

# GLUT1 (SLC2A1) tetramer transports Glc from extracellular region to cytosol

D'Eustachio, P., Jassal, B.

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](https://creativecommons.org/licenses/by/4.0/). For more information see our [license](https://reactome.org/licenses/).

03/05/2024

## 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

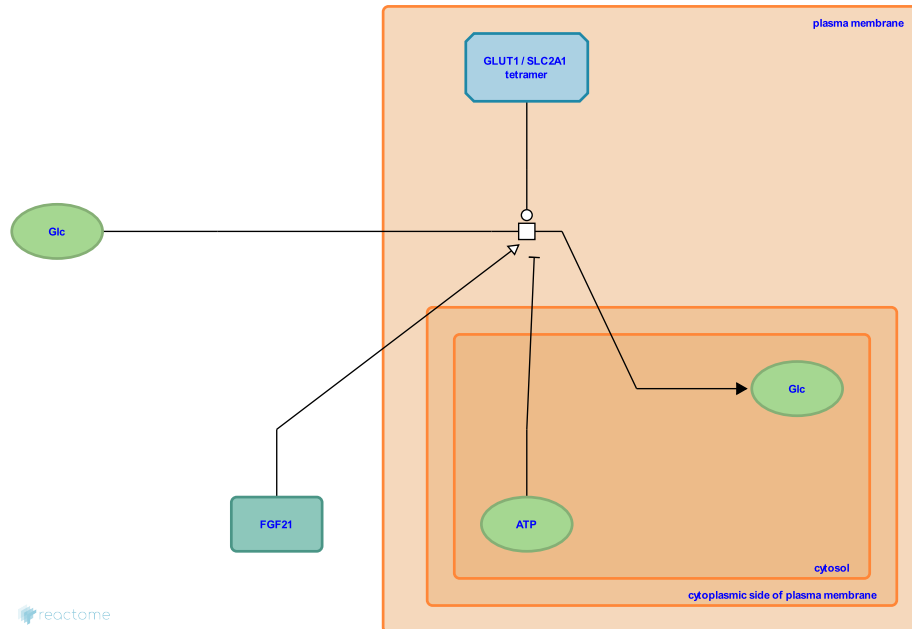
This document contains 1 reaction ([see Table of Contents](#))

## GLUT1 (SLC2A1) tetramer transports Glc from extracellular region to cytosol [↗](#)

**Stable identifier:** R-HSA-5339524

**Type:** transition

**Compartments:** cytosol, plasma membrane, extracellular region



Tetrameric GLUT1, the SLC2A1 gene product, associated with the plasma membrane, mediates the facilitated diffusion of glucose (Glc) into cells. GLUT1 is expressed by many cell types, notably endothelial cells, red blood cells and cells of the brain. Its low  $K_m$  for glucose ( $\sim 1$  mM) relative to normal blood glucose concentration ( $\sim 5$  mM) allows these cells to take up glucose independent of changes in blood glucose levels. It has been purified from red blood cells and biochemically characterized (Hruz & Mueckler 2001, Liu et al. 2001). Cytosolic ATP associates with GLUT1 and inhibits its glucose transporter activity. Fibroblast growth factor 21 (FGF21) is a potent positive regulator of glucose uptake in differentiated mouse 3T3-L1 adipocytes and in primary human adipocytes, probably acting by stimulating SLC2A1 / GLUT1 gene transcription.

### Literature references

- Golde, DW., Liu, Q., Vera, JC., Peng, H. (2001). The predicted ATP-binding domains in the hexose transporter GLUT1 critically affect transporter activity. *Biochemistry*, 40, 7874-81. [↗](#)
- Hammond, LJ., Owens, RA., Moyers, JS., Micanovic, R., Koester, A., Gromada, J. et al. (2005). FGF-21 as a novel metabolic regulator. *J. Clin. Invest.*, 115, 1627-35. [↗](#)
- Hruz, PW., Mueckler, MM. (2001). Structural analysis of the GLUT1 facilitative glucose transporter (review). *Mol Membr Biol*, 18, 183-93. [↗](#)

### Editions

2009-12-12	Revised	D'Eustachio, P.
2014-03-04	Authored, Edited	Jassal, B.
2015-02-11	Reviewed	D'Eustachio, P.