

GAPDH tetramers reduce 1,3BPG to GA3P

D'Eustachio, P., Harris, RA., Hill, DP.

European Bioinformatics Institute, New York University Langone Medical Center, Ontario Institute for Cancer Research, Oregon Health and Science University.

The contents of this document may be freely copied and distributed in any media, provided the authors, plus the institutions, are credited, as stated under the terms of [Creative Commons Attribution 4.0 International \(CC BY 4.0\) License](#). For more information see our [license](#).

05/05/2024

Introduction

Reactome is open-source, open access, manually curated and peer-reviewed pathway database. Pathway annotations are authored by expert biologists, in collaboration with Reactome editorial staff and cross-referenced to many bioinformatics databases. A system of evidence tracking ensures that all assertions are backed up by the primary literature. Reactome is used by clinicians, geneticists, genomics researchers, and molecular biologists to interpret the results of high-throughput experimental studies, by bioinformaticians seeking to develop novel algorithms for mining knowledge from genomic studies, and by systems biologists building predictive models of normal and disease variant pathways.

The development of Reactome is supported by grants from the US National Institutes of Health (P41 HG003751), University of Toronto (CFREF Medicine by Design), European Union (EU STRP, EMI-CD), and the European Molecular Biology Laboratory (EBI Industry program).

Literature references

- Fabregat, A., Sidiropoulos, K., Viteri, G., Forner, O., Marin-Garcia, P., Arnau, V. et al. (2017). Reactome pathway analysis: a high-performance in-memory approach. *BMC bioinformatics*, 18, 142. [↗](#)
- Sidiropoulos, K., Viteri, G., Sevilla, C., Jupe, S., Webber, M., Orlic-Milacic, M. et al. (2017). Reactome enhanced pathway visualization. *Bioinformatics*, 33, 3461-3467. [↗](#)
- Fabregat, A., Jupe, S., Matthews, L., Sidiropoulos, K., Gillespie, M., Garapati, P. et al. (2018). The Reactome Pathway Knowledgebase. *Nucleic Acids Res*, 46, D649-D655. [↗](#)
- Fabregat, A., Korninger, F., Viteri, G., Sidiropoulos, K., Marin-Garcia, P., Ping, P. et al. (2018). Reactome graph database: Efficient access to complex pathway data. *PLoS computational biology*, 14, e1005968. [↗](#)

Reactome database release: 88

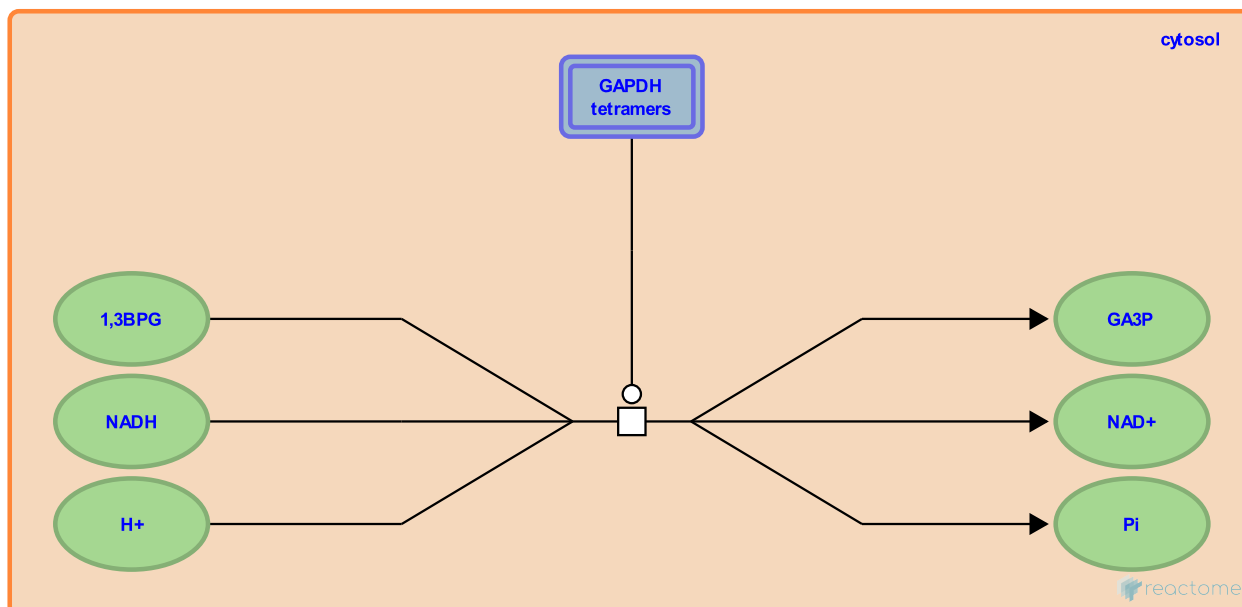
This document contains 1 reaction ([see Table of Contents](#))

GAPDH tetramers reduce 1,3BPG to GA3P [↗](#)

Stable identifier: R-HSA-70482

Type: transition

Compartments: cytosol



The reversible reduction of 1,3BPG (1,3-bisphosphoglycerate) to form G3P (glyceraldehyde-3-phosphate) is catalyzed by cytosolic GAPDH (glyceraldehyde-3-phosphate dehydrogenase) tetramer.

There are multiple human GAPDH-like pseudogenes, but only one GAPDH gene expressed in somatic tissue (Benham and Povey 1989). Consistent with this conclusion, the homogeneous enzymes purified from various human tissues had indistinguishable physical and immunochemical properties (Heinz and Freimüller 1982), and studies of human erythrocytes of various ages suggested that variant forms of the enzyme arise as a result of post-translational modifications (Edwards et al. 1976). There is, however, an authentic second isoform of GAPDH whose expression is confined to spermatogenic cells of the testis (Welch et al. 2000).

Literature references

- Eddy, EM., Bunch, DO., Mori, C., O'Brien, DA., Magyar, PL., Welch, JE. et al. (2000). Human glyceraldehyde 3-phosphate dehydrogenase-2 gene is expressed specifically in spermatogenic cells. *J Androl*, 21, 328-38. [↗](#)
- Edwards, YH., Harris, H., Clark, P. (1976). Isozymes of glyceraldehyde-3-phosphate dehydrogenase in man and other mammals. *Ann Hum Genet*, 40, 67-77. [↗](#)
- Florence, B., Alexander, M., Denaro, M., Ercolani, L. (1988). Isolation and complete sequence of a functional human glyceraldehyde-3-phosphate dehydrogenase gene. *J Biol Chem*, 263, 15335-41. [↗](#)
- Freimüller, B., Heinz, F. (1983). Glyceraldehyde-3-phosphate dehydrogenase from human tissues. *Methods Enzymol*, 89, 301-5. [↗](#)

Editions

2008-09-10	Reviewed	Harris, RA.
2022-08-29	Revised	D'Eustachio, P.
2022-08-29	Reviewed	Hill, DP.