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (1117,1255)
>> Only 109 reactions of 1255 are solved (~ 8.69%).
>> 0 reactions out of 109 are minimized (0.00%).
>> 0 reactions out of 109 are maximized (0.00%).
>> 109 reactions out of 109 are minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

>> The number of reactions retrieved is 109
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time:      Mon Sep 27 14:54:47 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 109. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 109.
-- End time:      Mon Sep 27 14:54:47 2021
Each model.subSystems{x} is a character array, and this format is retained.

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> The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAabin (line 778)
  In fastFVA (line 130)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (1092,1264)
>> Only 142 reactions of 1264 are solved (~ 11.23%).
>> 0 reactions out of 142 are minimized (0.00%).
>> 0 reactions out of 142 are maximized (0.00%).
>> 142 reactions out of 142 are minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

>> The number of reactions retrieved is 142
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time:      Mon Sep 27 14:54:50 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 142. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 142.
-- End time:      Mon Sep 27 14:54:50 2021
> The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAabin (line 778)
  In fastFVA (line 130)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (1112,1294)
>> Only 145 reactions of 1294 are solved (~ 11.21%).
>> 0 reactions out of 145 are minimized (0.00%).
>> 0 reactions out of 145 are maximized (0.00%).
>> 145 reactions out of 145 are minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

>> The number of reactions retrieved is 145
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time:      Mon Sep 27 14:54:48 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 145. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 145.
-- End time:      Mon Sep 27 14:54:49 2021
Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
> The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAabin (line 778)
  In fastFVA (line 130)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (1122,1313)
>> Only 152 reactions of 1313 are solved (~ 11.58%).
>> 0 reactions out of 152 are minimized (0.00%).
>> 0 reactions out of 152 are maximized (0.00%).
>> 152 reactions out of 152 are minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

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>> The number of reactions retrieved is 152
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time:      Mon Sep 27 14:54:48 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 152. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 152.
-- End time:      Mon Sep 27 14:54:49 2021
Each model.subSystems{x} is a character array, and this format is retained.
> The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVABin (line 778)
  In fastFVA (line 130)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (1087,1240)
>> Only 138 reactions of 1240 are solved (~ 11.13%).
>> 0 reactions out of 138 are minimized (0.00%).
>> 0 reactions out of 138 are maximized (0.00%).
>> 138 reactions out of 138 are minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

>> The number of reactions retrieved is 138
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time:      Mon Sep 27 14:54:48 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 138. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 138.
-- End time:      Mon Sep 27 14:54:48 2021
Each model.subSystems{x} is a character array, and this format is retained.
> The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVABin (line 778)
  In fastFVA (line 130)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (1059,1213)
>> Only 118 reactions of 1213 are solved (~ 9.73%).
>> 0 reactions out of 118 are minimized (0.00%).
>> 0 reactions out of 118 are maximized (0.00%).
>> 118 reactions out of 118 are minimized and maximized (100.00%).

WARNING: The Sequential Version mighttake a long time.

>> The number of reactions retrieved is 118
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time:      Mon Sep 27 14:54:51 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 118. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 118.
-- End time:      Mon Sep 27 14:54:51 2021
> The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVABin (line 778)
  In fastFVA (line 130)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (1128,1268)

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>> Only 118 reactions of 1268 are solved (~ 9.31%).
>> 0 reactions out of 118 are minimized (0.00%).
>> 0 reactions out of 118 are maximized (0.00%).
>> 118 reactions out of 118 are minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

>> The number of reactions retrieved is 118
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time:      Mon Sep 27 14:54:51 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 118. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 118.
-- End time:      Mon Sep 27 14:54:51 2021
Each model.subSystems{x} is a character array, and this format is retained.
> The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVABin (line 778)
  In fastFVA (line 130)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (1089,1217)
>> Only 107 reactions of 1217 are solved (~ 8.79%).
>> 0 reactions out of 107 are minimized (0.00%).
>> 0 reactions out of 107 are maximized (0.00%).
>> 107 reactions out of 107 are minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

>> The number of reactions retrieved is 107
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time:      Mon Sep 27 14:54:53 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 107. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 107.
-- End time:      Mon Sep 27 14:54:53 2021
> The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVABin (line 778)
  In fastFVA (line 130)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (1097,1239)
>> Only 123 reactions of 1239 are solved (~ 9.93%).
>> 0 reactions out of 123 are minimized (0.00%).
>> 0 reactions out of 123 are maximized (0.00%).
>> 123 reactions out of 123 are minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

>> The number of reactions retrieved is 123
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time:      Mon Sep 27 14:54:52 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 123. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 123.
-- End time:      Mon Sep 27 14:54:52 2021
Each model.subSystems{x} is a character array, and this format is retained.
> The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal

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> In fastFVA>checkFastFVABin (line 778)
  In fastFVA (line 130)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (964,1042)
>> Only 113 reactions of 1042 are solved (~ 10.84%).
>> 0 reactions out of 113 are minimized (0.00%).
>> 0 reactions out of 113 are maximized (0.00%).
>> 113 reactions out of 113 are minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

>> The number of reactions retrieved is 113
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time:      Mon Sep 27 14:57:14 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 113. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 113.
-- End time:      Mon Sep 27 14:57:15 2021
Each model.subSystems{x} is a character array, and this format is retained.
> The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVABin (line 778)
  In fastFVA (line 130)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (981,1058)
>> Only 92 reactions of 1058 are solved (~ 8.70%).
>> 0 reactions out of 92 are minimized (0.00%).
>> 0 reactions out of 92 are maximized (0.00%).
>> 92 reactions out of 92 are minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

>> The number of reactions retrieved is 92
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time:      Mon Sep 27 14:57:15 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 92. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 92.
-- End time:      Mon Sep 27 14:57:15 2021
Each model.subSystems{x} is a character array, and this format is retained.
> The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVABin (line 778)
  In fastFVA (line 130)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (934,988)
>> Only 111 reactions of 988 are solved (~ 11.23%).
>> 0 reactions out of 111 are minimized (0.00%).
>> 0 reactions out of 111 are maximized (0.00%).
>> 111 reactions out of 111 are minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

>> The number of reactions retrieved is 111
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/

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-- Start time:      Mon Sep 27 14:57:14 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 111. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 111.
-- End time:      Mon Sep 27 14:57:14 2021
Each model.subSystems{x} is a character array, and this format is retained.
> The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (1001,1109)
>> Only 110 reactions of 1109 are solved (~ 9.92%).
>> 0 reactions out of 110 are minimized (0.00%).
>> 0 reactions out of 110 are maximized (0.00%).
>> 110 reactions out of 110 are minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

>> The number of reactions retrieved is 110
>> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
-- Start time:      Mon Sep 27 14:57:16 2021
>> #Task.ID = 1; logfile: cplexint_logfile_1.log
    -- Minimization (iRound = 0). Number of reactions: 110. - printLevel 1
    -- Maximization (iRound = 1). Number of reactions: 110.
-- End time:      Mon Sep 27 14:57:16 2021
Each model.subSystems{x} is a character array, and this format is retained.
> The version of CPLEX is 129.
> The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
>> Solving Model.S. (uncoupled)
>> The number of arguments is: input: 6, output 4.
>> Size of stoichiometric matrix: (970,1036)
>> Only 101 reactions of 1036 are solved (~ 9.75%).
>> 0 reactions out of 101 are minimized (0.00%).
>> 0 reactions out of 101 are maximized (0.00%).
>> 101 reactions out of 101 are minimized and maximized (100.00%).

WARNING: The Sequential Version might take a long time.

>> The number of reactions retrieved is 101
>> Log files ...
Warning: Directory already exists.
ans =

    1

ans =

    2

ans =

    3

```

ans =

4

Each model.subSystems{x} is a character array, and this format is retained.  
Each model.subSystems{x} is a character array, and this format is retained.  
Each model.subSystems{x} is a character array, and this format is retained.

Warning: Reaction EX\_10fthf(e) not in model

> In changeRxnBounds (line 50)

    In parallel\_function>make\_general\_channel/channel\_general (line 837)

    In remoteParallelFunction (line 46)

Warning: Reaction EX\_10fthf(e) not in model

> In changeRxnBounds (line 50)

    In parallel\_function>make\_general\_channel/channel\_general (line 837)

    In remoteParallelFunction (line 46)

Warning: Reaction EX\_10fthf(e) not in model

> In changeRxnBounds (line 50)

    In parallel\_function>make\_general\_channel/channel\_general (line 837)

    In remoteParallelFunction (line 46)

Warning: Reaction EX\_10fthf(e) not in model

> In changeRxnBounds (line 59)

    In parallel\_function>make\_general\_channel/channel\_general (line 837)

    In remoteParallelFunction (line 46)

Warning: Reaction EX\_10fthf5glu(e) not in model

> In changeRxnBounds (line 50)

    In parallel\_function>make\_general\_channel/channel\_general (line 837)

    In remoteParallelFunction (line 46)

Each model.subSystems{x} is a character array, and this format is retained.

Warning: Reaction EX\_10fthf(e) not in model

> In changeRxnBounds (line 59)

    In parallel\_function>make\_general\_channel/channel\_general (line 837)

    In remoteParallelFunction (line 46)

Warning: Reaction EX\_10fthf5glu(e) not in model

> In changeRxnBounds (line 50)

    In parallel\_function>make\_general\_channel/channel\_general (line 837)

    In remoteParallelFunction (line 46)

Warning: Reaction EX\_10fthf(e) not in model

> In changeRxnBounds (line 59)

    In parallel\_function>make\_general\_channel/channel\_general (line 837)

    In remoteParallelFunction (line 46)

Warning: Reaction EX\_10fthf5glu(e) not in model

> In changeRxnBounds (line 50)

    In parallel\_function>make\_general\_channel/channel\_general (line 837)

    In remoteParallelFunction (line 46)

Warning: Reaction EX\_10fthf5glu(e) not in model

> In changeRxnBounds (line 59)

    In parallel\_function>make\_general\_channel/channel\_general (line 837)

    In remoteParallelFunction (line 46)

Warning: Reaction EX\_10m3hddcaACP(e) not in model

> In changeRxnBounds (line 50)

    In parallel\_function>make\_general\_channel/channel\_general (line 837)

    In remoteParallelFunction (line 46)

Warning: Reaction EX\_10m3hddcaACP(e) not in model

> In changeRxnBounds (line 59)

    In parallel\_function>make\_general\_channel/channel\_general (line 837)

    In remoteParallelFunction (line 46)

Warning: Reaction EX\_10m3hundecACP(e) not in model

> In changeRxnBounds (line 50)

    In parallel\_function>make\_general\_channel/channel\_general (line 837)

    In remoteParallelFunction (line 46)

Warning: Reaction EX\_10m3hundecACP(e) not in model

> In changeRxnBounds (line 59)

    In parallel\_function>make\_general\_channel/channel\_general (line 837)



























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    In remoteParallelFunction (line 46)
Warning: Reaction EX_laipdecg3p(e) not in model
> In changeRxnBounds (line 50)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_10mtundec2eACP(e) not in model
> In changeRxnBounds (line 59)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_10mundecACP(e) not in model
> In changeRxnBounds (line 50)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_10mundecACP(e) not in model
> In changeRxnBounds (line 59)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_11m3hddcaACP(e) not in model
> In changeRxnBounds (line 50)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_11m3hddcaACP(e) not in model
> In changeRxnBounds (line 59)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_11m3oddcaACP(e) not in model
> In changeRxnBounds (line 50)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_11m3oddcaACP(e) not in model
> In changeRxnBounds (line 59)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_11mddcaACP(e) not in model
> In changeRxnBounds (line 50)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_11mddcaACP(e) not in model
> In changeRxnBounds (line 59)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_11mtddec2eACP(e) not in model
> In changeRxnBounds (line 50)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_11mtddec2eACP(e) not in model
> In changeRxnBounds (line 59)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_12m3hmyrsACP(e) not in model
> In changeRxnBounds (line 50)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_12m3hmyrsACP(e) not in model
> In changeRxnBounds (line 59)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_12m3htridecACP(e) not in model
> In changeRxnBounds (line 50)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_12m3htridecACP(e) not in model
> In changeRxnBounds (line 59)
    In parallel_function>make_general_channel/channel_general (line 837)

```













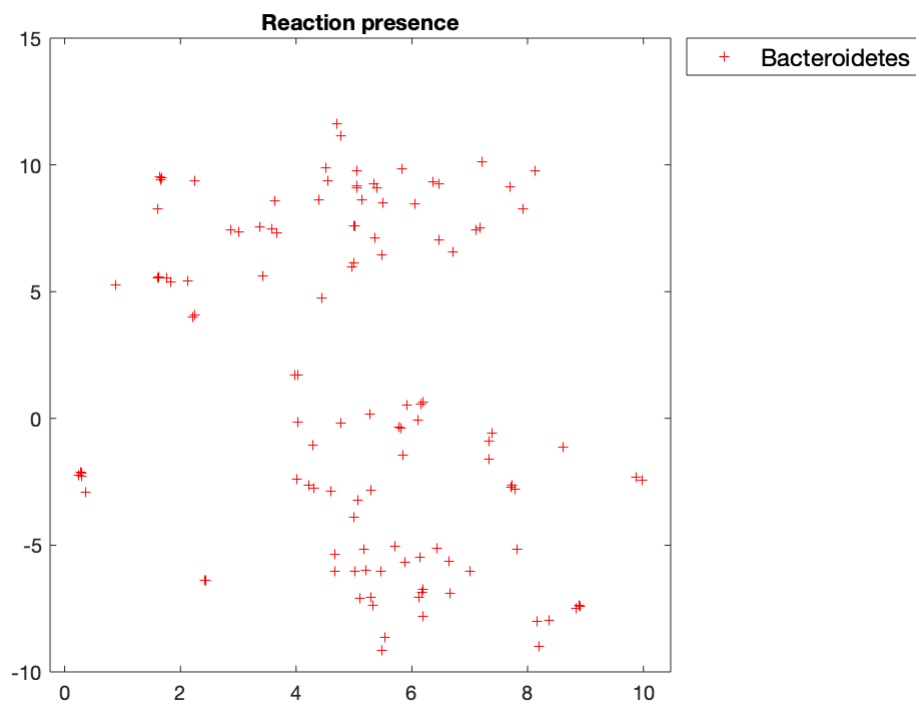


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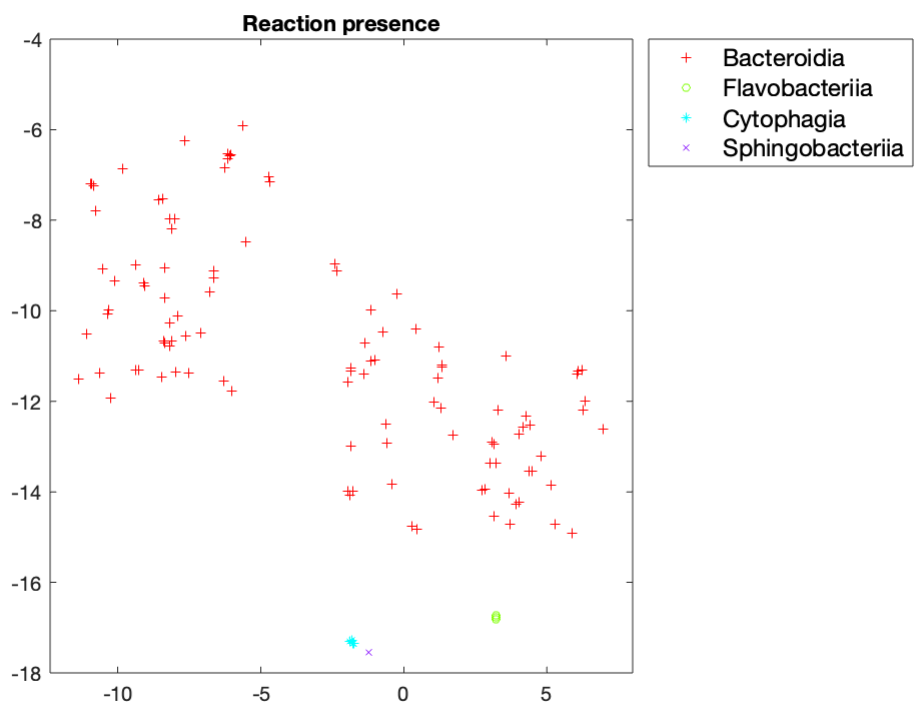
    In remoteParallelFunction (line 46)
Warning: Reaction EX_ltdecg3p(e) not in model
> In changeRxnBounds (line 59)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_lodeclleg3p(e) not in model
> In changeRxnBounds (line 50)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_lodeclleg3p(e) not in model
> In changeRxnBounds (line 59)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_lodecg3p(e) not in model
> In changeRxnBounds (line 50)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_lodecg3p(e) not in model
> In changeRxnBounds (line 59)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_lpyr5c(e) not in model
> In changeRxnBounds (line 50)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_lpyr5c(e) not in model
> In changeRxnBounds (line 59)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_ltdec7eg3p(e) not in model
> In changeRxnBounds (line 50)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_ltdec7eg3p(e) not in model
> In changeRxnBounds (line 59)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_ltdecg3p(e) not in model
> In changeRxnBounds (line 50)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_ltdecg3p(e) not in model
> In changeRxnBounds (line 59)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_23dhdp(e) not in model
> In changeRxnBounds (line 50)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_23dhdp(e) not in model
> In changeRxnBounds (line 59)
    In parallel_function>make_general_channel/channel_general (line 837)
    In remoteParallelFunction (line 46)
Warning: Reaction EX_25aics(e) not in mode...

```

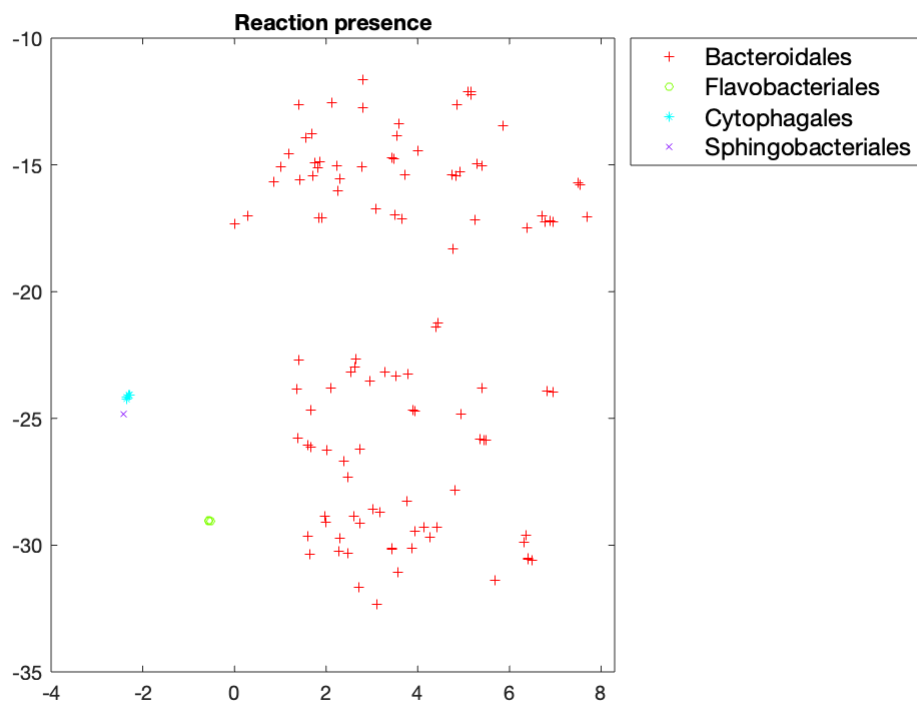
## Bacteroidetes



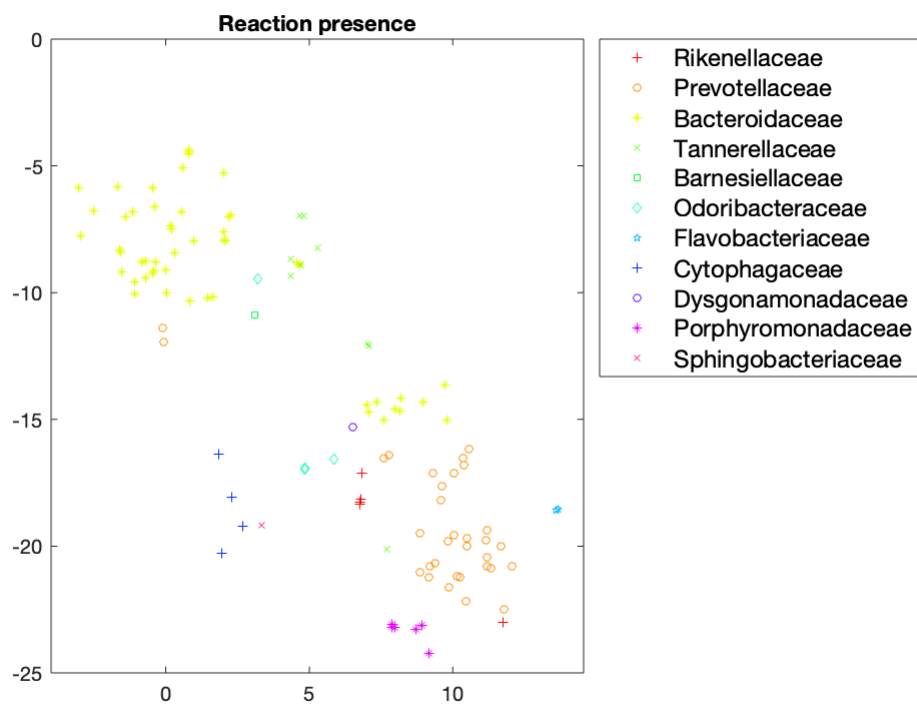
## Bacteroidetes



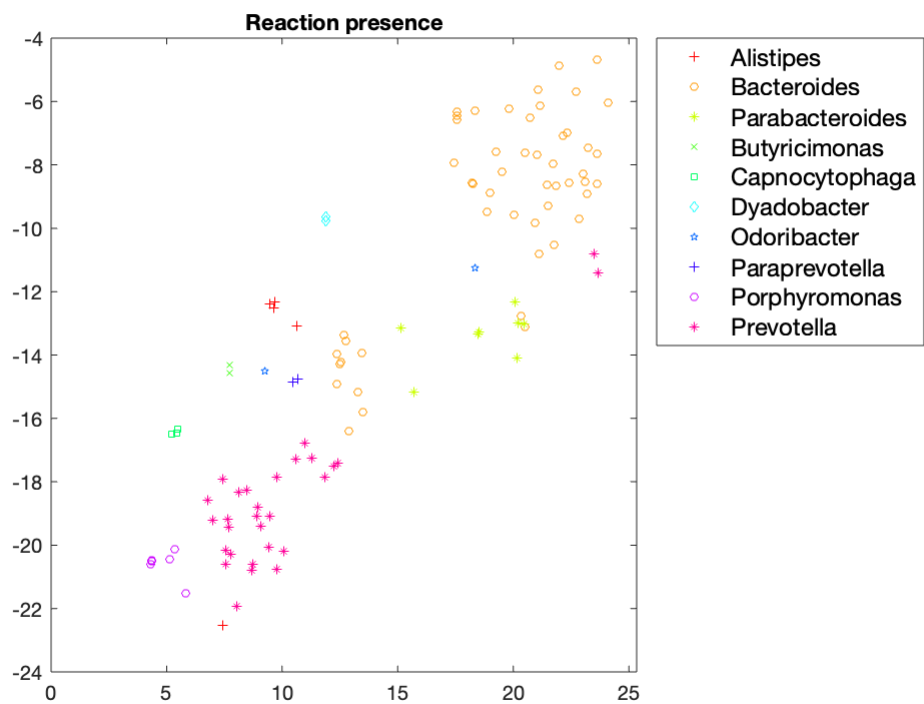
## Bacteroidetes



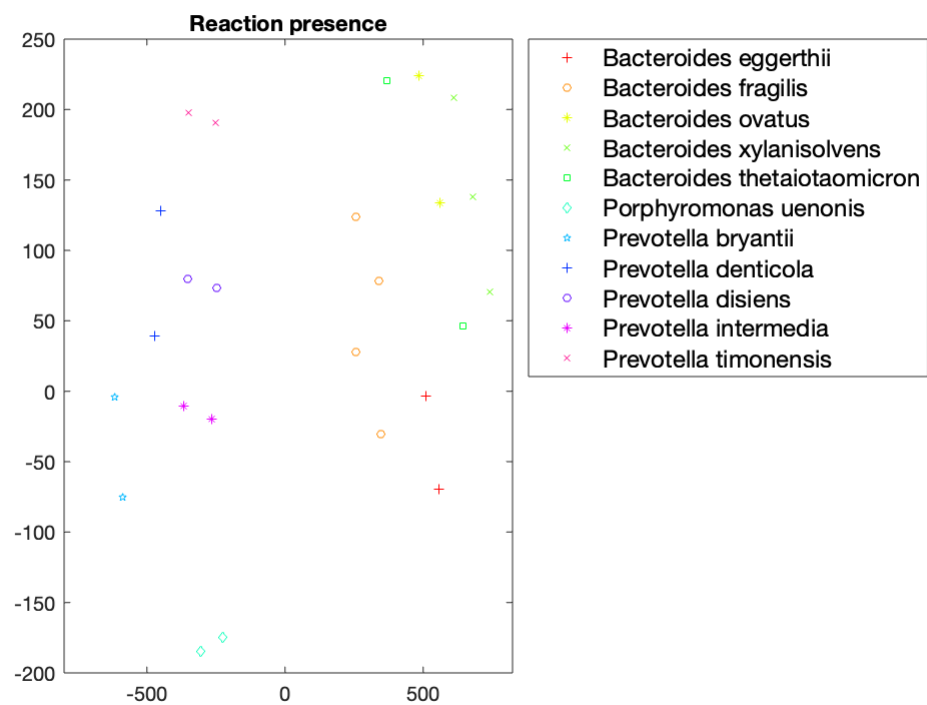
## Bacteroidetes



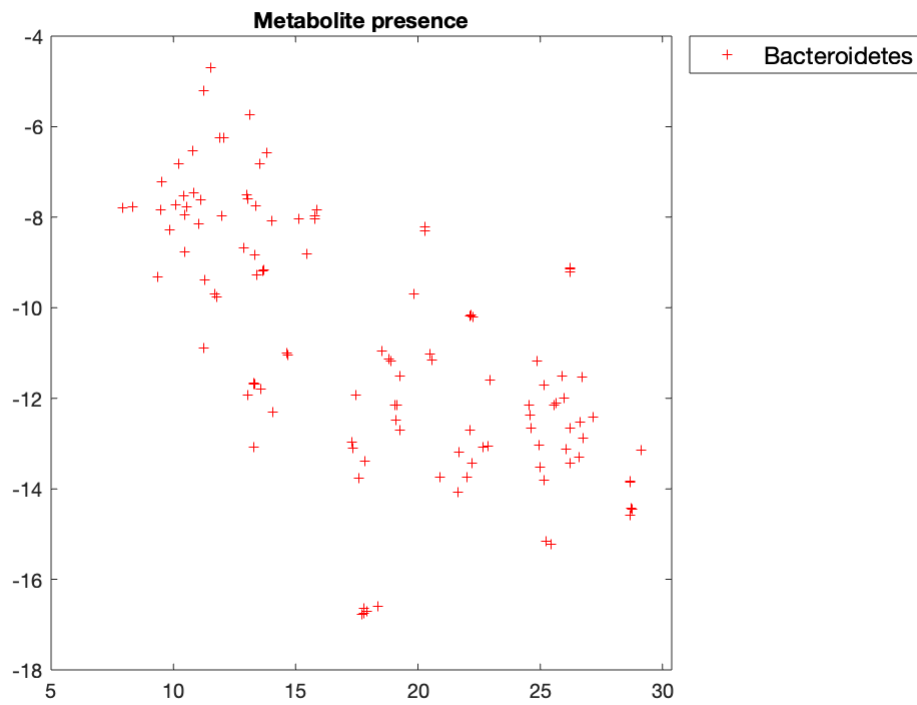
## Bacteroidetes



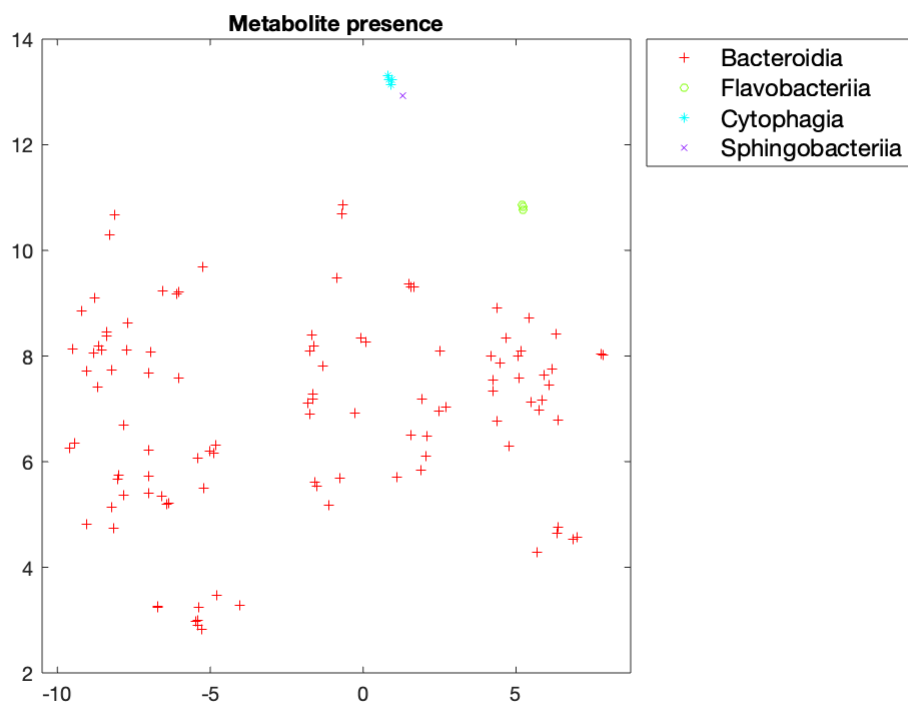
## Bacteroidetes



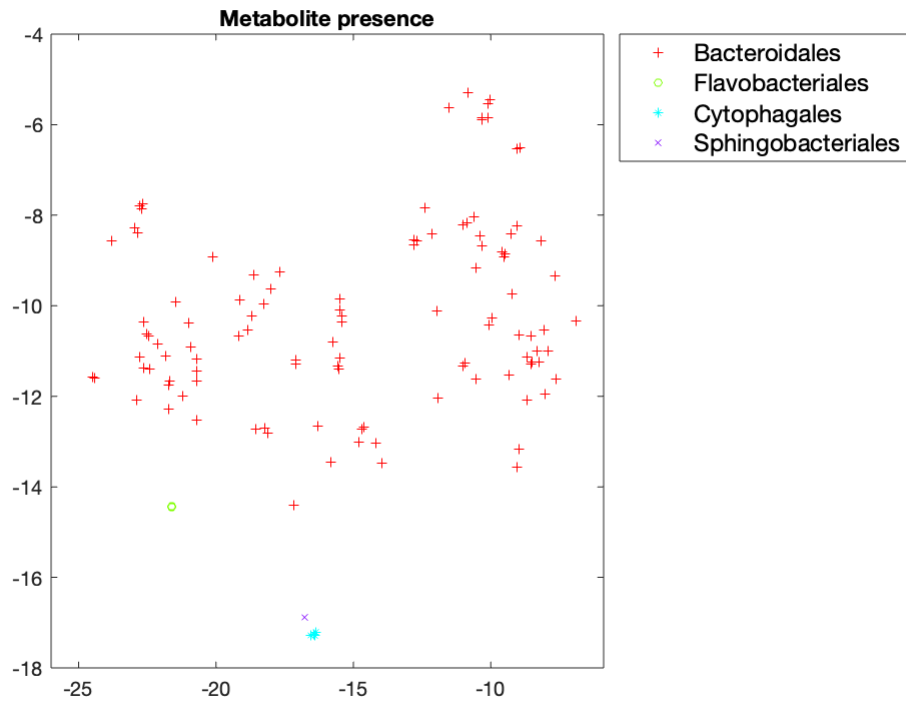
## Bacteroidetes



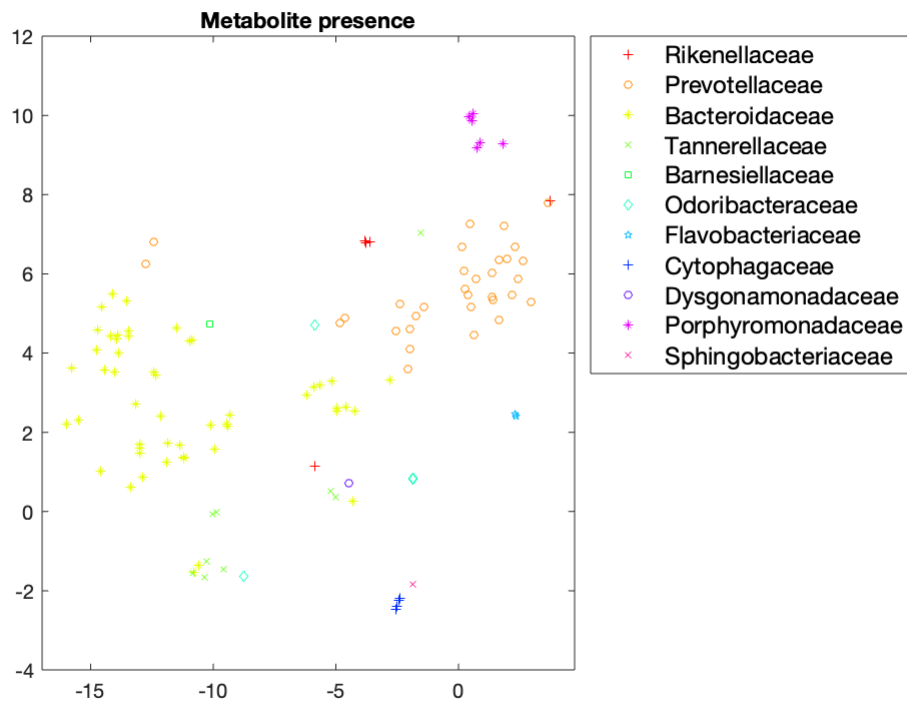
## Bacteroidetes



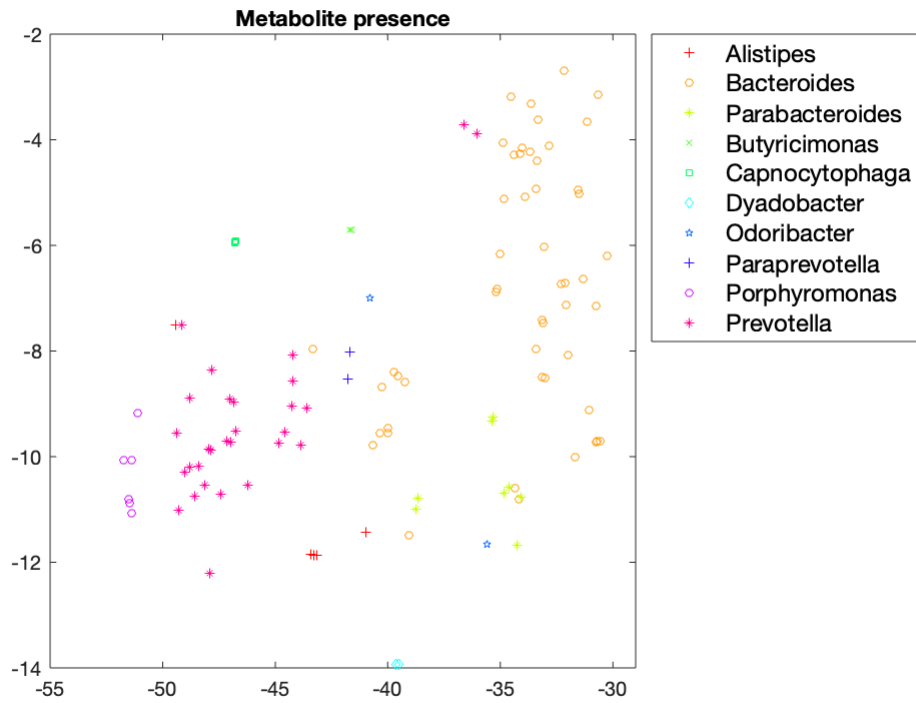
## Bacteroidetes



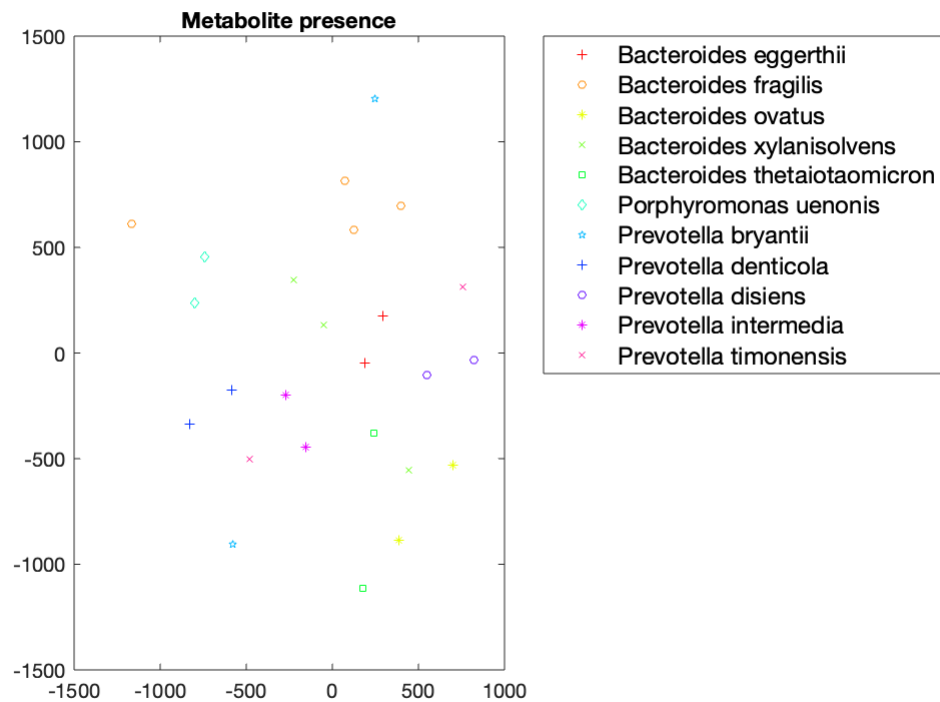
## Bacteroidetes



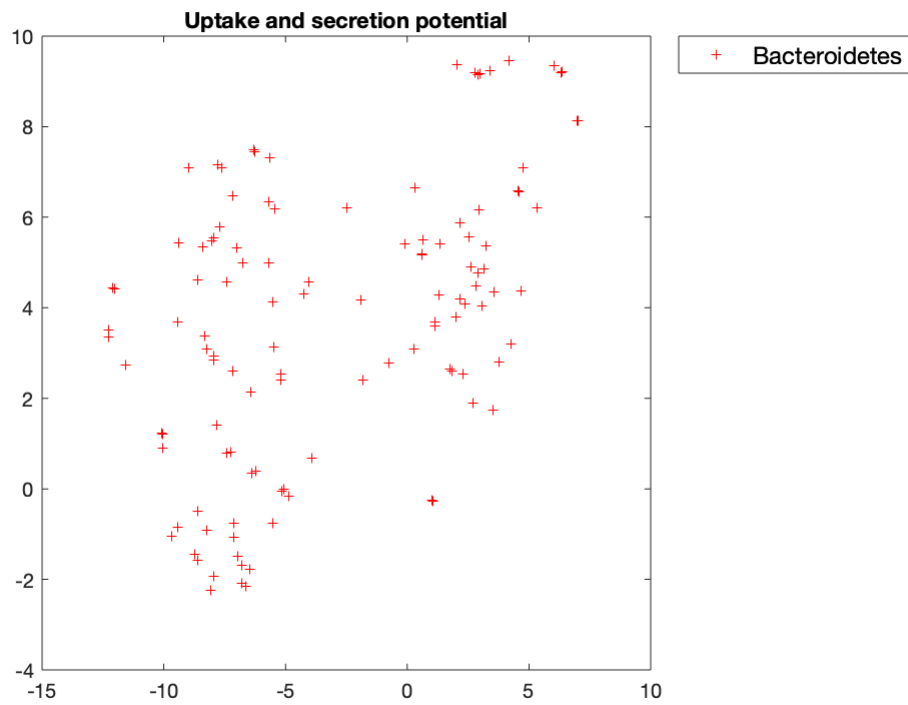
## Bacteroidetes



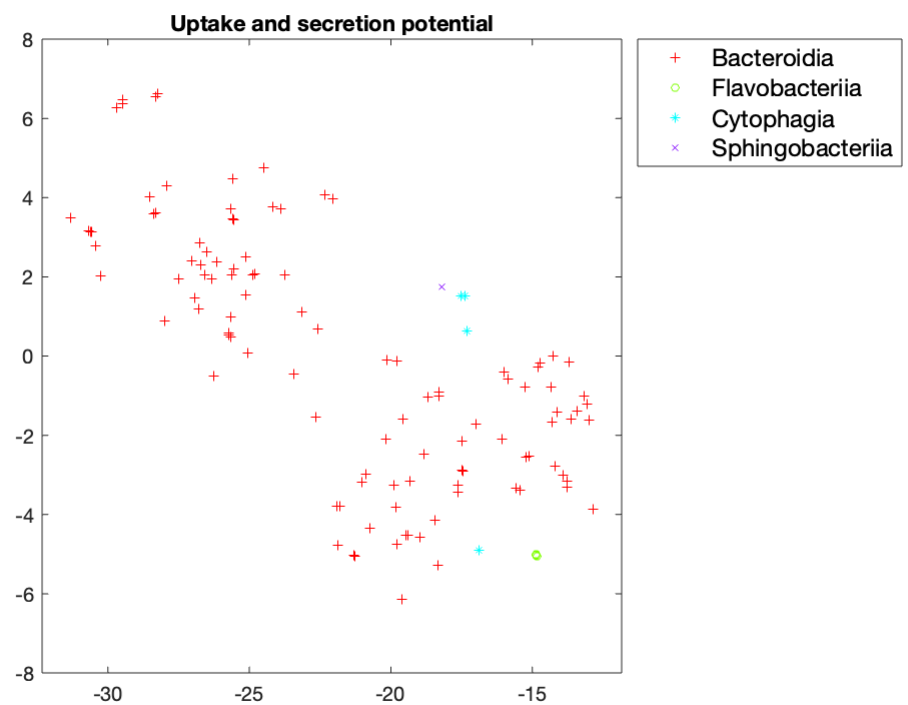
## Bacteroidetes



## Bacteroidetes

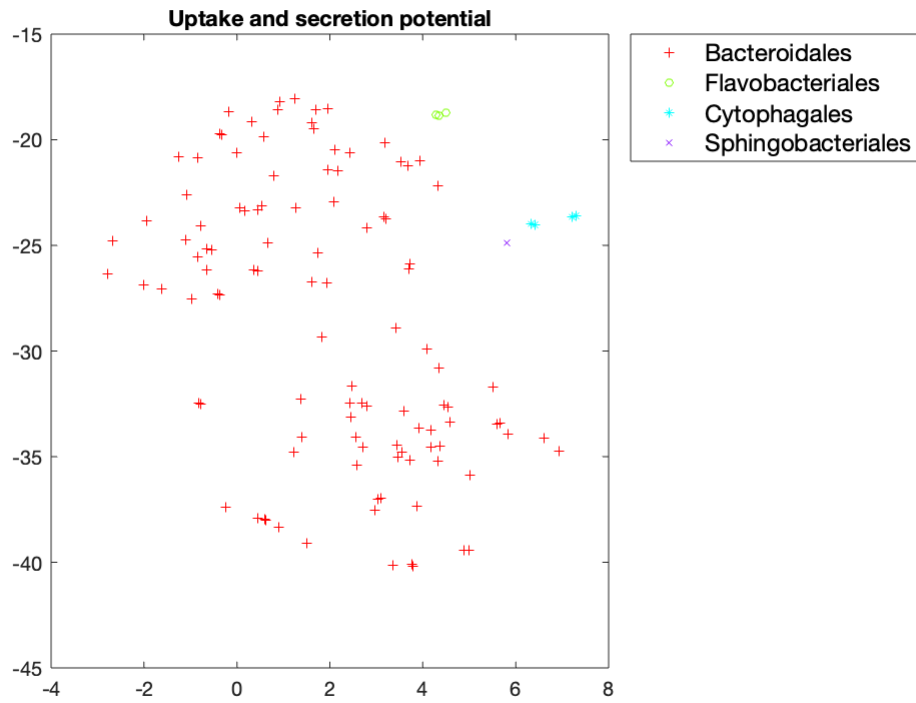


## Bacteroidetes

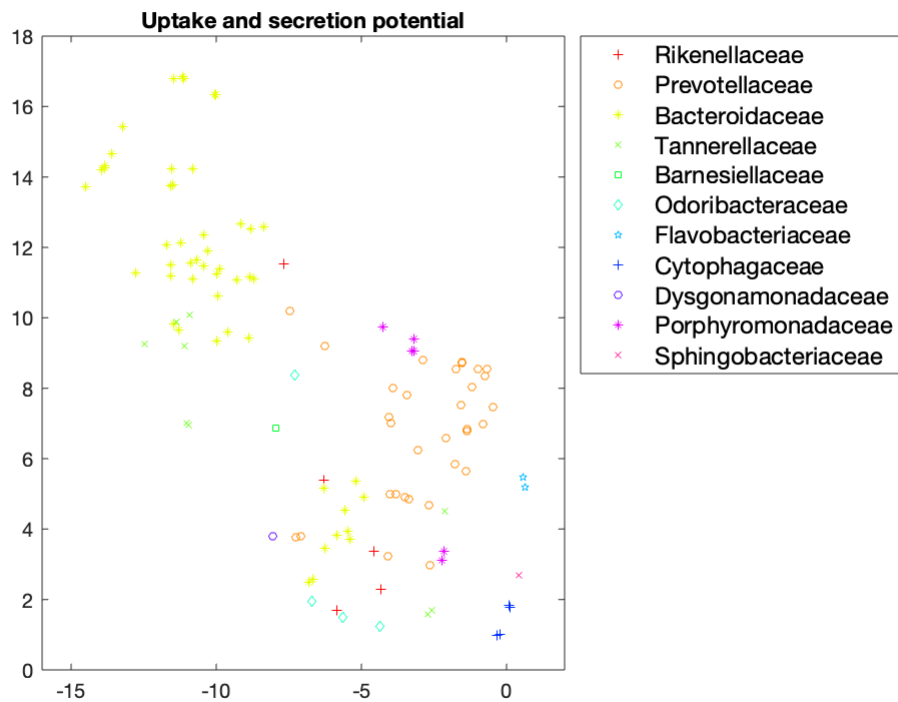




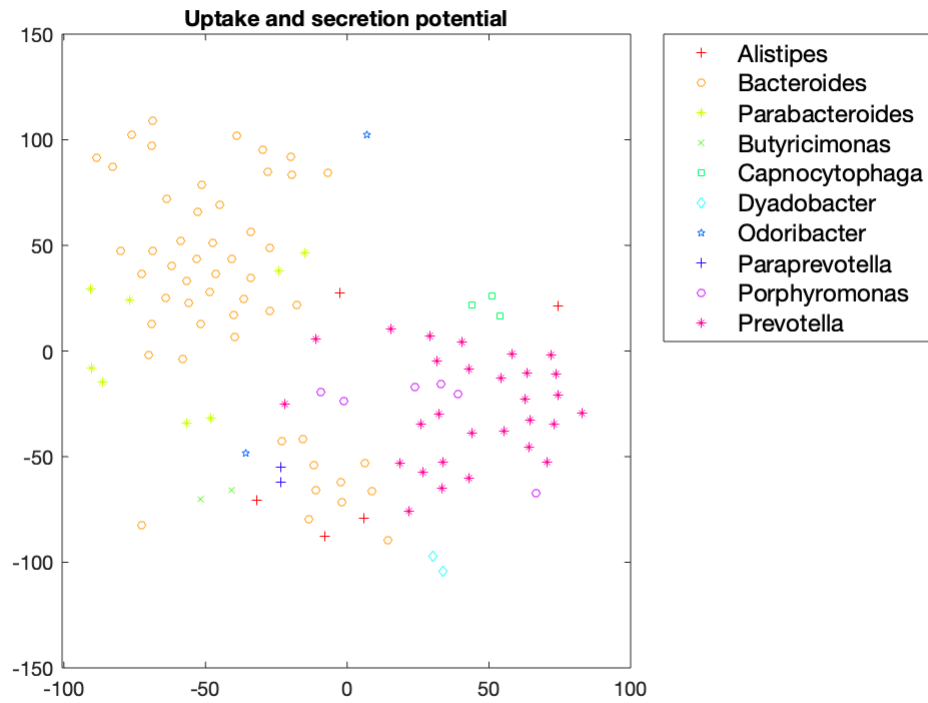
## Bacteroidetes



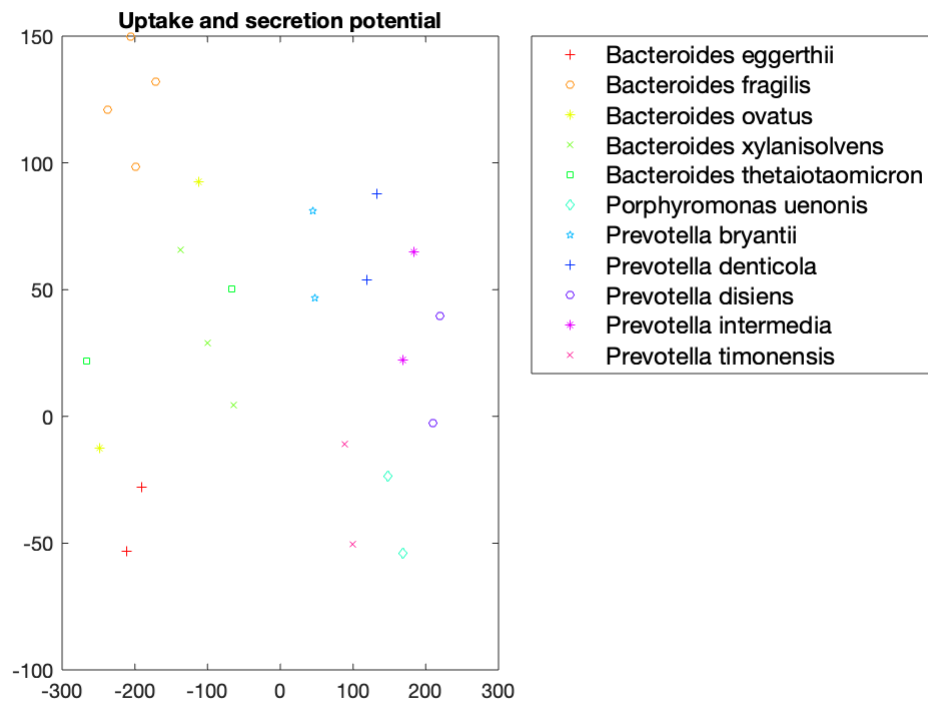
## Bacteroidetes



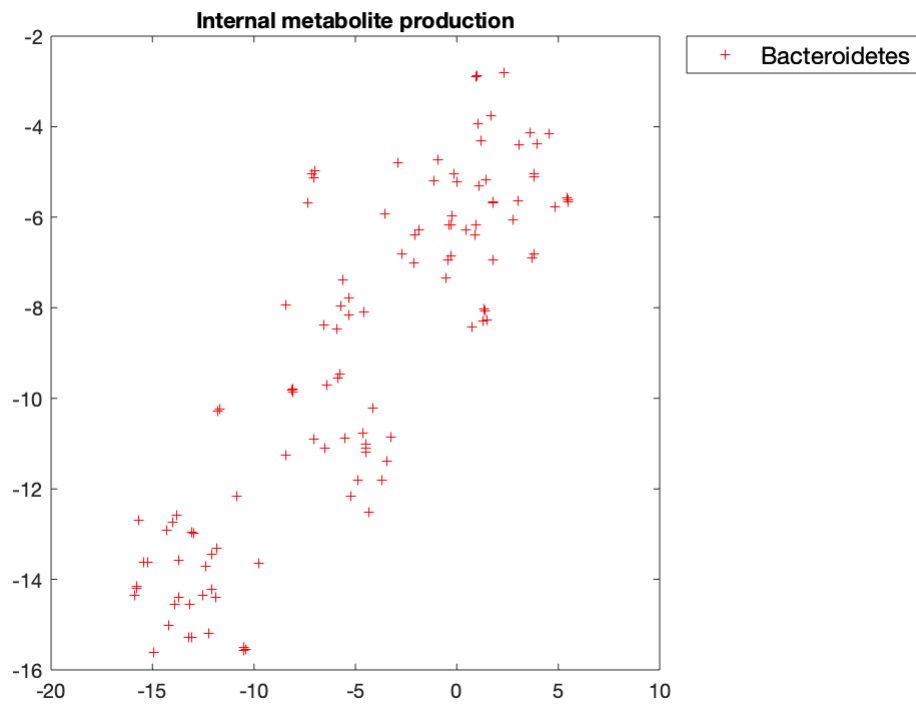
## Bacteroidetes



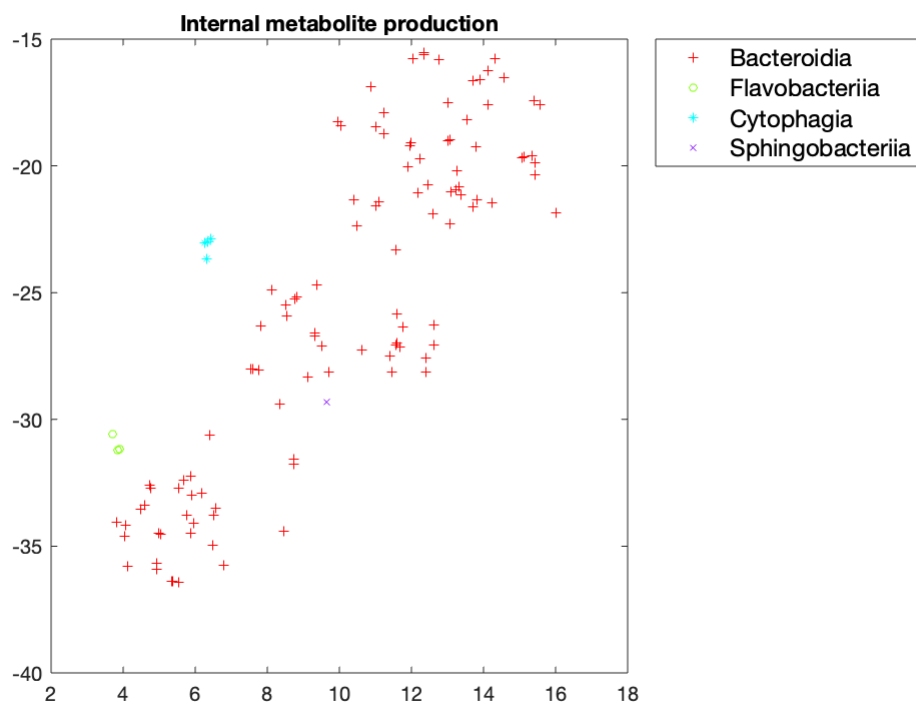
## Bacteroidetes



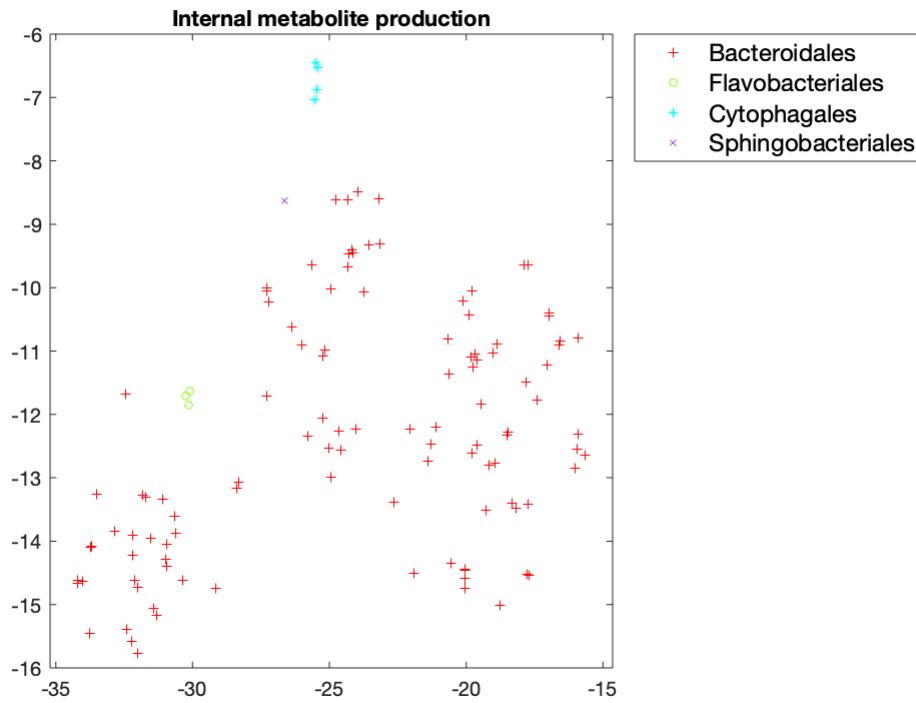
## Bacteroidetes



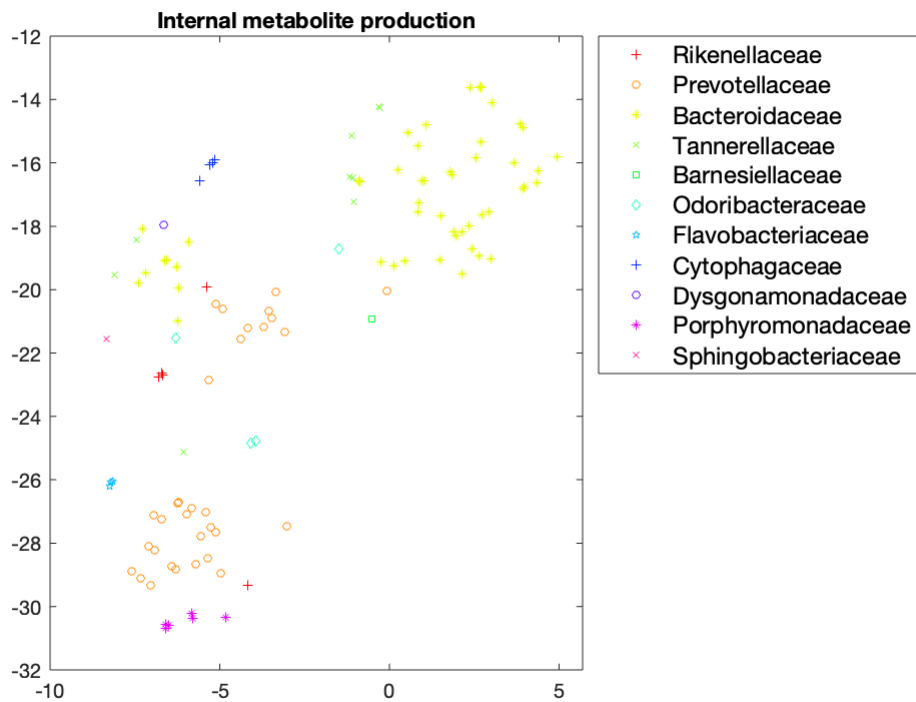
## Bacteroidetes



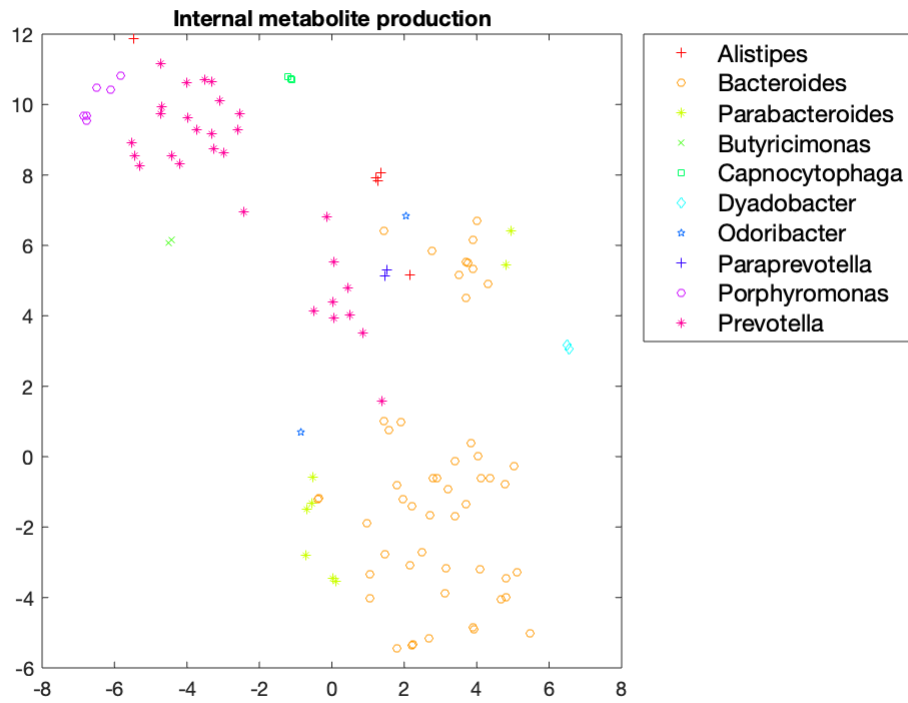
## Bacteroidetes



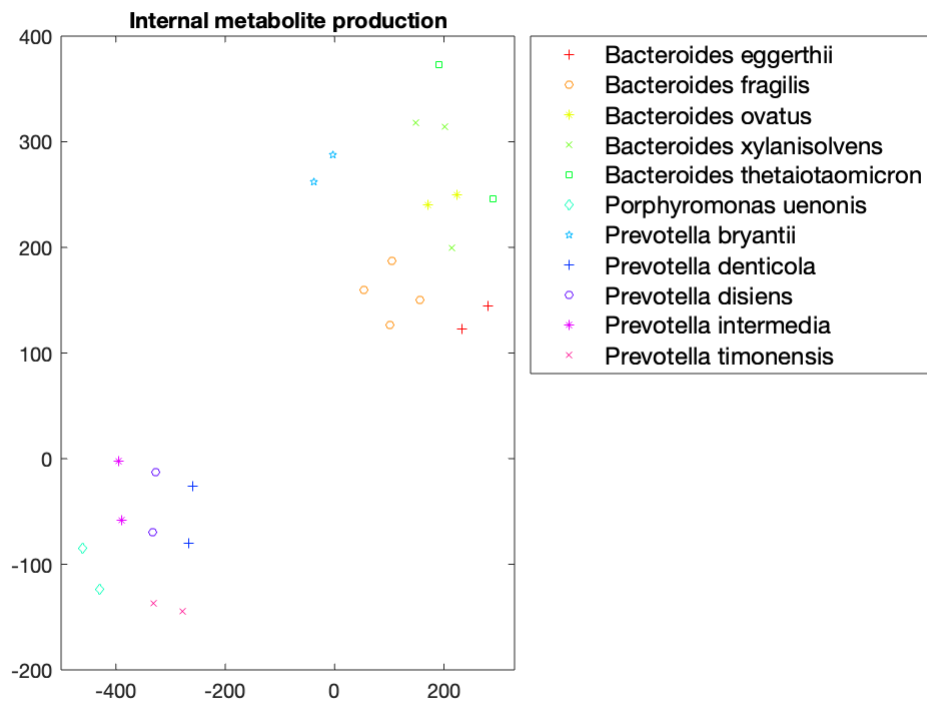
## Bacteroidetes

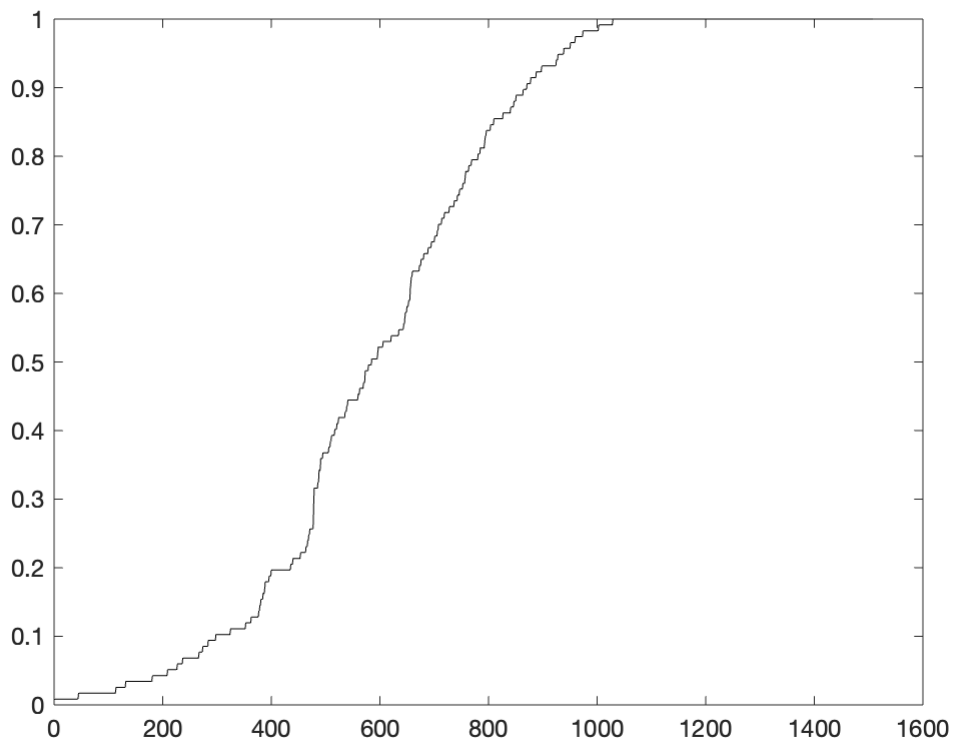
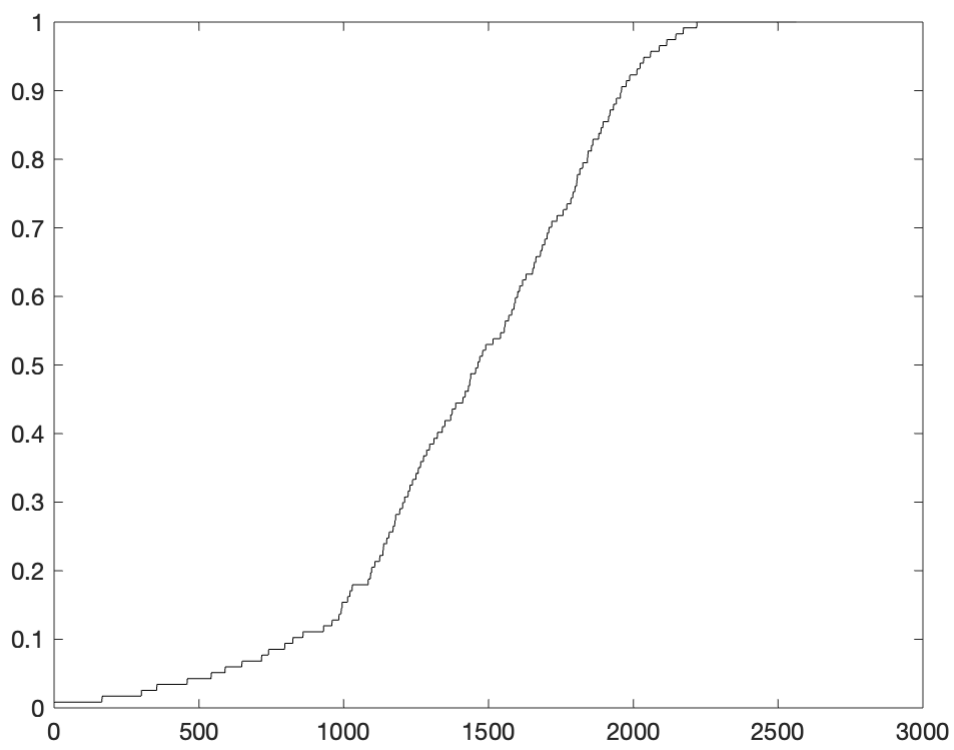


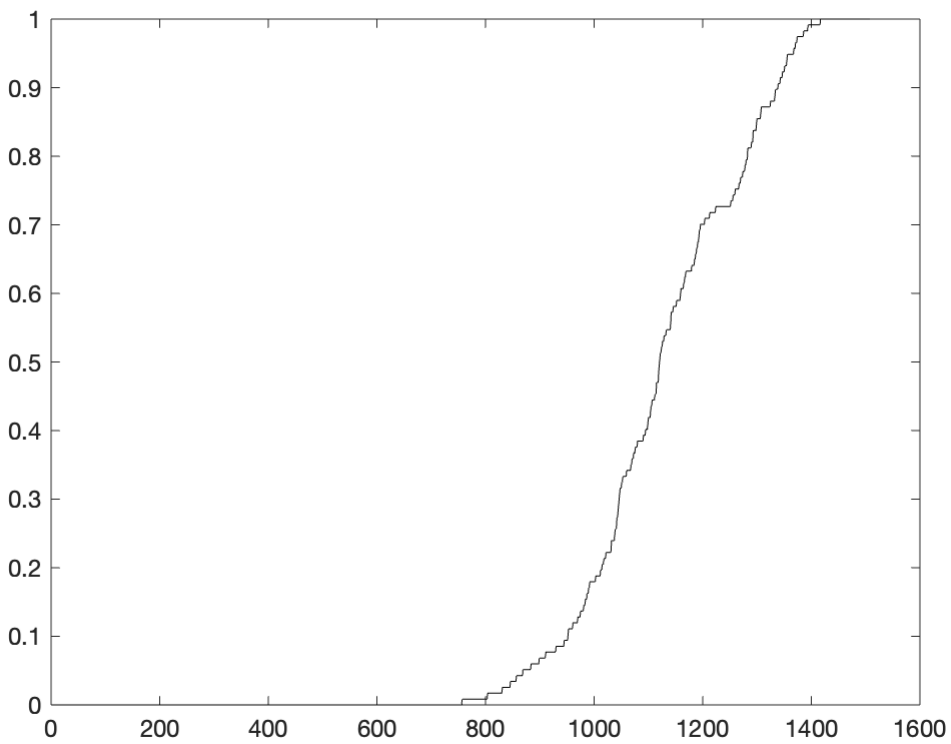
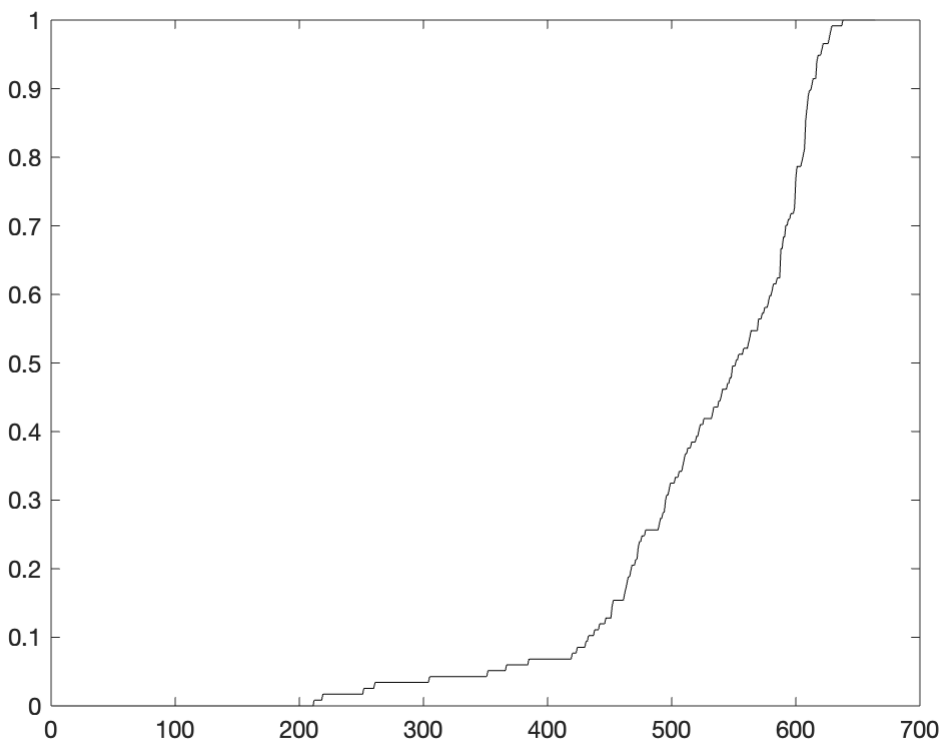
## Bacteroidetes



## Bacteroidetes







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