

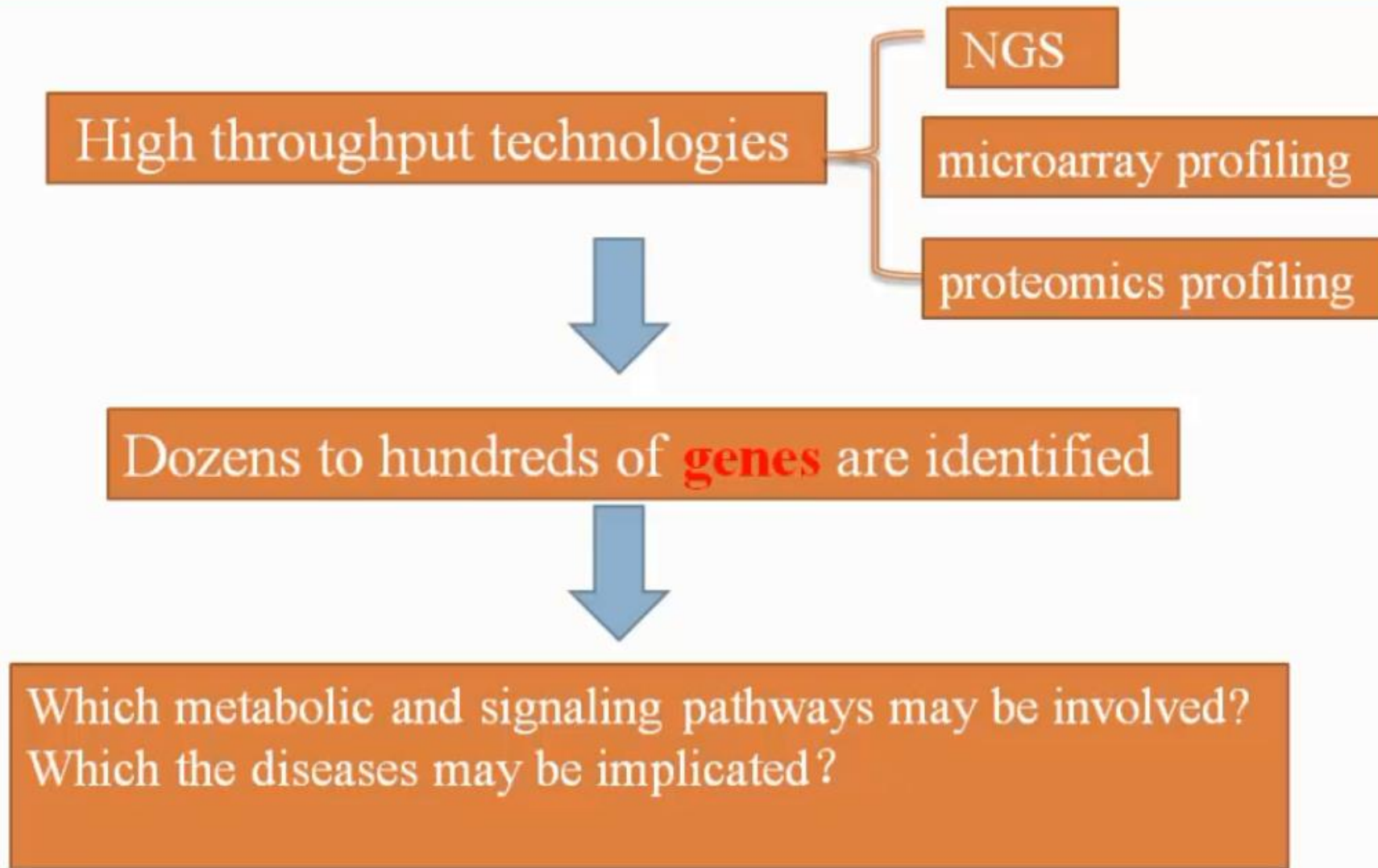
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KOBAS 2.0: a web server for annotation and identification of enriched pathways and diseases

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KOBAS
(**K**EGG **O**rthology **B**ased **A**nnotation **S**ystem)

What is the scientific question?



KOBAS 1.0

KOBAS server: a web-based platform for automated annotation and pathway identification

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- annotates an input set of genes or proteins by mapping to genes with known pathways in the **KEGG PATHWAY database**
- the first software to identify statistically significantly enriched pathways using a hypergeometric test.

KOBAS 2.0

Databases supported by KOBAS 2.0

Database name	Data content
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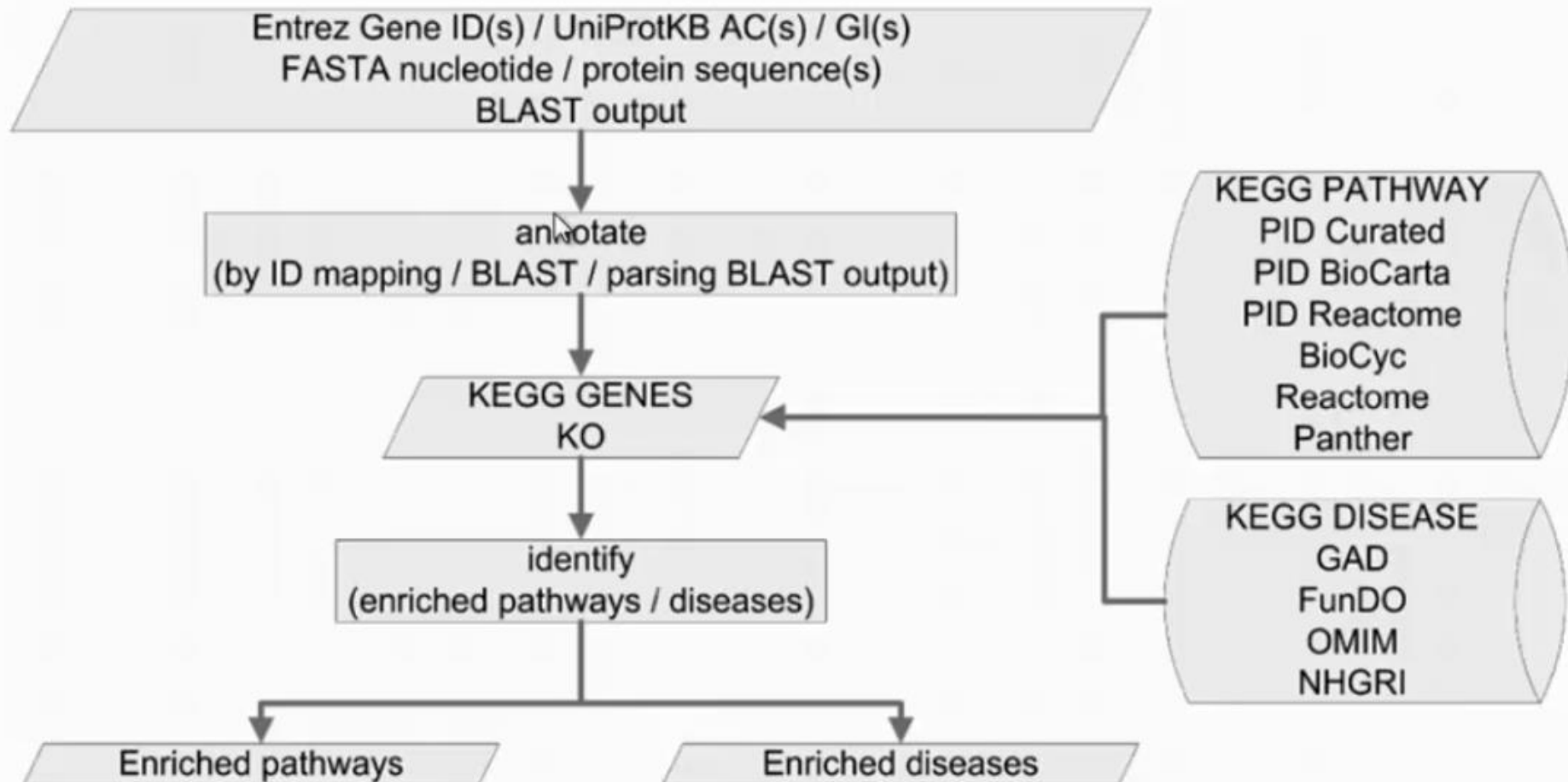
KEGG PATHWAY	Pathway
PID Curated	Pathway
PID BioCarta	Pathway
PID Reactome	Pathway
BioCyc	Pathway
Reactome	Pathway
Panther	Pathway
OMIM	Disease
KEGG DISEASE	Disease
FunDO	Disease
GAD	Disease
NHGRI	Disease



ID mapping

Sequence similarity mapping

The workflow of KOBAS 2.0



Application Example of KOBAS 2.0

Result of file: upCA.a

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RAW CONTENT TABLE VIEW

130 succeed, 241 fail

Query	Gene ID	Gene Name
MmugDNA.36363.1.S1_at (details)	hsa:55690	GPRC5C, MGC131820, RAIG-3, RAIG3
MmugDNA.6781.1.S1_at (details)	hsa:1297	COL9A1, DJ149L1.1.2, EDM6, FLJ40263, MED
MmugDNA.15232.1.S1_at (details)	None	None
Mmu.12320.1.S1_at (details)	hsa:2109	ETFB, MADD
MmugDNA.36986.1.S1_at (details)	None	None
MmugDNA.1883.1.S1_at (details)	None	None
MmuSTS.1124.1.S1_at (details)	None	None
MmugDNA.12821.1.S1_at (details)	None	None
MmugDNA.30787.1.S1_at (details)	None	None
MmugDNA.39136.1.S1_at (details)	hsa:2109	ETFB, MADD
MmuSTS.4242.1.S1_at (details)	None	None
MmuSTS.4335.1.S1_at (details)	hsa:84893	FBXO18, FBH1, FLJ14590, Fbx18, MGC131916, MGC141935, MGC141937
MmugDNA.14249.1.S1_at (details)	hsa:746	C11orf10
MmugDNA.14828.1.S1_at (details)	None	None
MmugDNA.37451.1.S1_at (details)	hsa:51076	CUTC, RP11-483F11.3
MmuSTS.3730.1.S1_at (details)	None	None
MmugDNA.3015.1.S1_at (details)	hsa:5436	POLR2G, MGC138367, MGC138369, RPB19, RPB7, hRPB19, hRPB7
MmugDNA.29430.1.S1_at (details)	None	None
MmugDNA.9338.1.S1_at (details)	hsa:28989	METTL11A, AD-003, C9orf32
MmugDNA.29915.1.S1_at (details)	hsa:5705	PSMC5, S8, SUG-1, SUG1, TBP10, TRIP1, p45, p45/SUG

Displaying 1 - 20 of 371 Page 1 of 19

Result of file: upCA.BH.i

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RAW CONTENT TABLE VIEW (FOR PATHWAY IDENTIFICATION RESULT) TABLE VIEW (FOR DISEASE IDENTIFICATION RESULT)

Term	Database	ID	Sample Number (click to sort; click again to toggle)	Background Number	PValue (click to sort; click again to toggle so)	Corrected PValue (click to sort; click again to toggle Cannot sort when the
Respiratory electron transport, ATP synt	Reactome	REACT:6305	8 / 41	129 / 4092	0.0000312347300064	0.00264236043059
Alzheimer's disease	KEGG PATHWAY	hsa05010	9 / 47	189 / 5014	0.000312305371425	0.00947326293322
Huntington's disease	KEGG PATHWAY	hsa05018	9 / 47	220 / 5014	0.000664088709773	0.0196580181473
no2-dependent s-12 pathway in rik cells	PID BioCarta	100093	2 / 6	12 / 1151	0.00146145188136	0.0221653535339
Gene Expression	Reactome	REACT:71	12 / 41	501 / 4092	0.00274836840139	0.0284735432448
it2 and stat4 dependent signaling pathw	PID BioCarta	100133	2 / 6	17 / 1151	0.00297654241314	0.0284735432448
Oxidative phosphorylation	KEGG PATHWAY	hsa00190	8 / 47	159 / 5014	0.00338578203532	0.0284735432448
Respiratory electron transport	PID Reactome	500282	3 / 21	30 / 1909	0.00385051732382	0.0284735432448
Parkinson's disease	KEGG PATHWAY	hsa05012	9 / 47	185 / 5014	0.00406764903497	0.0284735432448
Diabetes pathways	Reactome	REACT:15380	9 / 41	349 / 4092	0.00647169563672	0.0420660218387
Metabolism of proteins	Reactome	REACT:17015	9 / 41	355 / 4092	0.00722985049746	0.0438610930179

Displaying 1 - 20 of 61 Page 1 of 4

Result of file: upCA.BH.i

DOWNLOAD... HELP

RAW CONTENT TABLE VIEW (FOR PATHWAY IDENTIFICATION RESULT) TABLE VIEW (FOR DISEASE IDENTIFICATION RESULT)

Term	Database	ID	Sample Number (click to sort; click again to toggle)	Background Number	PValue (click to sort; click again to toggle so)	Corrected PValue (click to sort; click again to toggle Cannot sort when the
Glutaricaciduria, type IIB	OMIM	None	2 / 23	2 / 2313	0.000094820895585	0.00430525074912
Glutaric acidemia	KEGG DISEASE	H00178	2 / 8	6 / 814	0.00124446233735	0.0221653535339
menarche (age at onset)	GAD	None	2 / 23	8 / 2795	0.00178042663165	0.0228655462115
Autoimmune disease	FunDO	None	3 / 13	91 / 3507	0.00400335198312	0.0284735432448

Displaying 1 - 20 of 30 Page 1 of 2

KOBAS2.0 vs other tools

- KOBAS 2.0 is more specific and informative than the lists of functional categories identified by the GO enrichment analysis tools, and offers more insights into the biological processes.

Reference

- Xie C, Mao X, Huang J, et al. KOBAS 2.0: a web server for annotation and identification of enriched pathways and diseases[J]. Nucleic acids research, 2011, 39(suppl 2): W316-W322.
- Wu J, Mao X, Cai T, et al. KOBAS server: a web-based platform for automated annotation and pathway identification[J]. Nucleic acids research, 2006, 34(suppl 2): W720-W724.
- <http://kobas.cbi.pku.edu.cn/home.do>

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