

Supporting Information

Table S1 Primers for qRT-PCR in *G. cantor*

Primers	Primer Sequence (5'-3')
GcGK1-F	AGTGGAAGATGGCGGTTTCAG
GcGK1-R	GGTACGCTGGCCAATAACCT
GcGK2-F	ACAGTGGCCTACAAGTTGGG
GcGK2-R	CAACCAGTTCAATGCAGCCC
GcGK3-F	AGAGTGGATGCTGAACACGG
GcGK3-R	ACCCACTGAACGCAGGTATG
GcGPDH-F	CTCCCACATCATCACCCGTC
GcGPDH-R	TTGCAGCCTATGGTGGTCTC
GcEAFA1-F	TGGCGATGCTGCCATTAT
GcEAFA1-R	GGACAGCGAAACGTCCTAAT
GcRPL36-F	GAAATTCGTGCGAGACCTCATC
GcRPL36-R	GGCGGCGCTTAAGGAATTTA

Table S2 The top10 pathway enrichment of *G. cantor*

	Pathway	All genes with pathway annotation (9492)	Pathway ID
1	Metabolic pathways	2679 (28.22%)	ko01100
2	Pathways in cancer	660 (6.95%)	ko05200
3	Human papillomavirus infection	563 (5.93%)	ko05165
4	Alzheimer disease	542 (5.71%)	ko05010
5	PI3K-Akt signaling pathway	445 (4.69%)	ko04151
6	Lysosome	443 (4.67%)	ko04142
7	Protein processing in endoplasmic reticulum	438 (4.61%)	ko04141
8	Huntington disease	413 (4.35%)	ko05016
9	Hypertrophic cardiomyopathy (HCM)	379 (3.99%)	ko05410
10	Proteoglycans in cancer	371 (3.91%)	ko05205

The nucleotide sequence of 3 and 1 GK and GPDH in *G. cantor*

>GcGK1

ATGGAAACAAGTTCGAGTTCAGAAAAGCCTTTAATTGGAGTGATAGATGCCGGAACAA
GGACGGTAAAGTTTTGCGTTTTTCGAAGTCAAGAAACCAAAGAAATAGCAGAACACA
CCATCGATATTAGCACATATACTCCAAAAGAAGGATGGTCGGAACAGGATCCAAAGGA
AATTTTAGATGCTGTGAAAAGTTGTATGGAAAAAGTAGTTAAGTGTTTAGGATCAGAAA
GTGAAAAAATTCGGGCGATAGGTATAACAAACCAAAGGGAAACGACTATACTGTGGGA
CAAAACGACCGGCGAACCTTTGTACAATGCCTTAGTGTGGAACGACATAAGGACAGAT
TCCACGGTGGACATAATTCTGGCCAAAGTACCAGAAAACAATACAACTATTACAAAC
CAATATGTGGTCTTCCGATATCTCCGTACTTTAGTGCTTTTAAGGTCAAGTGGCTTATGC
ATTACGTTTCTGACGTAAAAAGGCGGTCCTGCCAAAAAGTGCCTTTTTGGAAGTGT
CGACACATGGATATTGTGGAATTTGACGGGTGGGGTGAATGGCGGTTTACACTTAACG
GACGTGACTAACGCGTCTCGCACATTCTTATGAACATAGAATTACTGAACTGGGATCC
GGTACTGTTGCACACCTTTAAGATCCCTCCGGAGATCCTGCCAGAGATCCGGAGCAGC
TCAGAAATTTATGGTCGCATCGCCAAGGGCTTAACCTTGGAAGACGTGCCTATATCCGG
GATCTTAGGCAACCAACAGGCGTCCCTGCTAGGTCAAGGCTGCATGAGGGAAGGTGA
GGCCAAAAACACGTACAGGAGCGGATGTTTCCTACTTTACAACACCGGCAATTCGAAA
GTACAATCGACTCATGGGTAGTGACGACGGTGGCTTACAAGTTTGGGGACAAACCGG
CGGTTTTTCGCGTTGGAAGGAAGTGTGGCGGTAGCTGGGGCGGCCATGAAGTGGTTGA
GGGACAACATGGGTTTCCTGAACGATGTGCAGAGGGACACGGAATCTTTAGCTCAGGA
AGTGTTCAATACCGGCGATGTATACTTTGTACCTGCCTTTAAGGGCCTCTATGCTCCATA
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GCACATAGTTAGAGCCGCTTTGGAAGCTGTCTGCTTCCAGACGAGGGACATCTTAGAG
GCCATGAACAAGGACTGCGGCATACCGCTTTCCAAACTGCACGTCGACGGTAAAATGA
CGCAGAACAGCCTCCTCATGCAGCTGCAGGCGGATATCAGCGGCATACCCGTTATACG
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GGGGATCGACGTGTGGGACCTCGAAGCCGAGGACCGTCAGCTGGTGCCTAGCGATAC
ATTCCTTCCCACGTCGACGGAGGACGAGAGAGACGCGAGGTACACGAAGTGGAAGAT
GGCGGTTTCAGAGGTCGCTGGGATGGTCGGTAGCGAAGAAGTCAGAAGCTATGACAGA

GGAGCGGTACAGGTTATTGGCCAGCGTACCGGGAAGCCTGTACATTATGTCGAGCTTC
GGCTTGATAGCCCTCTCGGAGTATCTAACGAAAGCCGTATAA

> GcGK2

ATGGGACCCCTGGTAGGAGCTATCGACGAGGGCACGTCAAGTGCGAGATTTATTCTATT
TGAGGCTGGAAC TACAAATGTGGTGGCTTCACATCAACAGGAATTATCGCAAATTTACC
CGCAGGAAGGATGGGTTGAGCAGGACCCCATGGAAATTTTGAGAGTCGTAAGAACTT
GCATTGAGAATGCCATCGATAAGCTCATAGCCTCAGGAGGTAGTGTGAATGATATCGTA
GCAGTAGGTGTAACAAATCAAAGGGAGTCTACTATAGTTTGGGATAAACTACCGGAG
AGCCTTTGTACAAC TCCATTGTATGGTTAGACGTGAGGACTTCGTCGACTGTTGATCAA
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GCTCCCTCCTGATGCAACTGCAGGCGGACTTGGCGGGGGTGACGGTGTTAAAACCGA
CGATGGCGGAGAGCACCGCTCTGGGGGCGGCGATGGTGGCTGGGGCGGCGGTGGGCC
ACTGGAAC TTGTCCGGTCCCCCGCTGGATATACCGGCTATAAGATGGTCCCCGAAATTC
ACCGAGGACGAGAGGGACGTGCGTACTCCAAGTGGAAGATGGCCGTGGAACGGTCC
ATGGGGTGGGTTGTGTAA

> GcGK3

ATGTATAAGTCTGGCGACACTCCTGATTATGTAGCAGCACTAGATATAGGAACAACAAC
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GATATCGAGAAACAAAAGGTATGGAGTGGGCAGCAAATTAATAATTCTGCAGCAATCAT
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TGGAGCGATAAGGAACAATTGAAAGAGTTCCATGAGACGGAAAAAGTATTTACACCAT
GCACATCAGAGGAATATAAAAATGCATGTAGAAGGAATTTAAGTGAATGGATGGTTGC
GGCTTATAGATTTAAGTCGTGGTACAAAGAAAATTAA

> GcGPDH

ATGATTGGTAATACAGTTTTTAACCAAAATTCTATTGGCCGGGTCATAGTTGTTTTTAAA

CGACGTCGACTTTGTGCGATTCCGATATTAACCTGTAGTTCGTGTTGCGGTGAAATAGTT
 GTTAATCAGTCGCCGCAGTTGTGCGTTCGTCCTTATCGTGGTTATTCCACATCAAAATTT
 TTAGTTAATTACACAACCAAAATGGCTTGTACAAAACCAAAAAGGGTTTGCATTGTAG
 GTAGTGGCAACTGGGGCTCTGCAATTGCAAAGATCGTTGGCAAAAATGCTGTGCAACT
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 ATTGACTGAAATTATAAATGACACCCATGAAAATGTGAAATATTTACCAGGGGCATAAATT
 GCCTCCCAATGTGGTTGCTGTACCCGATGTTGTAGATGCAGCGAAAGATGCAGATATTC
 TTATATTTGTTGTGCCCCATCAGTTTATAAGAACATTGTGCTCAACTTTATTAGGAAAAA
 TTAAACCAACTGCAATTGCTTTGTCATTGATCAAGGGATTTCGATCGCGCAGAAGGTGG
 AGGCATAGACCTAATCTCCCACATCATCACCCGTCACCTGAAAATCCCGTGCGCCGTGC
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 AGGCTGCAAAGACATCCAGCTGGGCCCCGTGCTCAGAGACATCATCCAGACCAACTAC
 TTCAGGGTGGTTGTCGTCGACGACGAGGATACCGTCGAAGTGTGCGGAGCTCTTAAGA
 ATATCGTAGCCTGCGGAGCCGGCTTCGTCGACGGTTTAGGCTTGGGGGACAACACCAA
 GGCCGCCGTCATCCGACTAGGATTGATGGAGATGGTGAAATTTGTGGACGTATTCTATC
 CTGGTGGCAAGCTGGCCACTTTCTTTGAGAGCTGCGGCGTGGCTGATCTCATAACCAC
 CTGCTACGGAGGTCGCAACAGGAAAGTCAGCGAGGCATTCGTGAAGACCGGCAAGTC
 GATAAAGGAGCTGGAGGATGAGCTGTTGAATGGCCAAAAGCTACAAGGTCCCTTCACC
 GCCGAAGAGGTGAATTACATGTTGAGGAACAGGGACATGGAGGACAGGTTTCCGCTG
 TTCACGGCCATCCACAAGATTTGTACGGGGCAGTTGCCAGCGCAGGAATTTATAGATTG
 TATCAGGAACCACCCTGAGCACATGGTTAGAGGTGCATCCAGTTAA

The accession number for various species in GK gene phylogenetic tree.

species	accession number
<i>Rhopalosiphum padi</i>	XP_060844228.1
<i>Aphis gossypii</i>	XP_027851749.1

<i>Nesidiocoris tenuis</i>	BES90209.1
<i>Homalodisca vitripennis</i>	XP_046676071.1
<i>Nilaparvata lugens</i>	XP_039281267.1
<i>Aphis craccivora</i>	KAF0772382.1
<i>Acyrtosiphon pisum</i>	XP_016660307.1
<i>Diaphorina citri</i>	XP_008469116.1
<i>Halyomorpha halys</i>	XP_024216973.1
<i>Myzus persicae</i>	XP_022172698.1
<i>Lygus Hesperus</i>	JAG35158.1
<i>Amyelois transitella</i>	XP_060809509.1
<i>Achroia grisella</i>	XP_059045853.1
<i>Plodia interpunctella</i>	XP_053624052.1
<i>Galleria mellonella</i>	XP_052752500.1
<i>Spodoptera frugiperda</i>	XP_035429035.1
<i>Pectinophora gossypiella</i>	XP_049886227.1
<i>Bombus pascuorum</i>	XP_060811859.1
<i>Microplitis mediator</i>	XP_057321465.1
<i>Hylaeus anthracinus</i>	XP_054007974.1
<i>Microplitis demolitor</i>	XP_008546991.1
<i>Leptopilina boulardi</i>	XP_051174454.1
<i>Bombus affinis</i>	XP_050578300.1
<i>Bombus terrestris</i>	XP_003394582.1

<i>Neodiprion lecontei</i>	XP_015516193.1
<i>Diorhabda carinulata</i>	XP_057672179.1
<i>Diabrotica virgifera virgifera</i>	XP_028134815.1
<i>Anthonomus grandis grandis</i>	XP_050312360.1
<i>Aethina tumida</i>	XP_019871562.1
<i>Acanthoscelides obtectus</i>	CAK1647795.1
<i>Dendroctonus ponderosae</i>	XP_048525395.1
<i>Harmonia axyridis</i>	XP_045478379.1
<i>Tribolium madens</i>	XP_044268892.1
<i>Leptinotarsa decemlineata</i>	XP_023015333.1
<i>Photinus pyralis</i>	XP_031356436.1
<i>Sitophilus oryzae</i>	XP_030767742.1
<i>Agrilus planipennis</i>	XP_025836773.1
<i>Anoplophora glabripennis</i>	XP_018571090.1
<i>Anopheles gambiae</i>	XP_061506539.1
<i>Musca vetustissima</i>	XP_061391482.1
<i>Drosophila nasuta</i>	XP_060655978.1
<i>Phlebotomus argentipes</i>	XP_059614843.1
<i>Stomoxys calcitrans</i>	XP_013097421.2
<i>Musca domestica</i>	XP_011296357.1
<i>Topomyia yanbarensis-1</i>	XP_058826953.1
<i>Topomyia yanbarensis-2</i>	XP_058825349.1

<i>Anopheles ziemanni</i>	XP_058174836.1
<i>Anopheles coustani</i>	XP_058130533.1
<i>Eupeodes corollae</i>	XP_055911455.1
<i>Episyrphus balteatus</i>	XP_055855934.1
<i>Lutzomyia longipalpis</i>	XP_055693793.1
<i>Condylostylus longicornis</i>	XP_055382290.1
<i>Sitodiplosis mosellana</i>	XP_055315939.1

The accession number for various species in GPDH gene phylogenetic tree.

species	accession number
<i>Anthonomus grandis grandis</i>	XP_050297873.1
<i>Harmonia axyridis</i>	XP_045465915.1
<i>Photinus pyralis</i>	XP_031358876.1
<i>Sitophilus oryzae</i>	XP_030754652.1
<i>Agrilus planipennis</i>	XP_025832249.1
<i>Anoplophora glabripennis</i>	XP_018575858.1
<i>Metopolophium dirhodum</i>	XP_060873676.1
<i>Rhopalosiphum padi</i>	XP_060849200.1
<i>Macrostes quadrilineatus</i>	XP_054281543.1
<i>Daktulosphaira vitifoliae</i>	XP_050520852.1

<i>Adelges cooleyi</i>	XP_050443623.1
<i>Aphis gossypii</i>	XP_050058615.1
<i>Homalodisca vitripennis</i>	XP_046684301.1
<i>Nilaparvata lugens</i>	XP_022196867.1
<i>Acyrtosiphon pisum</i>	XP_008184495.1
<i>[Rhopalosiphum maidis</i>	XP_026820454.1
<i>Achroia grisella</i>	XP_059046124.1
<i>Plodia interpunctella</i>	XP_053603284.1
<i>Bicyclus anynana</i>	XP_023944955.2
<i>Galleria mellonella</i>	XP_026755779.1
<i>Leptidea sinapis</i>	XP_050681388.1
<i>Spodoptera frugiperda</i>	XP_035438355.1
<i>Pectinophora gossypiella</i>	XP_049869964.1
<i>Helicoverpa armigera</i>	XP_049694767.1
<i>Danaus Plexippus</i>	XP_032512602.1
<i>Plutella xylostella</i>	XP_048478972.1
<i>Bombus pascuorum</i>	XP_060813611.1
<i>Hylaeus volcanicus</i>	XP_053986857.1
<i>Microplitis demolitor</i>	XP_053595246.1
<i>Vespula vulgaris</i>	XP_050868177.1
<i>Bombus huntii</i>	XP_050474024.1

<i>Melipona bicolor</i>	KAK1120443.1
<i>Athalia rosae</i>	XP_020710418.2
<i>Bombus terrestris</i>	XP_003397690.1
<i>Bombus terrestris-2</i>	XP_020720012.1
<i>Drosophila nasuta</i>	XP_060654475.1
<i>Phlebotomus argentipes</i>	XP_059610095.1
<i>Musca domestica</i>	XP_011294614.1
<i>Topomyia yanbarensis</i>	XP_058826644.1
<i>Malaya genurostris</i>	XP_058466329.1
<i>Anopheles ziemanni</i>	XP_058176740.1
<i>Anopheles Bellator</i>	XP_058053725.1
<i>Eupeodes corollae</i>	XP_055923687.1

The accession number for nucleotide sequences of GK and GPDH genes

Glycerol kinase 1	PP965667
Glycerol kinase 2	PP965668
Glycerol kinase 3	PP965669
Glycerol-3-phosphate dehydrogenase	PP965670