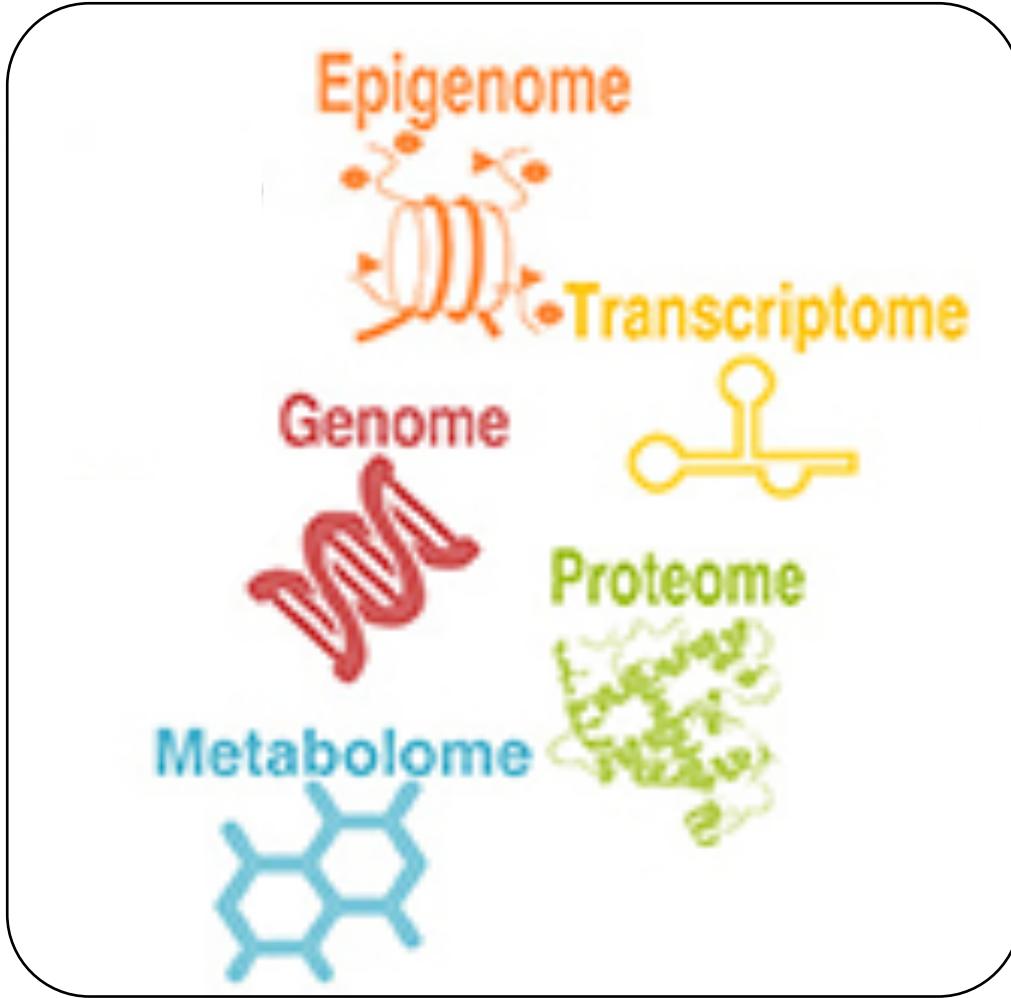


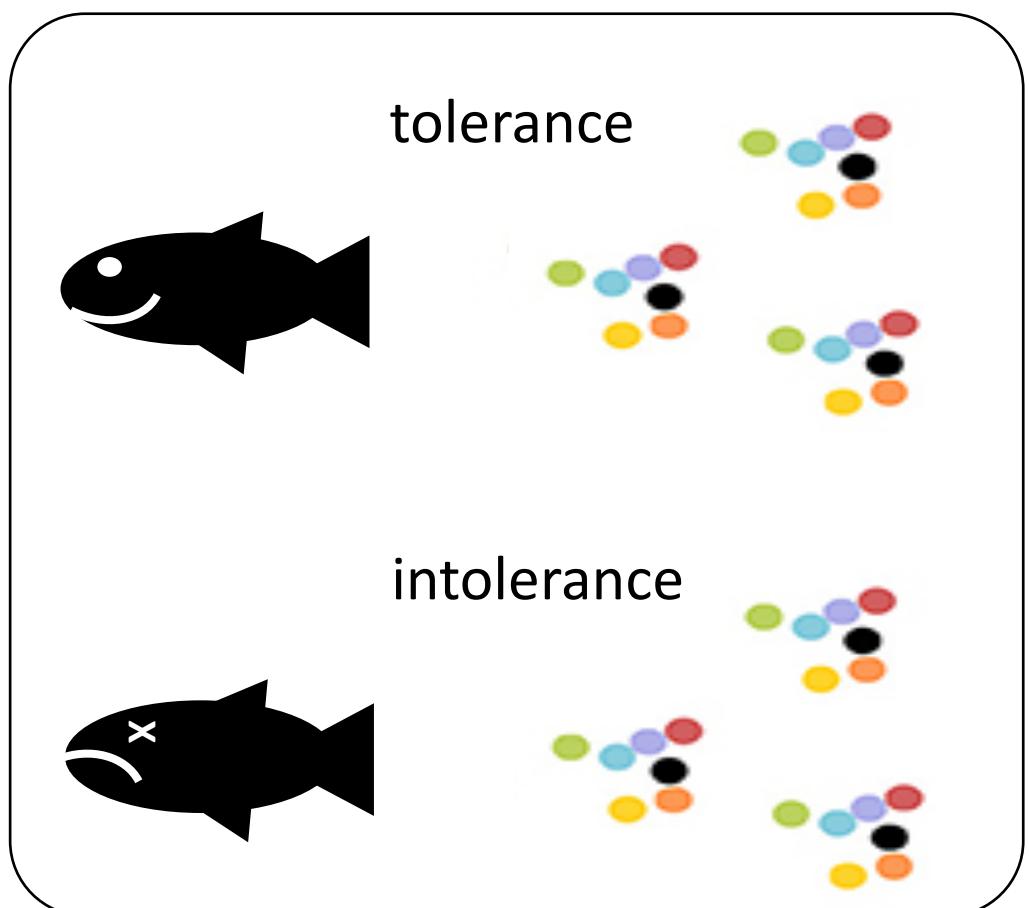
Environmental change



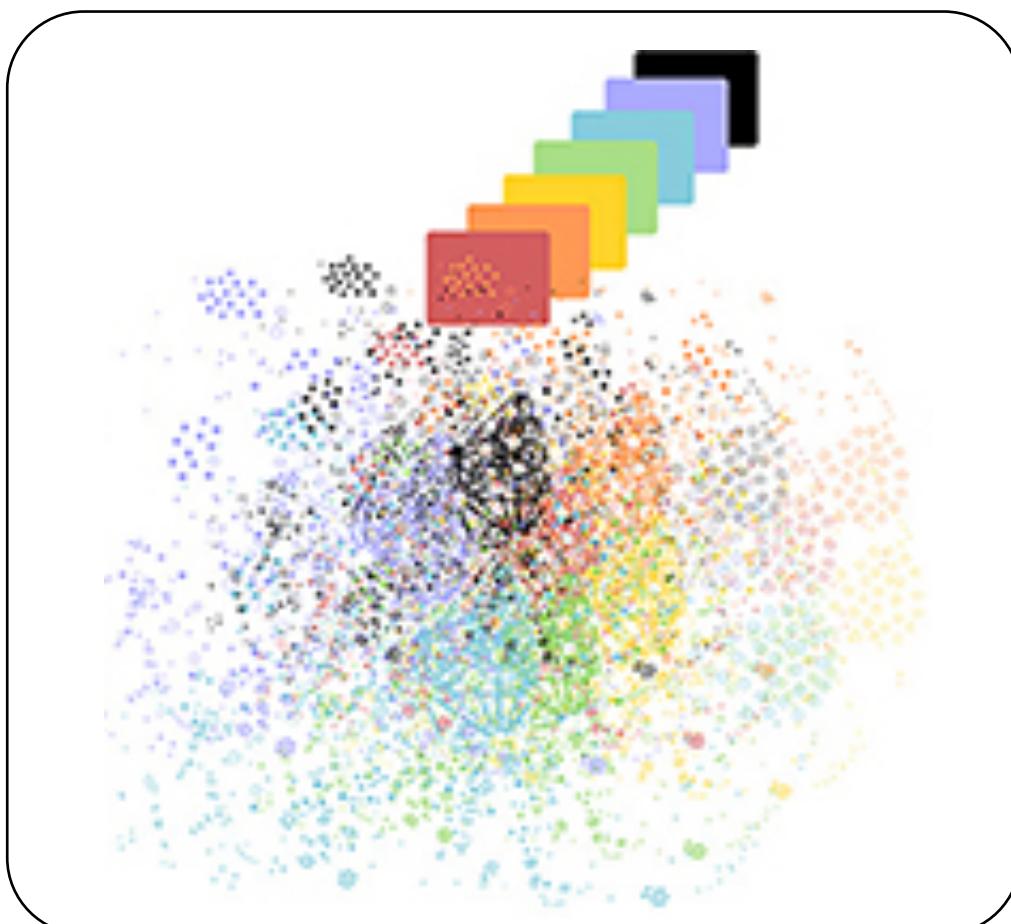
Molecular surveys



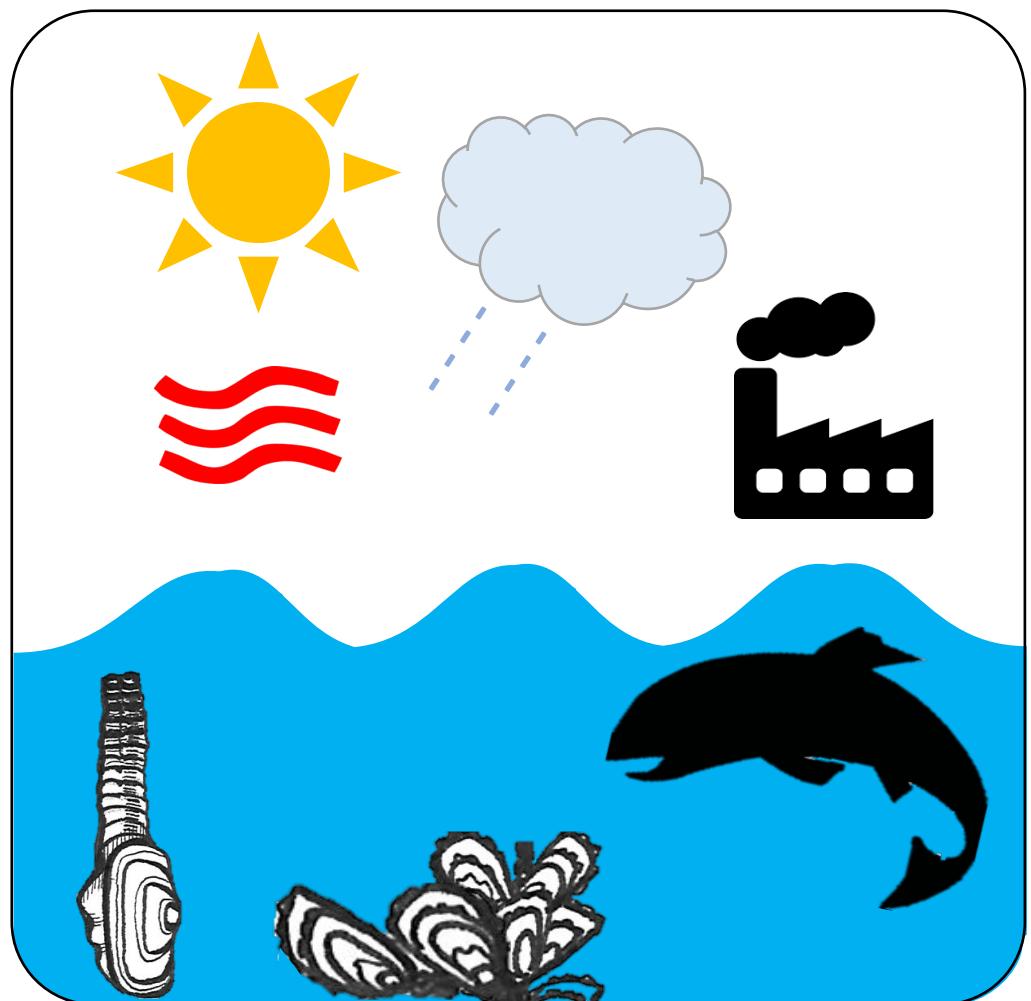
Signatures



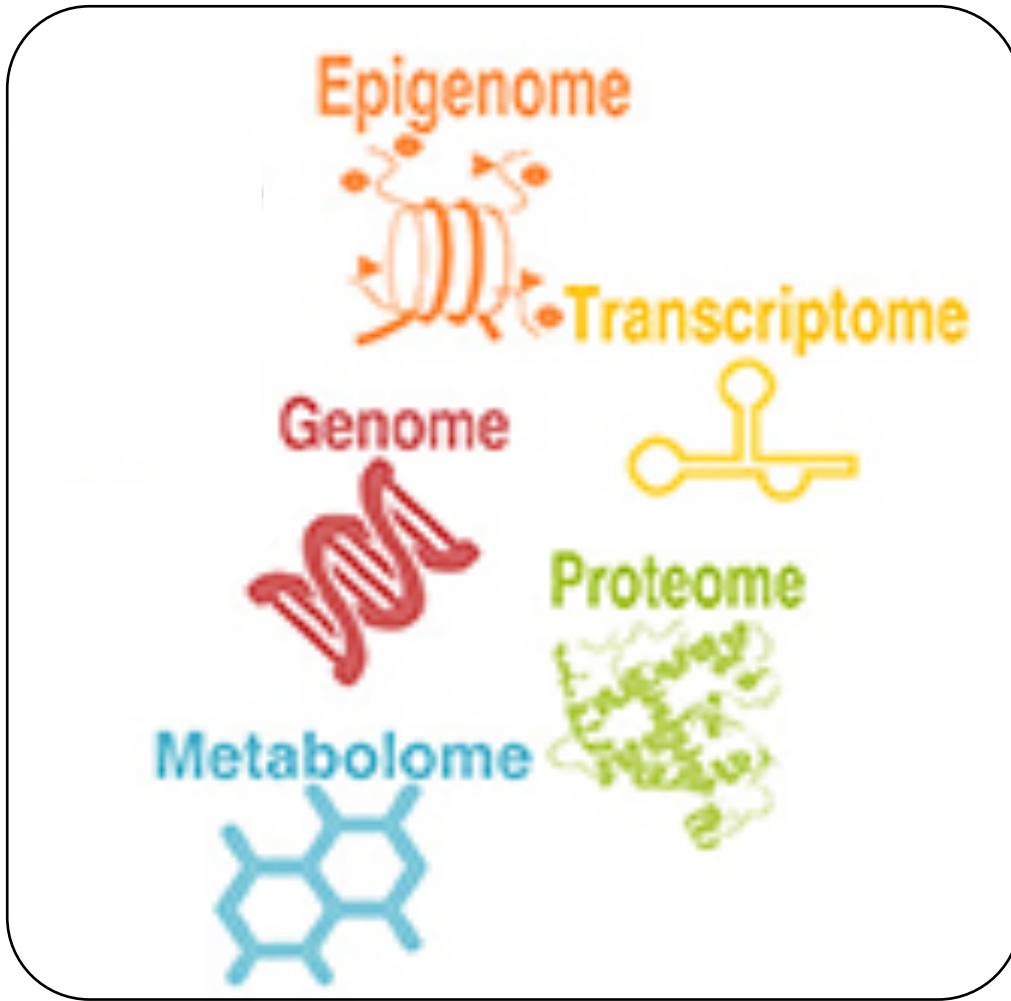
Data integration



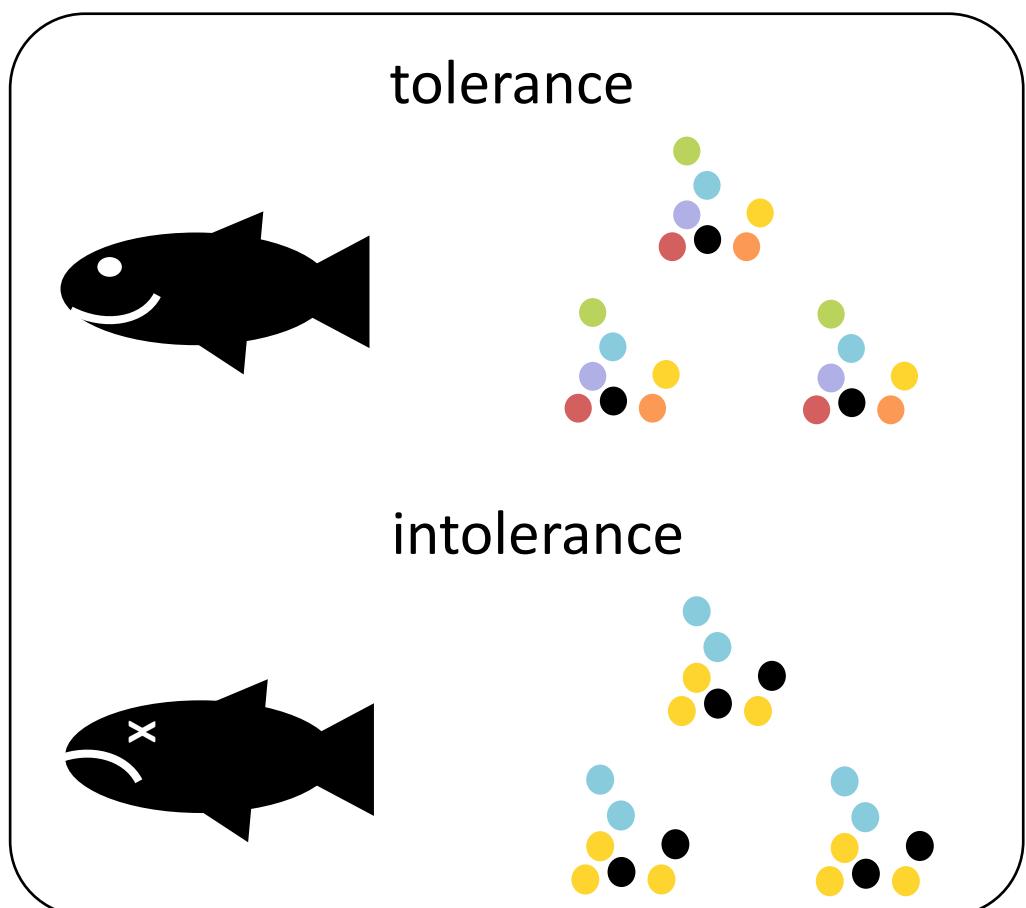
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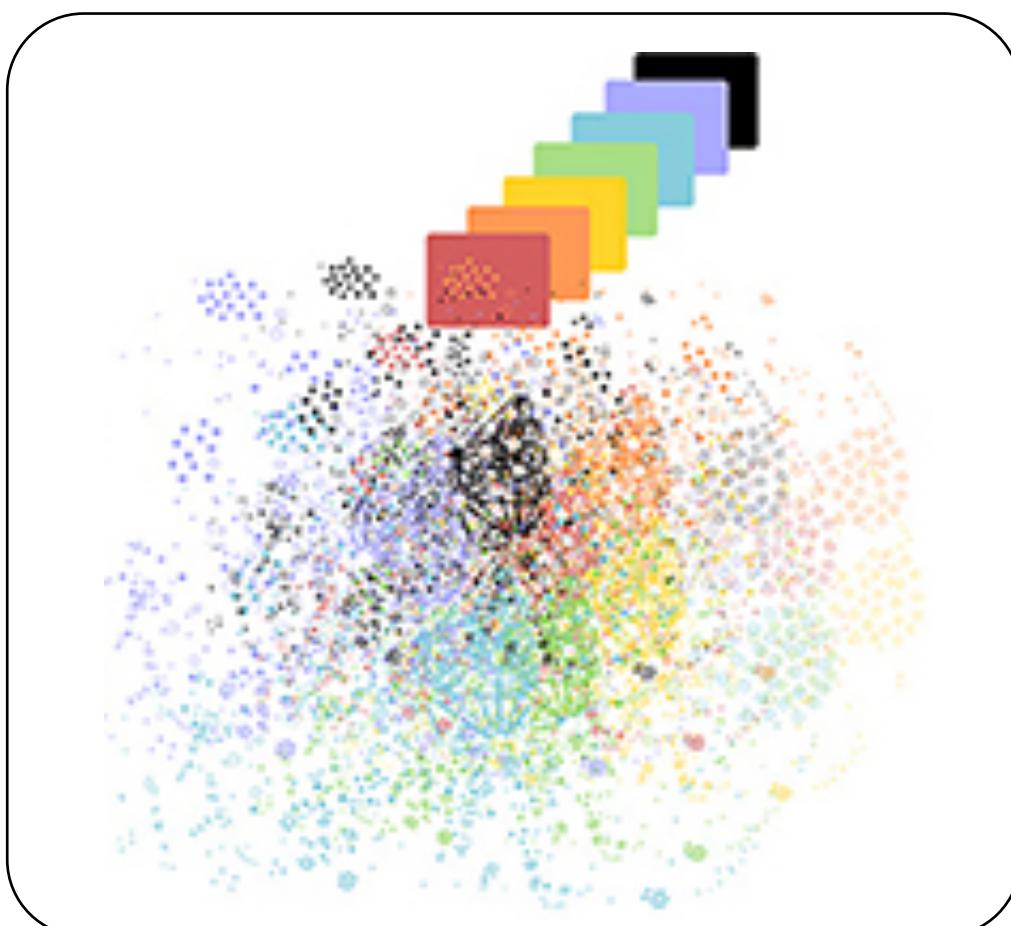
Molecular surveys



Signatures



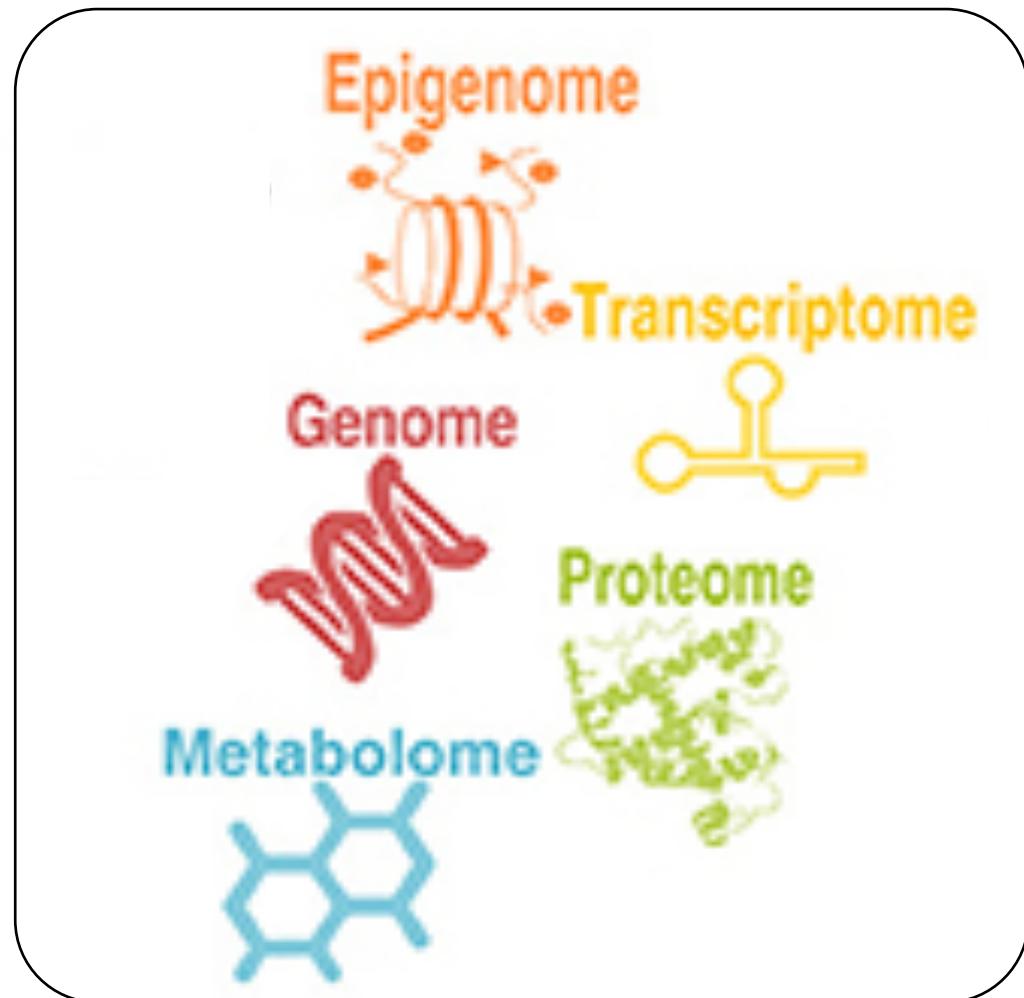
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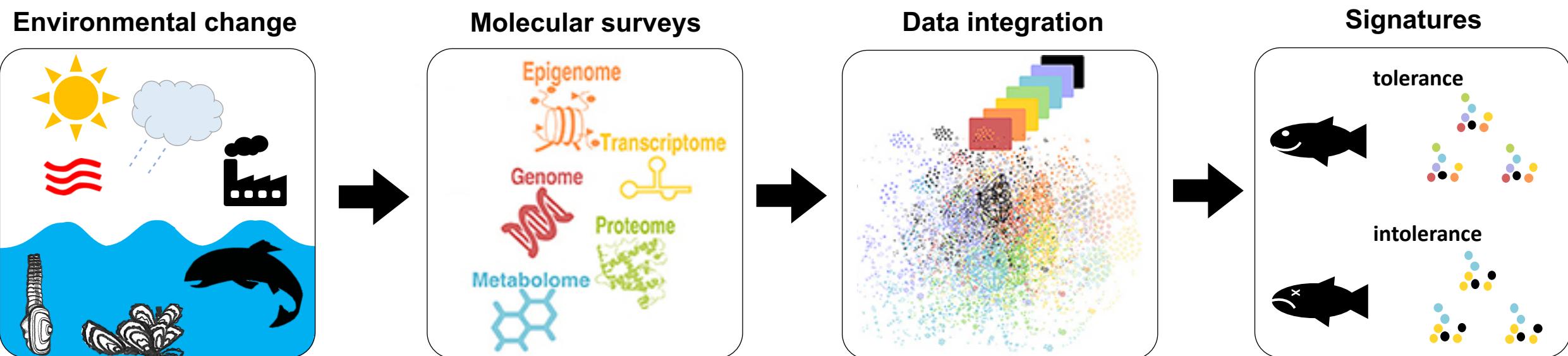
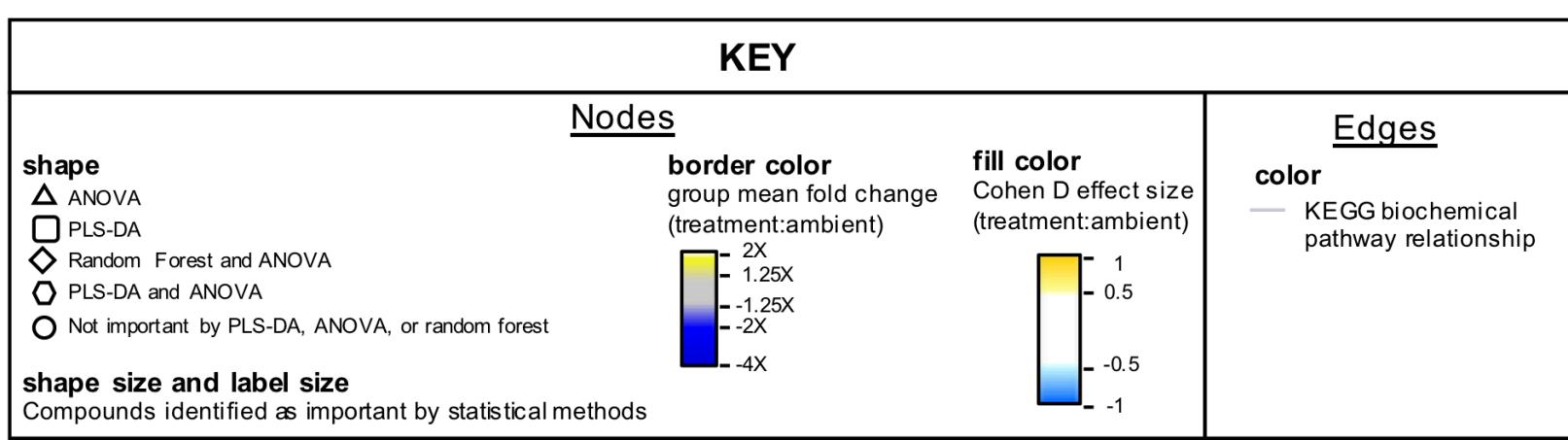
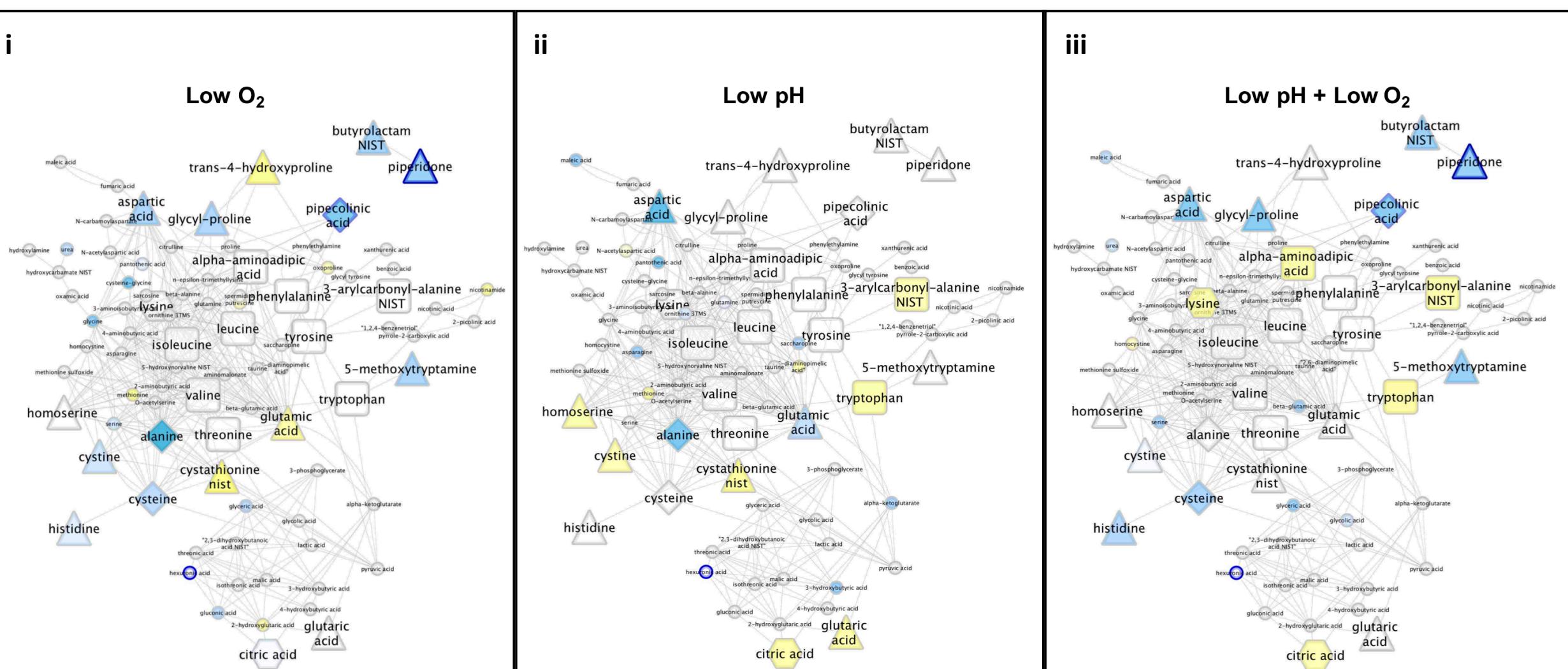


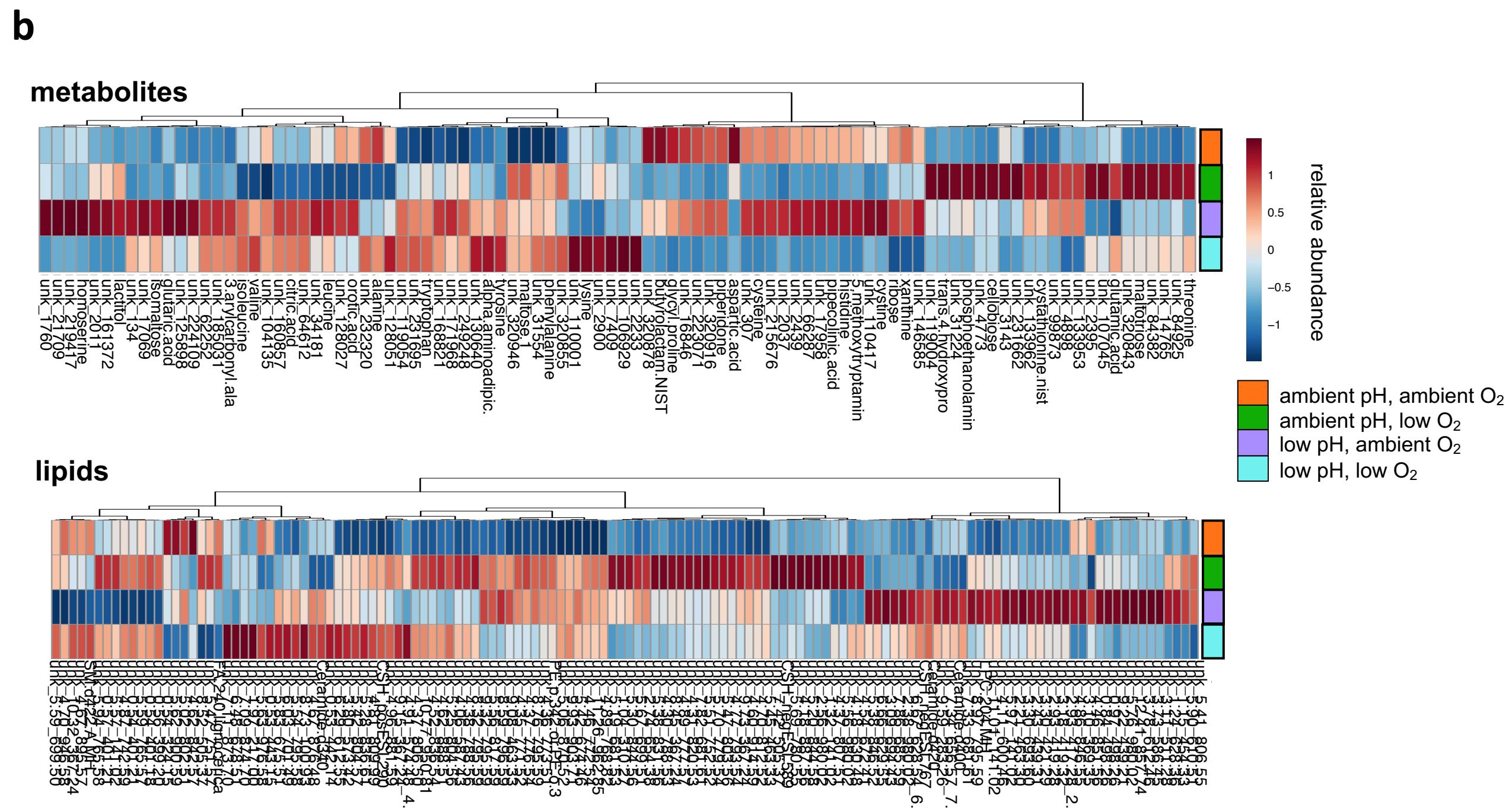
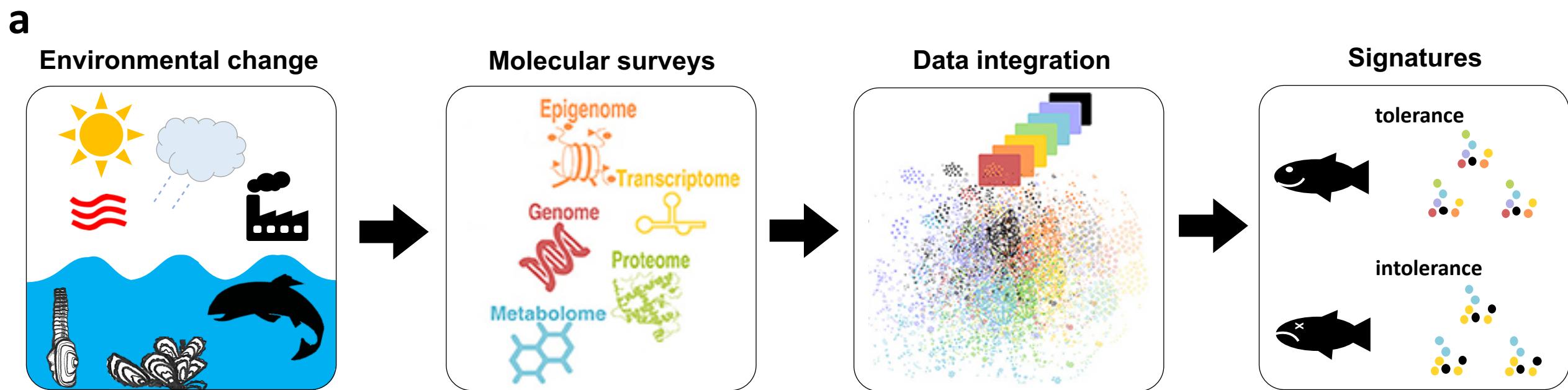
Environmental change



Molecular surveys



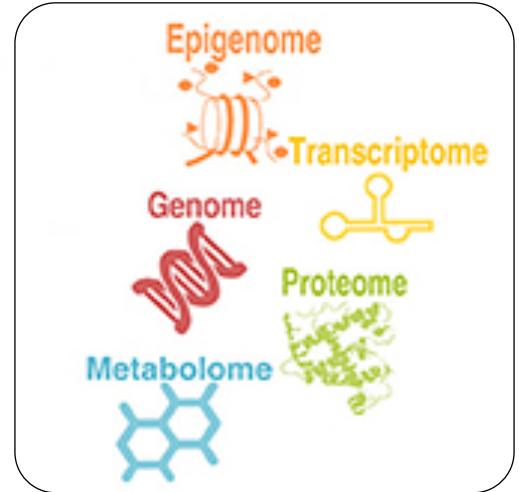
a**b**



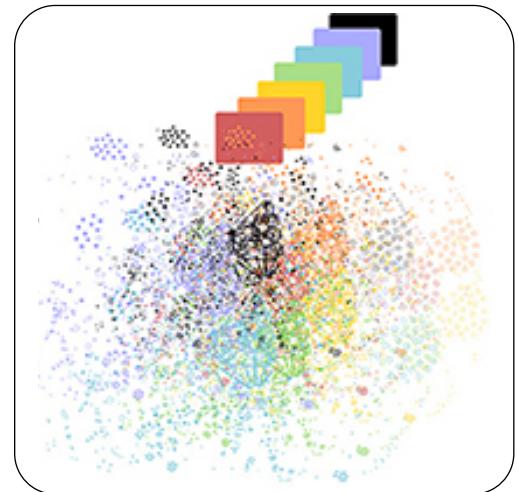
Environmental change pathogen exposure



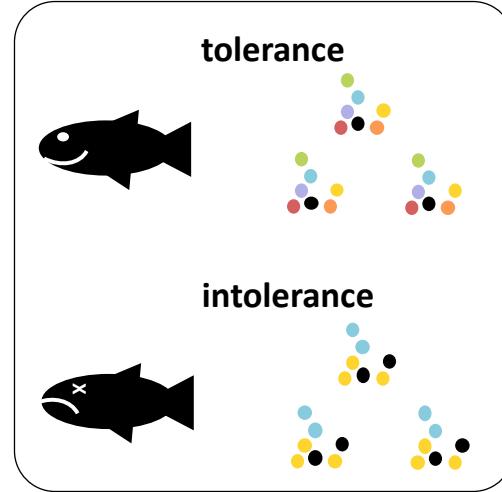
Molecular surveys



Data integration

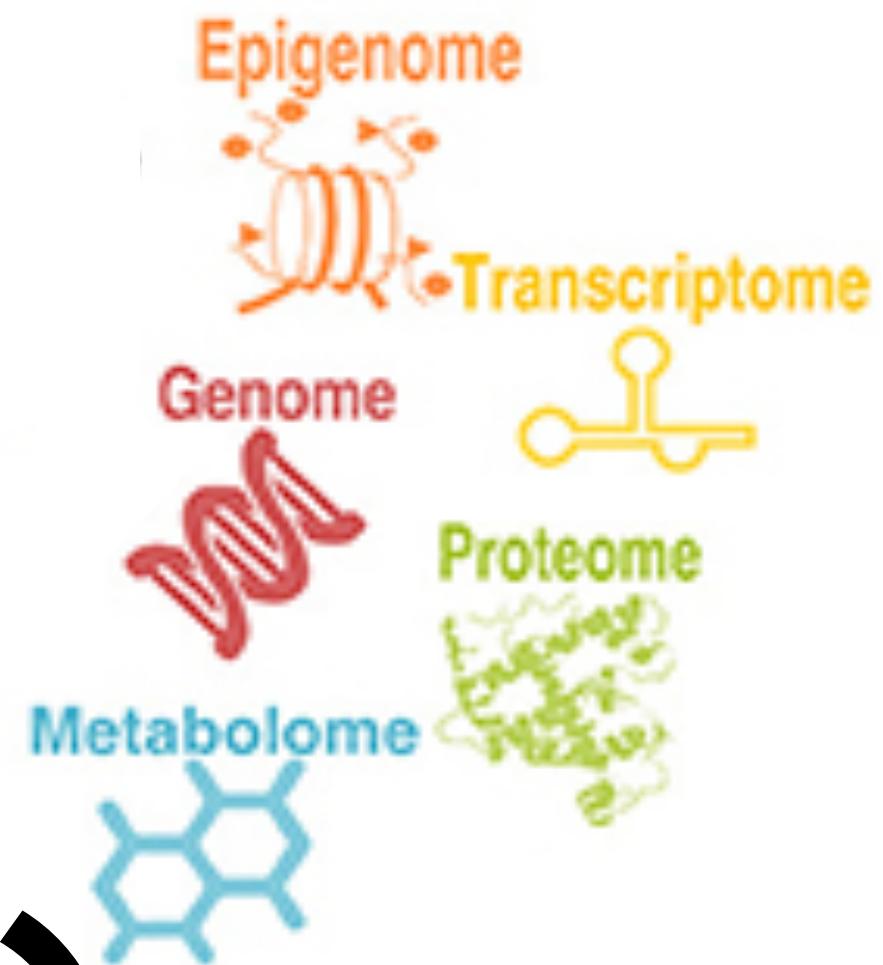
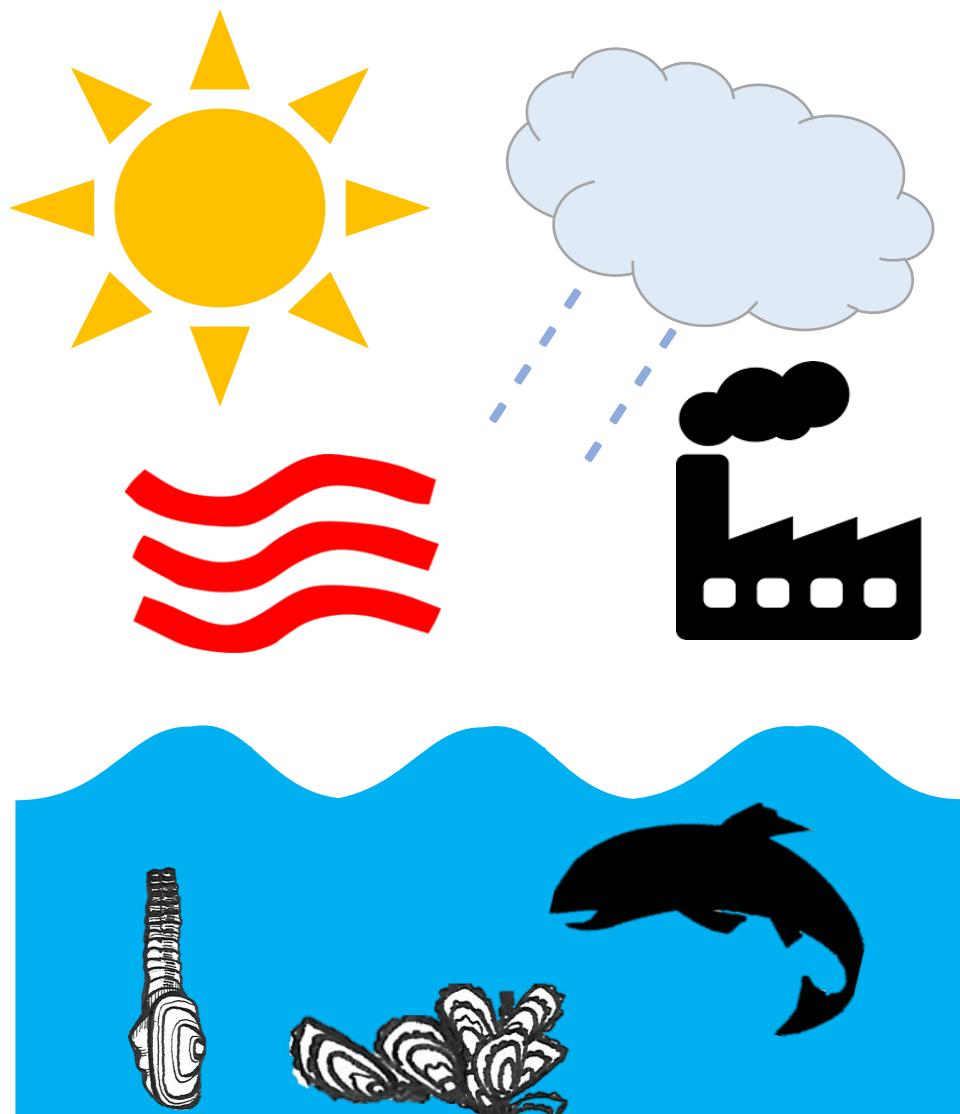


Biomarkers

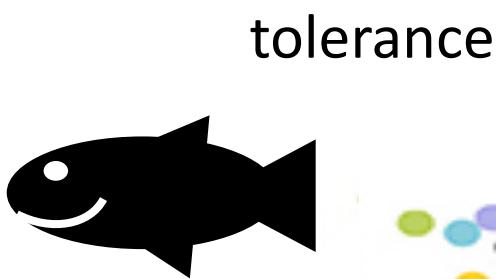


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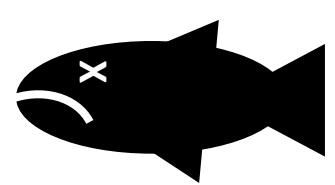
Molecular surveys



Signatures



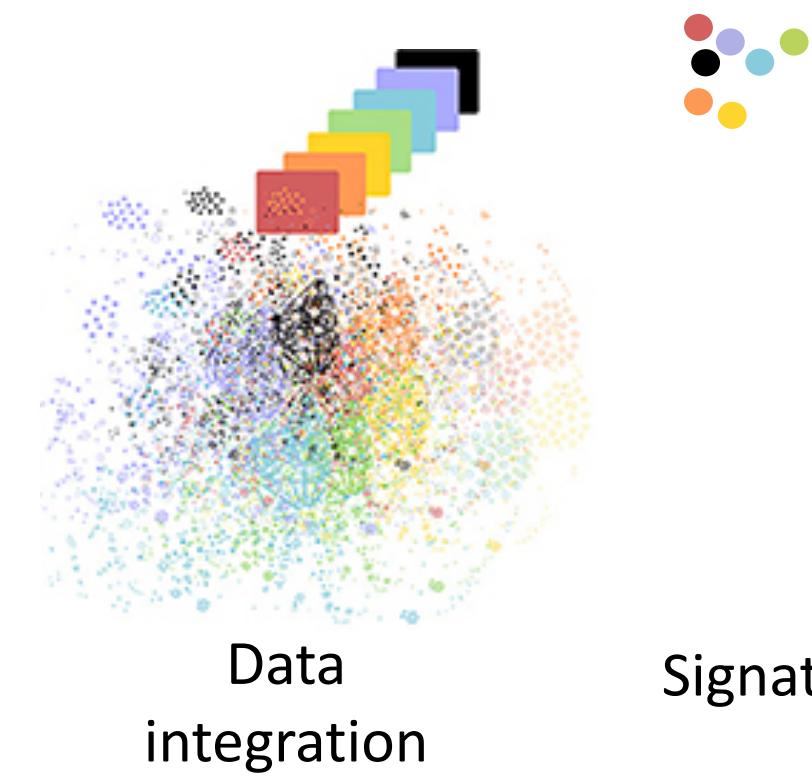
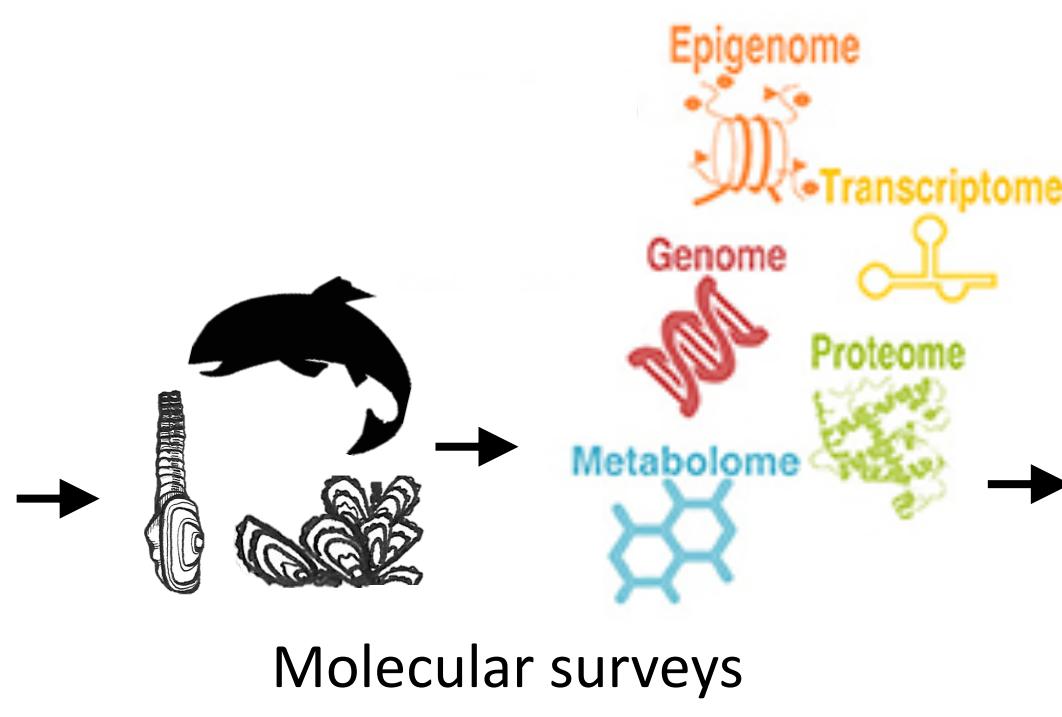
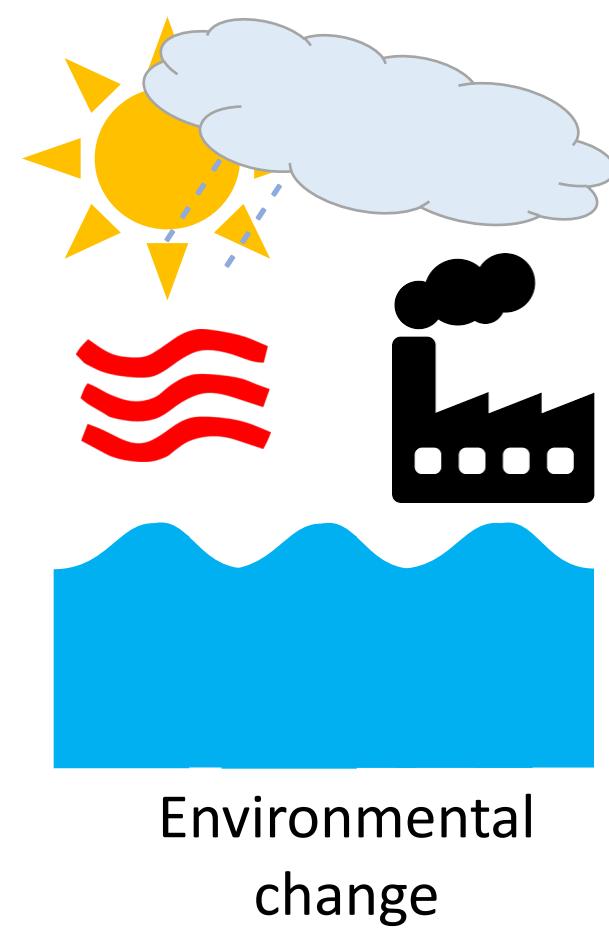
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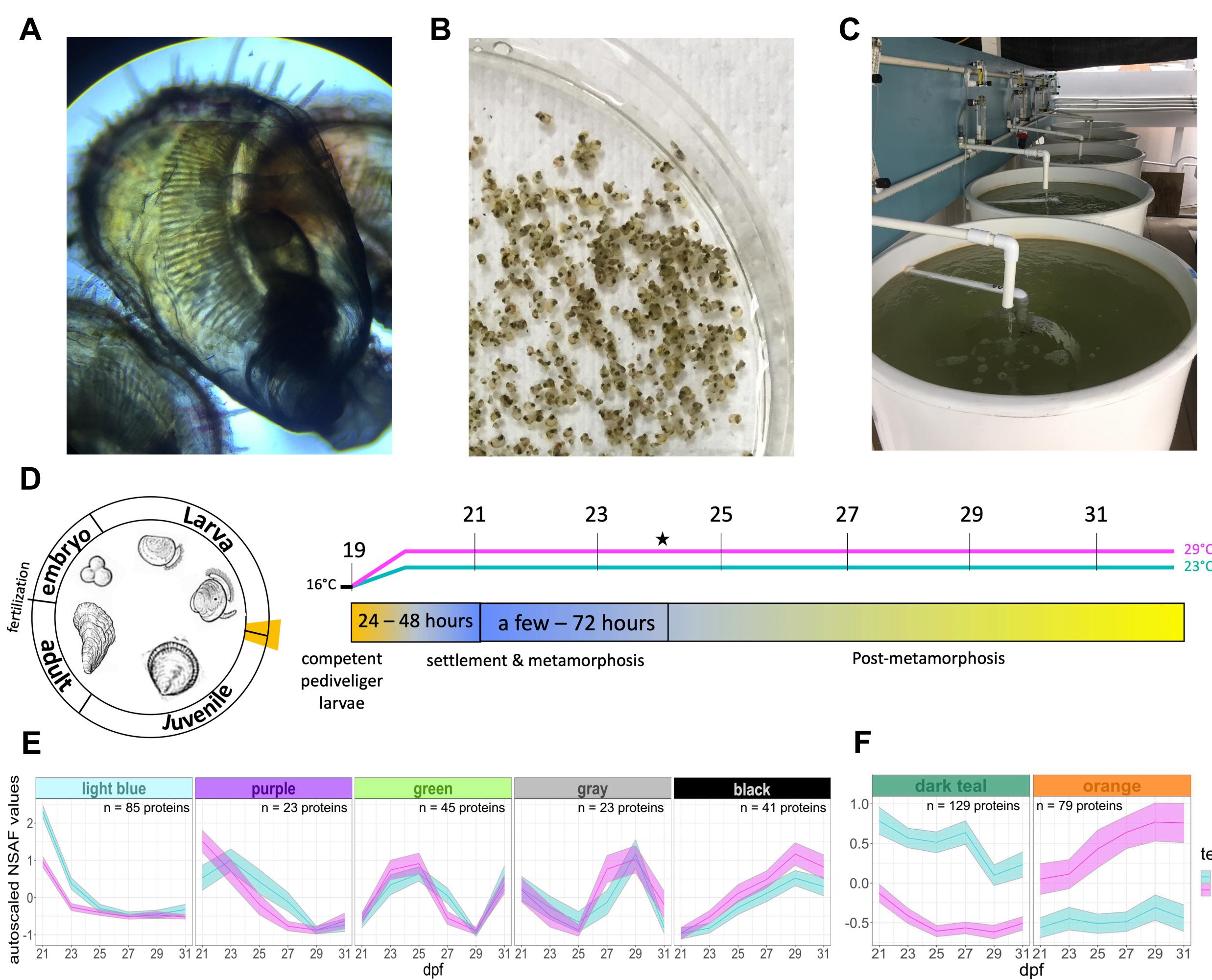


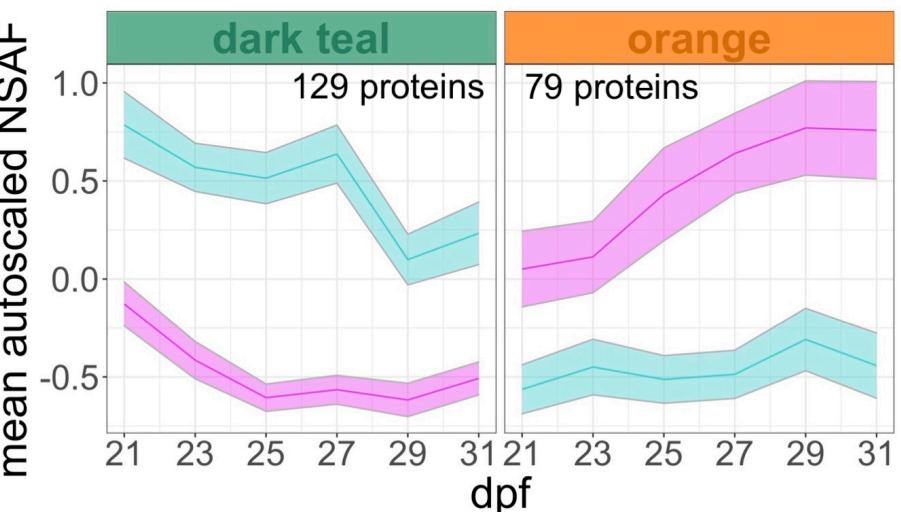
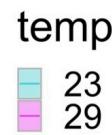
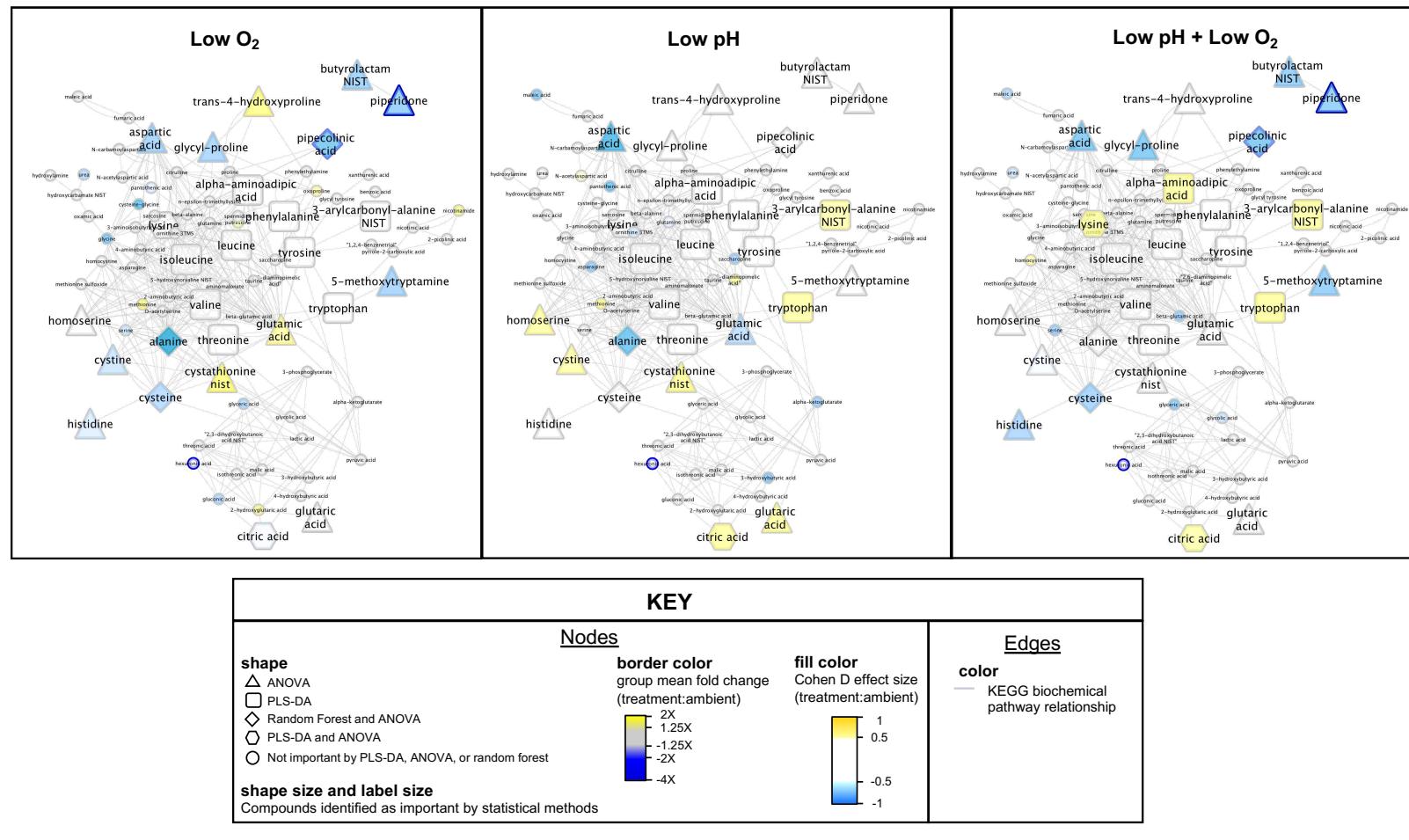
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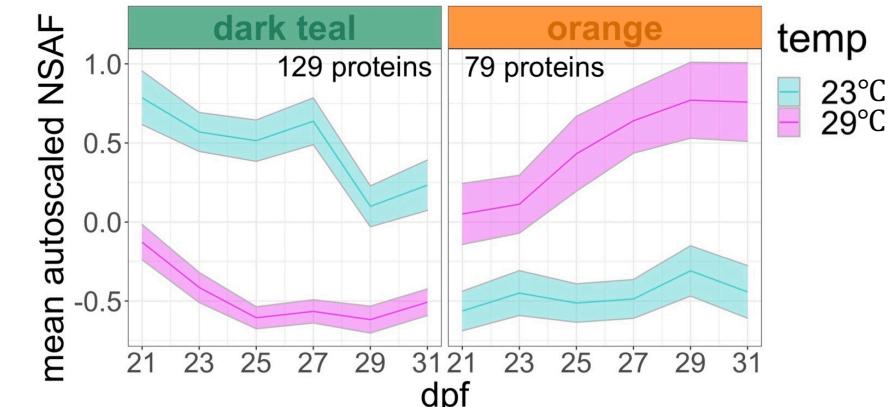
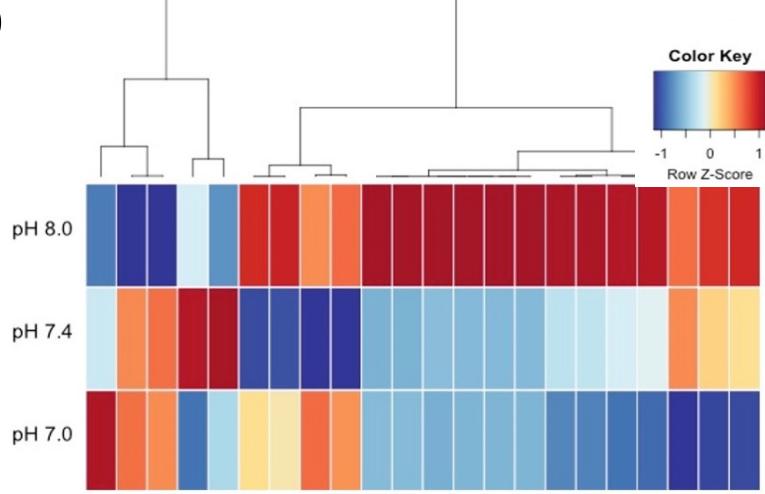
Data integration



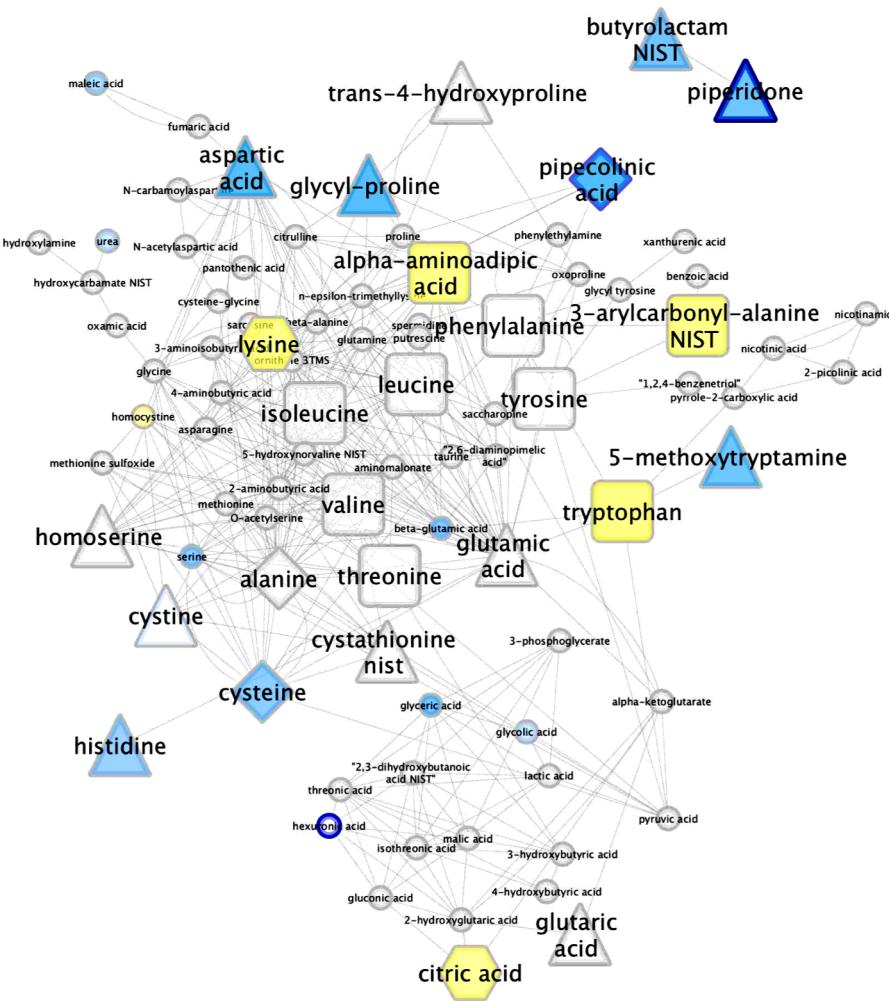


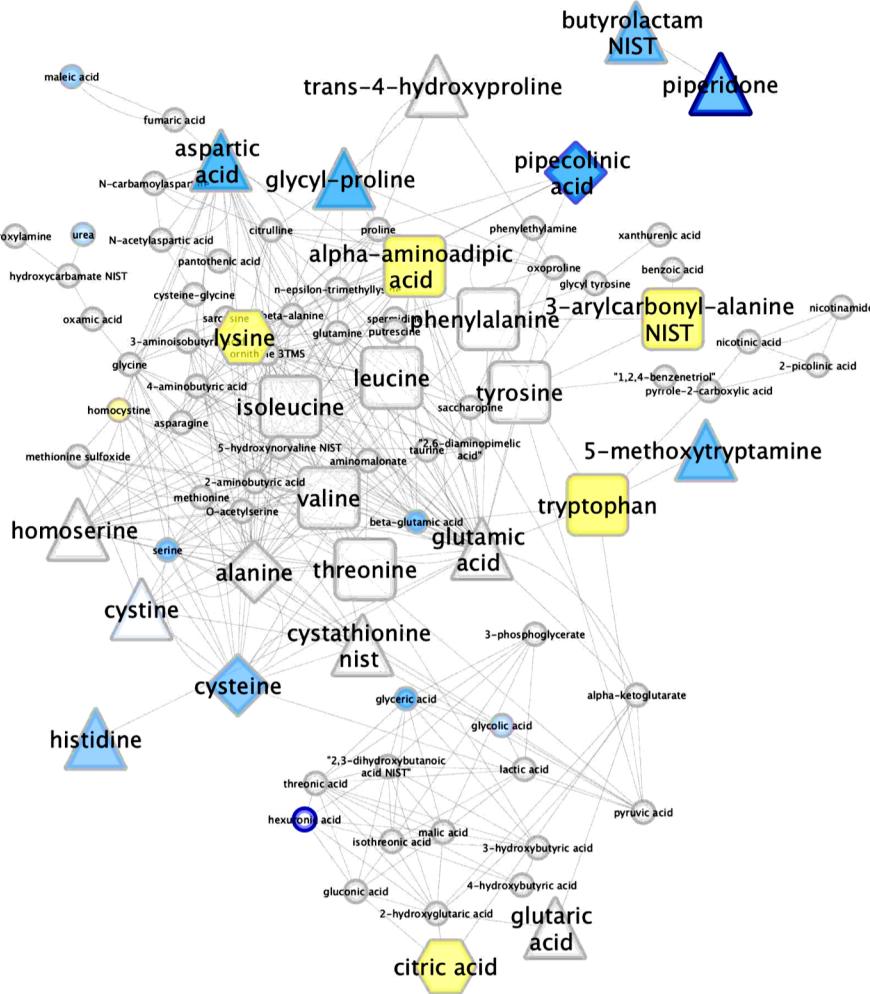
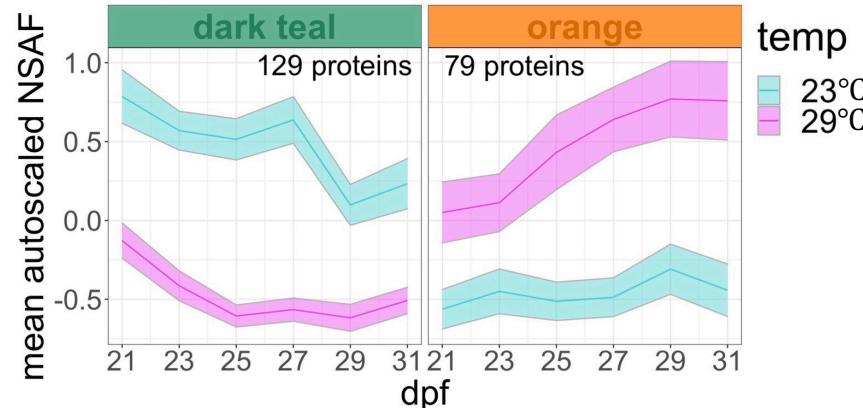
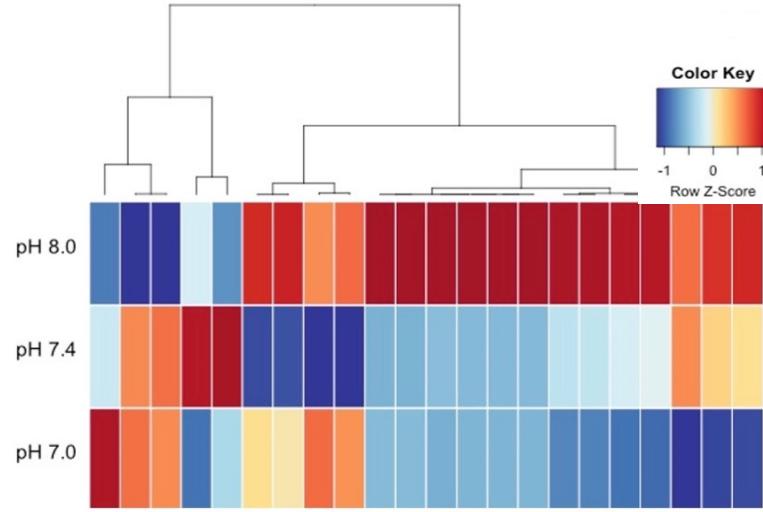


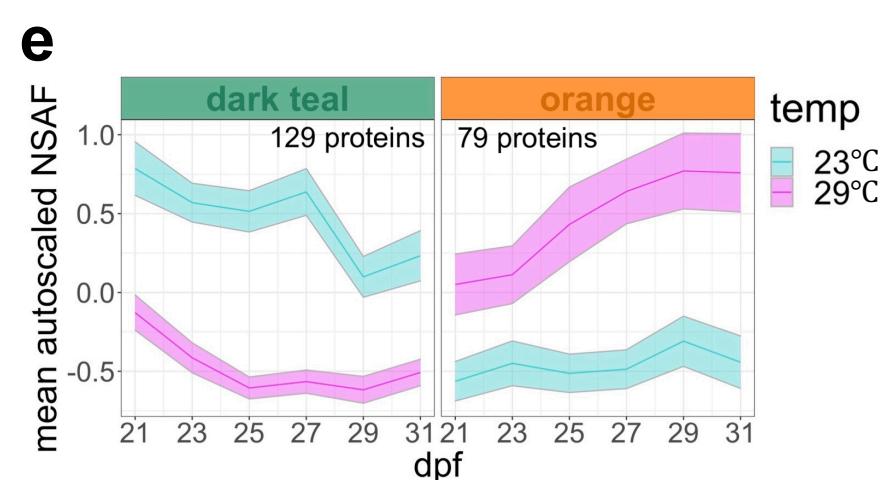
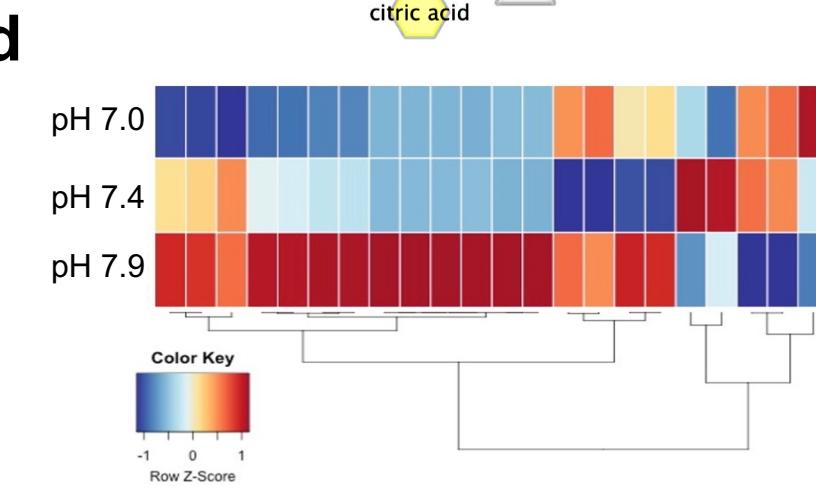
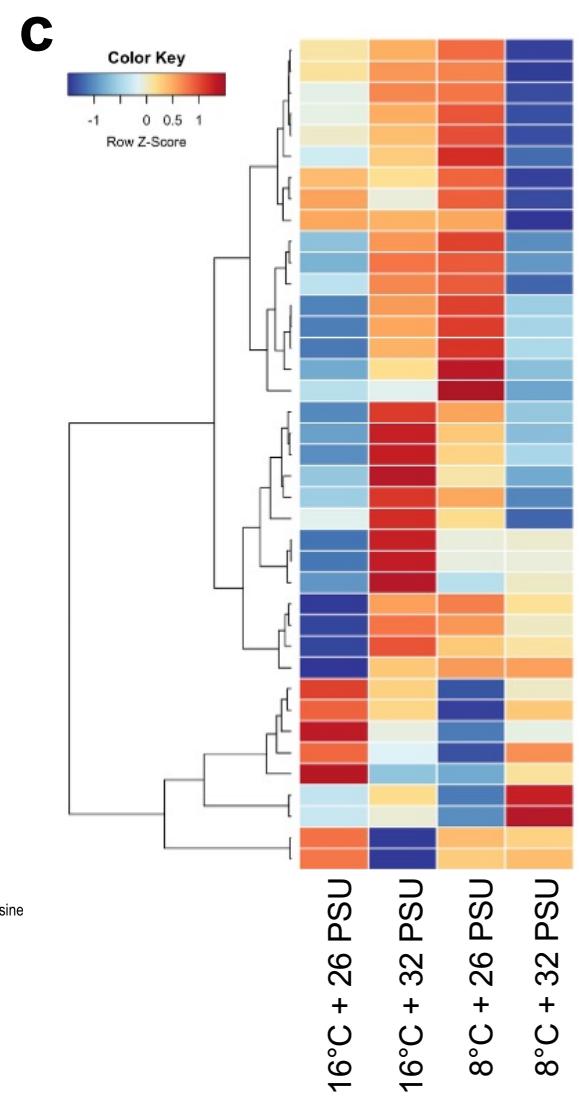
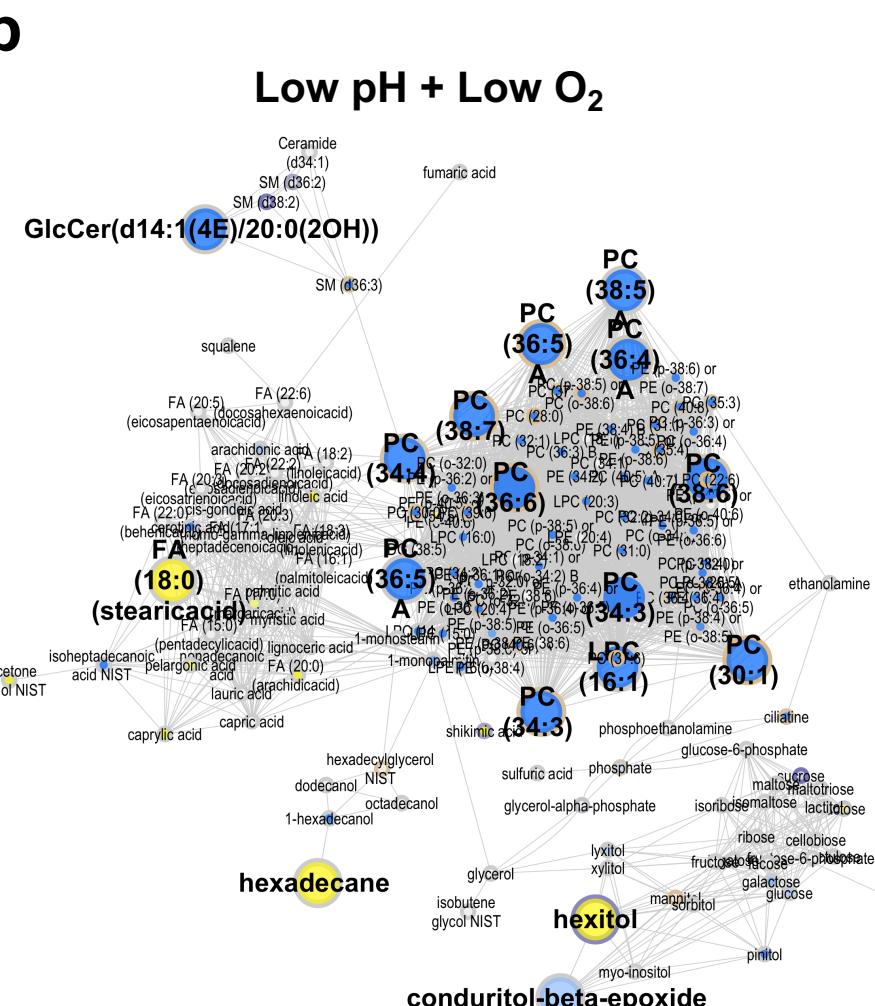
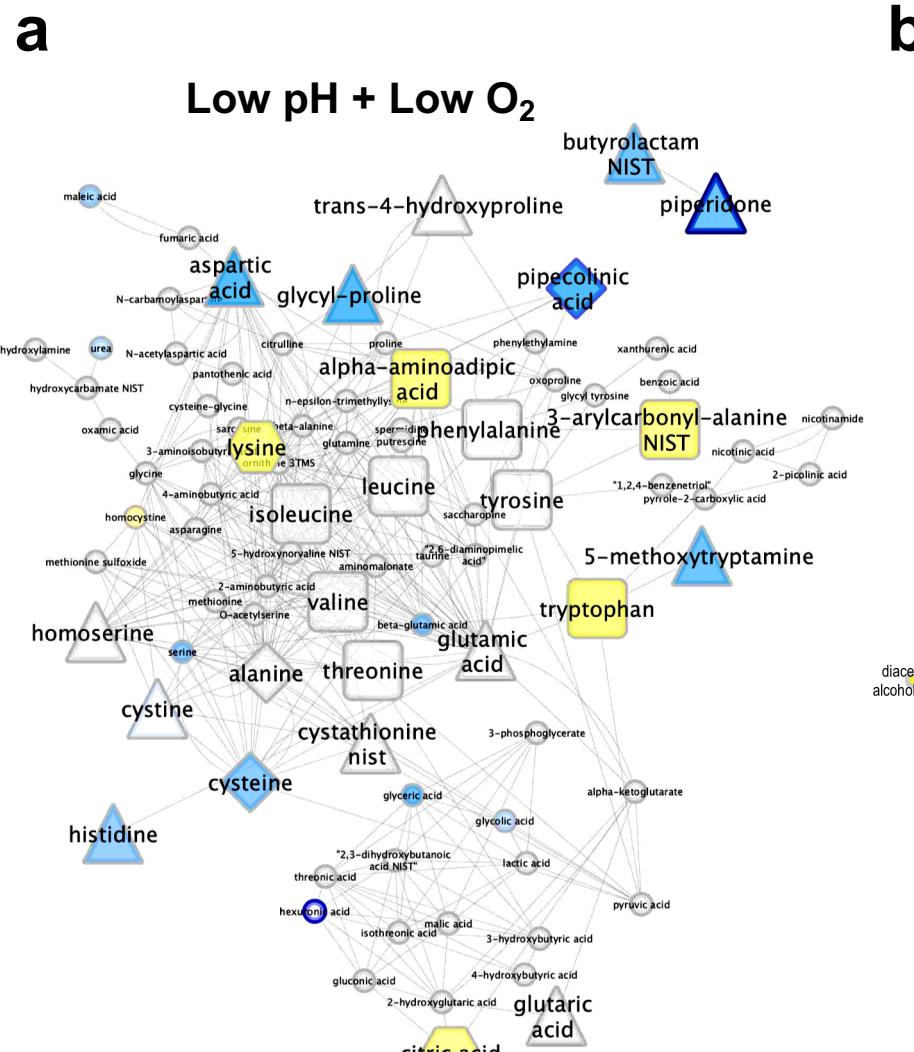
a**b**

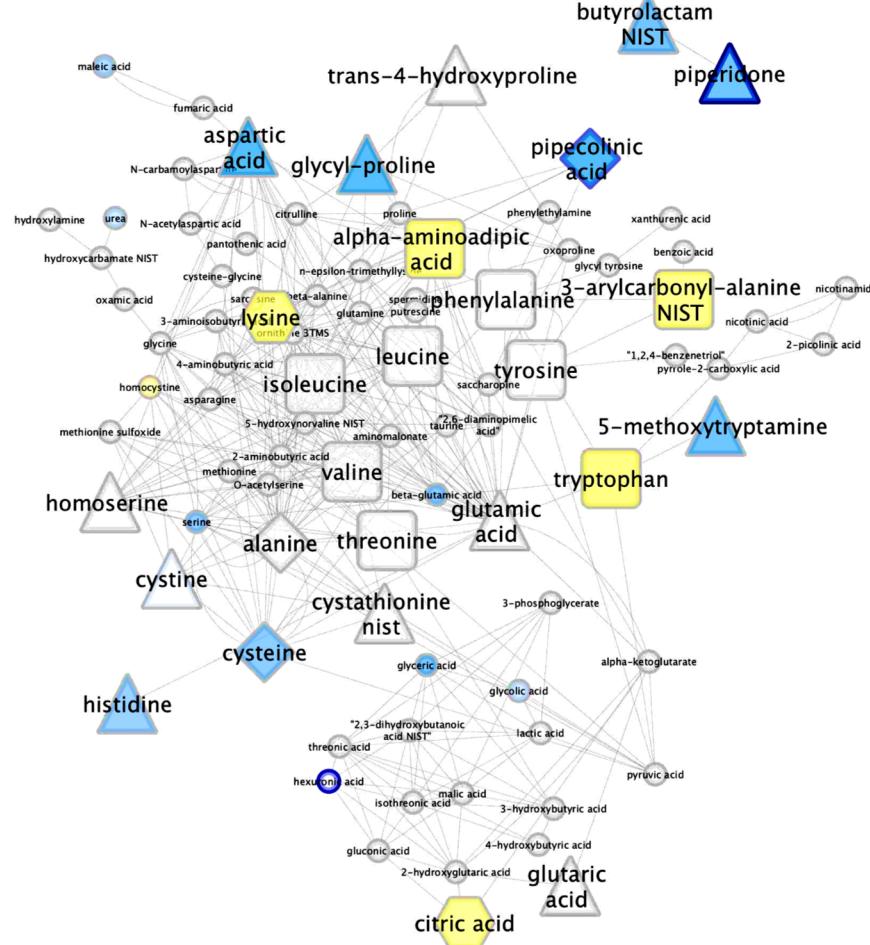
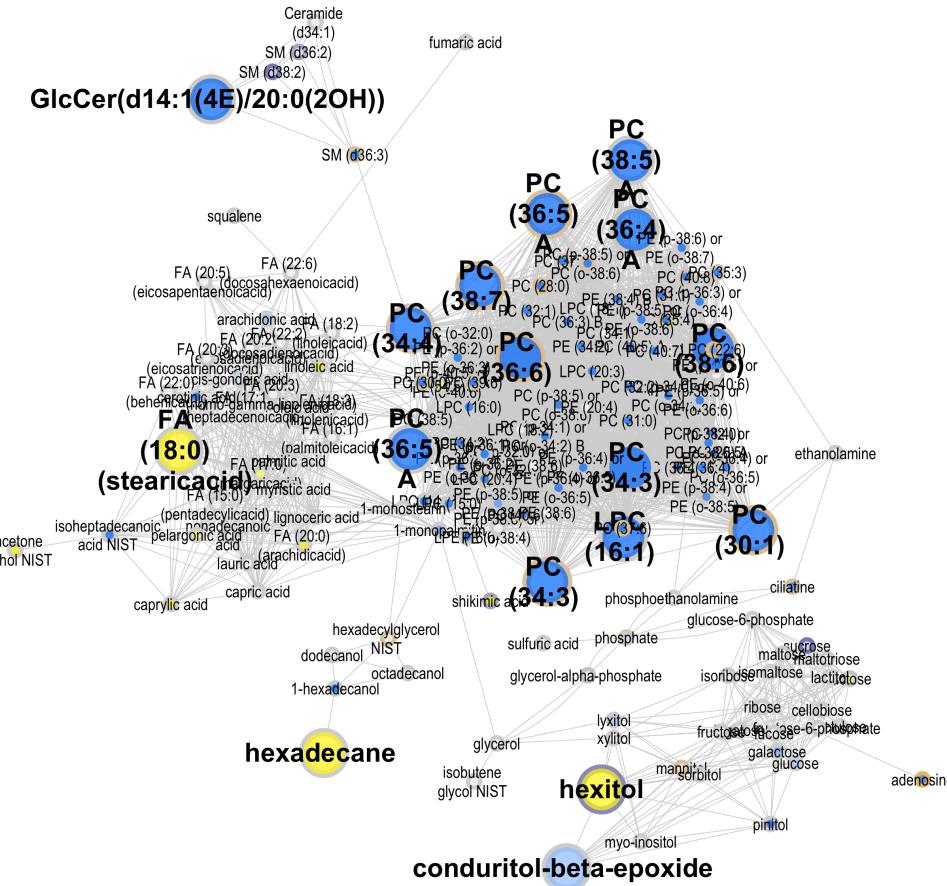
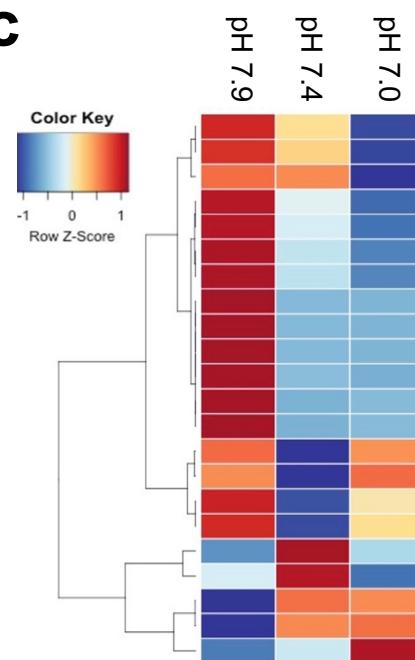
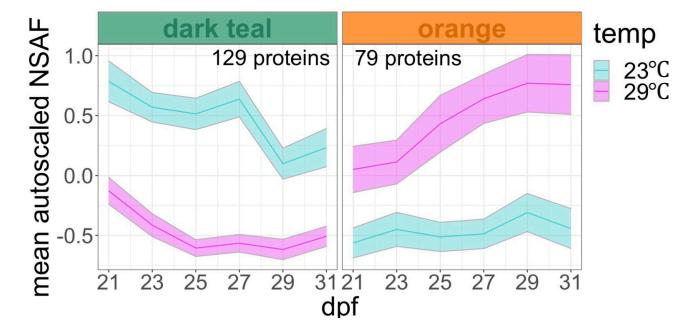
a**b****c**

Low pH + Low O₂



a**Low pH + Low O₂****b****c**



a**Low pH + Low O₂****b****Low pH + Low O₂****c****d**

OBJECTIVE 1: Systematic reanalysis

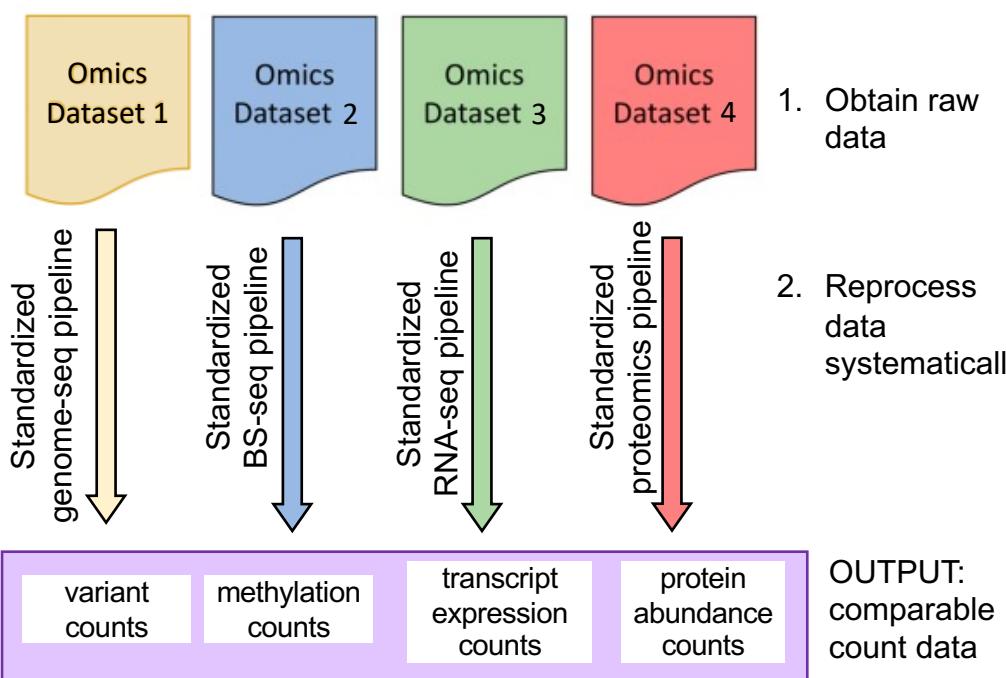
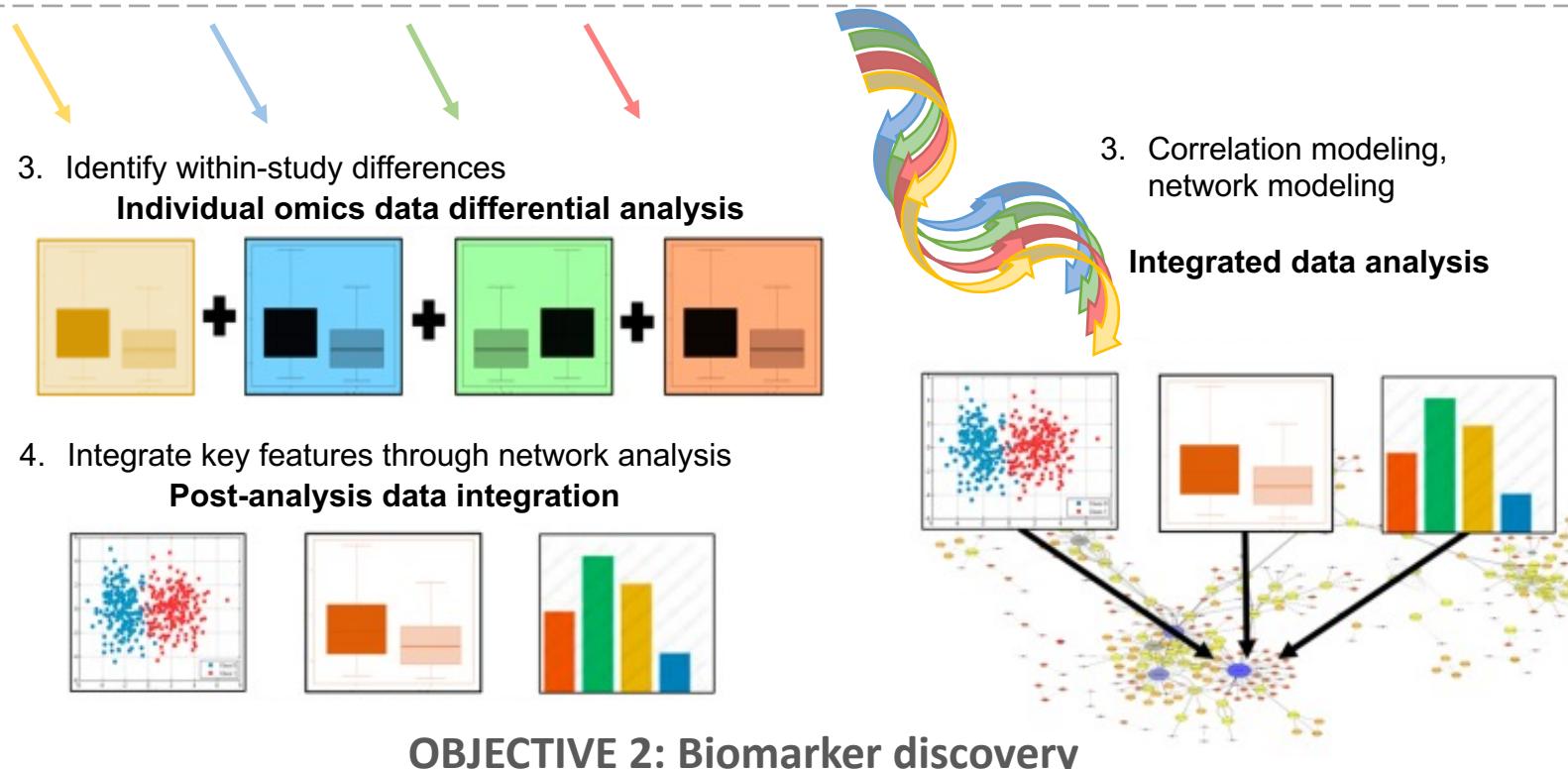


Figure 2. Graphical summary of proposal objectives. **(a)** Systematic reanalysis of genomic datasets (e.g. RNA-seq, bisulfite sequencing, proteomics) will be carried out using standardized bioinformatics pipelines to get data into comparable format. **(b)** Biomarker discovery by integrating omics datasets by post-analysis data integration and by integrated data analysis. **(a-b)** adapted from Pinu *et al.* (2019). **(c)** Biomarker database that will be built to host the discovered candidate biomarkers. Modelled after the Cancer Biomarkers database (Tamberaro *et al.* 2018).



OBJECTIVE 3: Biomarker database

Aquaculture Biomarkers database

Biomarker	Condition	Effect	Evidence	Source
ABL1 (E255K,E255V,Y25...	OSHV-1 exposure	Sensitive	European Leuk...	PMID:21562040
ABL1 (F359V,F359C,F35...	OSHV-1 exposure	Resilient	NCCN guidelines	PMID:21562040
ABL1 (I242T,M244V,K24...	OSHV-1 exposure	Sensitive	European Leuk...	PMID:21562040
ABL1 (T315A,F317L,F31...	OSHV-1 exposure	Resilient	NCCN guidelines	PMID:21562040
ABL1 (T315A,F317L,F31...	OSHV-1 exposure	Resilient	NCCN guidelines	PMID:21562040