

Using Machine Learning to Measure Relatedness Between Genes: A Multi-Features Model

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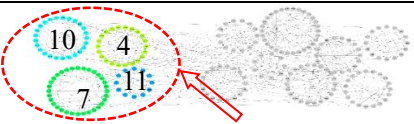
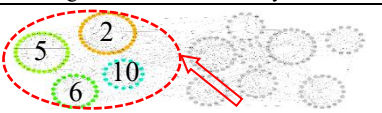
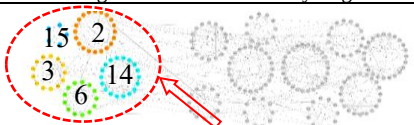
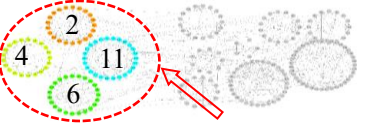
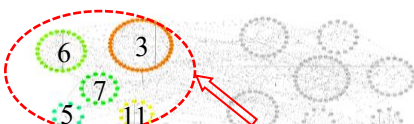
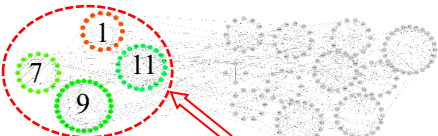
Network	Method	Pathway	Q-value	Module
 (A) Modules related with increased glutamine and glutamate metabolism by MFR	MFR	Glutathione metabolism	3.27E-05	7, 10
	MFR	Glycine, serine and threonine metabolism	5.39E-04	4
	MFR	Purine metabolism	6.07E-04	11
	MFR	Pyrimidine metabolism	1.46E-13	10
 (B) Modules related with increased glutamine and glutamate metabolism by LDA	LDA	Glutathione metabolism	9.52E-09	2
	LDA	Glycine, serine and threonine metabolism	4.72E-04	5
	LDA	Purine metabolism	8.64E-05	2
	LDA	Pyrimidine metabolism	1.64E-18	10
 (C) Modules related with increased glutamine and glutamate metabolism by Logit	Logit	Glutathione metabolism	2.27E-07	3
	Logit	Glycine, serine and threonine metabolism	4.71E-05	6
	Logit	Purine metabolism	5.00E-04	3
	Logit	Pyrimidine metabolism	1.64E-18	11
 (D) Modules related with increased glutamine and glutamate metabolism by PCC	PCC	Purine metabolism	7.00E-05	6
	PCC	Pyrimidine metabolism	1.20E-22	14
 (E) Modules related with increased glutamine and glutamate metabolism by SRC	SRC	Glycine, serine and threonine metabolism	3.21E-05	6
	SRC	Pyrimidine metabolism	2.54E-19	6
 (F) Modules related with increased glutamine and glutamate metabolism by PPC	PPC	Glycine, serine and threonine metabolism	2.10E-04	11
	PPC	Purine metabolism	4.84E-04	2
	PPC	Glutathione metabolism	1.50E-04	6
 (G) Modules related with increased glutamine and glutamate metabolism by MI	MI	Glutathione metabolism	2.25E-05	2
	MI	Pyrimidine metabolism	8.99E-20	1
	MI	Purine metabolism	1.56E-04	5
 (H) Modules related with increased glutamine and glutamate metabolism by CMI	CMI	Glutathione metabolism	1.27E-04	7
	CMI	Pyrimidine metabolism	1.40E-04	11
 (I) Modules related with increased glutamine and glutamate metabolism by CXP	CXP	Pyrimidine metabolism	2.72E-19	9
	CXP	Purine metabolism	2.88E-04	11

Figure S1. Metabolic pathways are predicted to be directly influenced by increased glutamine and glutamate metabolism in nine BLCA gene networks

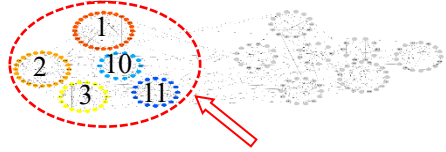
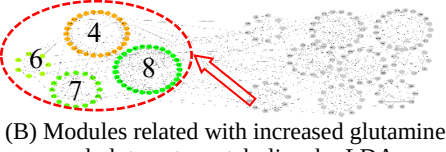
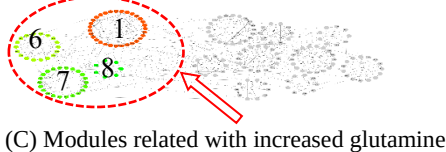
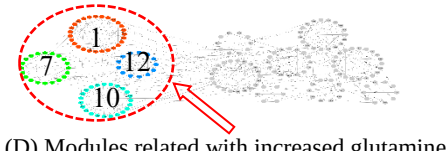
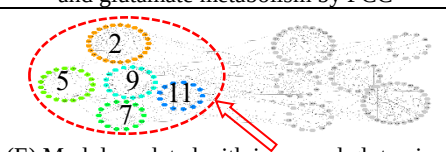
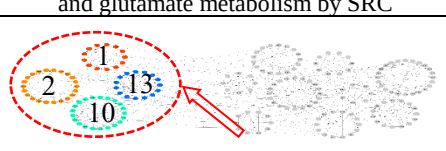
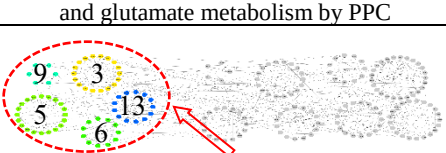
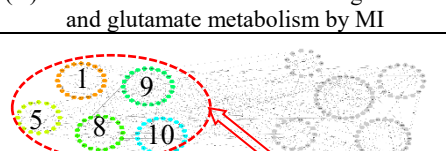
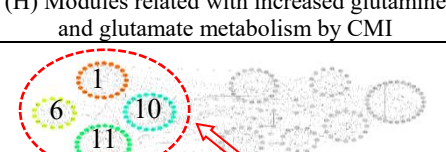
Network	Method	Pathway	Q-value	Module
 (A) Modules related with increased glutamine and glutamate metabolism by MFR	MFR	Glycine, serine and threonine metabolism	1.75E-04	2
	MFR	Purine metabolism	2.15E-08	2, 10
	MFR	Pyrimidine metabolism	2.72E-31	1, 3, 11
 (B) Modules related with increased glutamine and glutamate metabolism by LDA	LDA	Glycine, serine and threonine metabolism	7.17E-09	6
	LDA	Purine metabolism	6.69E-21	4, 8
	LDA	Pyrimidine metabolism	2.00E-21	4, 7, 8
 (C) Modules related with increased glutamine and glutamate metabolism by Logit	Logit	Glycine, serine and threonine metabolism	7.17E-09	8
	Logit	Purine metabolism	2.70E-20	1, 7
	Logit	Pyrimidine metabolism	7.24E-21	1, 6, 7
 (D) Modules related with increased glutamine and glutamate metabolism by PCC	PCC	Glycine, serine and threonine metabolism	1.49E-04	1
	PCC	Pyrimidine metabolism	3.68E-13	1, 7
	PCC	Purine metabolism	2.04E-11	1, 7
 (E) Modules related with increased glutamine and glutamate metabolism by SRC	SRC	Glycine, serine and threonine metabolism	3.14E-05	7
	SRC	Pyrimidine metabolism	3.61E-04	5, 9
	SRC	Purine metabolism	4.55E-13	7, 9
 (F) Modules related with increased glutamine and glutamate metabolism by PPC	PPC	Glycine, serine and threonine metabolism	1.68E-08	10
	PPC	Purine metabolism	1.16E-10	1, 10
	PPC	Pyrimidine metabolism	2.00E-04	2
 (G) Modules related with increased glutamine and glutamate metabolism by MI	MI	Glycine, serine and threonine metabolism	1.43E-05	6
	MI	Pyrimidine metabolism	3.30E-05	3
	MI	Purine metabolism	2.41E-07	3
 (H) Modules related with increased glutamine and glutamate metabolism by CMI	CMI	Pyrimidine metabolism	1.53E-10	10
	CMI	Purine metabolism	1.53E-10	5, 10
 (I) Modules related with increased glutamine and glutamate metabolism by CXP	CXP	Glycine, serine and threonine metabolism	8.67E-05	11
	CXP	Purine metabolism	1.99E-13	10, 11
	CXP	Pyrimidine metabolism	4.39E-14	11

Figure S2. Metabolic pathways are predicted to be directly influenced by increased glutamine and glutamate metabolism in nine COAD gene networks.

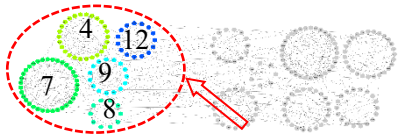
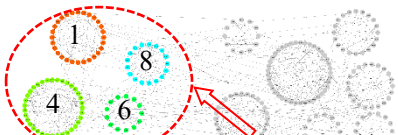
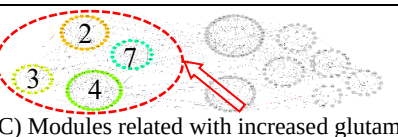
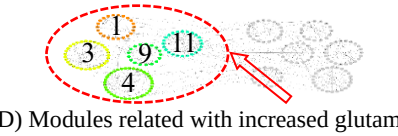
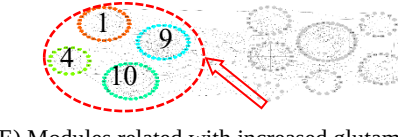
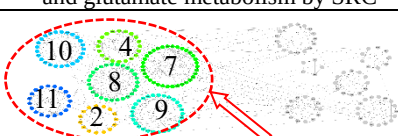
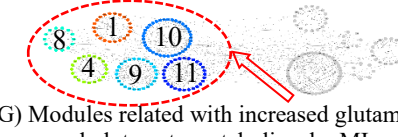
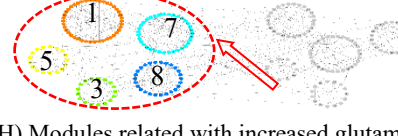
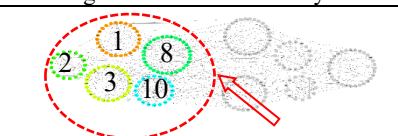
Network	Method	Pathway	Q-value	Module
 (A) Modules related with increased glutamine and glutamate metabolism by MFR	MFR	Amino sugar and nucleotide, sugar metabolism	7.72E-08	8
	MFR	Glutathione metabolism	2.45E-11	4, 12
	MFR	Glycine, serine and threonine metabolism	1.31E-07	7
	MFR	Purine metabolism	8.33E-08	4
	MFR	Pyrimidine metabolism	6.95E-12	7
 (B) Modules related with increased glutamine and glutamate metabolism by LDA	LDA	Amino sugar and nucleotide sugar metabolism	1.66E-11	1
	LDA	Glutathione metabolism	7.80E-11	6, 8
	LDA	Glycine, serine and threonine metabolism	2.19E-04	4
	LDA	Purine metabolism	1.24E-10	6
 (C) Modules related with increased glutamine and glutamate metabolism by Logit	Logit	Glutathione metabolism	2.01E-10	2, 7
	Logit	Glycine, serine and threonine metabolism	3.00E-06	4
	Logit	Purine metabolism	8.00E-07	2
	Logit	Pyrimidine metabolism	1.18E-33	4
 (D) Modules related with increased glutamine and glutamate metabolism by PCC	PCC	Glutathione metabolism	1.18E-09	11
	PCC	Purine metabolism	4.99E-18	3
	PCC	Pyrimidine metabolism	9.65E-21	3
 (E) Modules related with increased glutamine and glutamate metabolism by SRC	SRC	Glutathione metabolism	6.06E-13	9
	SRC	Purine metabolism	1.36E-16	10
	SRC	Pyrimidine metabolism	4.62E-19	1, 10
 (F) Modules related with increased glutamine and glutamate metabolism by PPC	PPC	Glutathione metabolism	7.92E-13	11
	PPC	Glycine, serine and threonine metabolism	3.24E-06	4
	PPC	Purine metabolism	1.12E-07	8
	PPC	Pyrimidine metabolism	9.46E-18	10
 (G) Modules related with increased glutamine and glutamate metabolism by MI	MI	Glutathione metabolism	1.43E-12	4
	MI	Purine metabolism	6.42E-15	11
	MI	Pyrimidine metabolism	2.63E-19	11
 (H) Modules related with increased glutamine and glutamate metabolism by CMI	CMI	Purine metabolism	3.22E-06	1
	CMI	Glycine, serine and threonine metabolism	2.22E-04	3
	CMI	Glutathione metabolism	1.50E-05	3
 (I) Modules related with increased glutamine and glutamate metabolism by CXP	CXP	Glutathione metabolism	1.46E-11	10
	CXP	Purine metabolism	4.07E-14	1
	CXP	Pyrimidine metabolism	1.44E-16	1

Figure S3. Metabolic pathways are predicted to be directly influenced by increased glutamine and glutamate metabolism in nine LUAD gene networks