Defective GLB1 does not hydrolyse a glycosaminoglycan

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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.

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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. ↗

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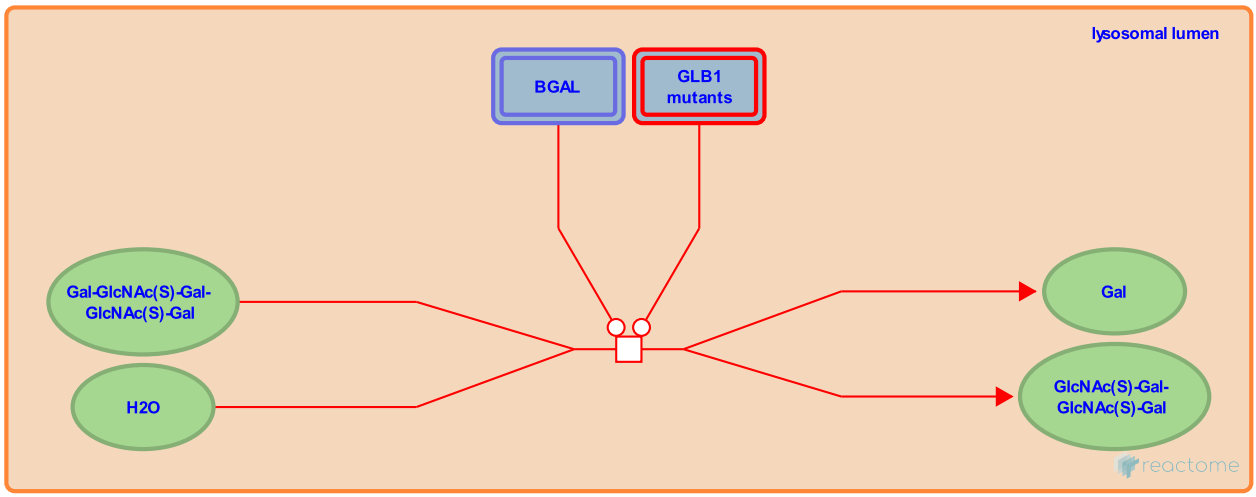
Stable identifier: R-HSA-2265534

Type: transition

Compartments: lysosomal lumen

Diseases: mucopolysaccharidosis



Defects in beta-galactosidase (GLB1, MIM:611458) result in galactose moieties not being hydrolysed from keratan sulfate (KS) or the GAG linker chain, a tetrasccharide sequence required for some GAG biosyntheses to take place. Mucopolysaccharidosis IV B (MPSIVB, Morquio's syndrome B; MIM:253010) is the result of GLB1 deficiency. GLB1 mutations causing severe phenotypes are R482C (Ishii et al. 1995), W509C (Oshima et al. 1991), Y83C (Santamaria et al. 2006) and W273L Paschke et al. 2001. Mild phenotypes where a partial loss of enzyme activity occurs can involve the mutants G438E, N484K, T500A (Bagshaw et al. 2002) and Y83H (Ishii et al. 1995). These mild phenotype mutants are not detailed here.

Literature references

Suzuki, Y., Ishii, N., Oshima, A., Sakuraba, H., Sukegawa, K., Matsuda, I. et al. (1995). Clinical and molecular analysis of a Japanese boy with Morquio B disease. *Clin. Genet., 48*, 103-8.

Coll, MJ., Vilageliu, L., Chabás, A., Santamaria, R., Miranda, CS., Grinberg, D. (2006). Twenty-one novel mutations in the GLB1 gene identified in a large group of GM1-gangliosidosis and Morquio B patients: possible common origin for the prevalent p.R59H mutation among gypsies. *Hum. Mutat., 27*, 1060.

Hoefler, G., Radeva, B., Hoeltzenbein, M., Kreimer-Erlacher, H., Paschke, E., Levade, T. et al. (2001). Mutation analyses in 17 patients with deficiency in acid beta-galactosidase: three novel point mutations and high correlation of mutation W273L with Morquio disease type B. *Hum. Genet., 109*, 159-66.

Fukuhara, Y., Yoshida, K., Suzuki, Y., Sakuraba, H., Oshima, A., Shimmoto, M. (1991). Human beta-galactosidase gene mutations in morquio B disease. *Am J Hum Genet, 49*, 1091-3.

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