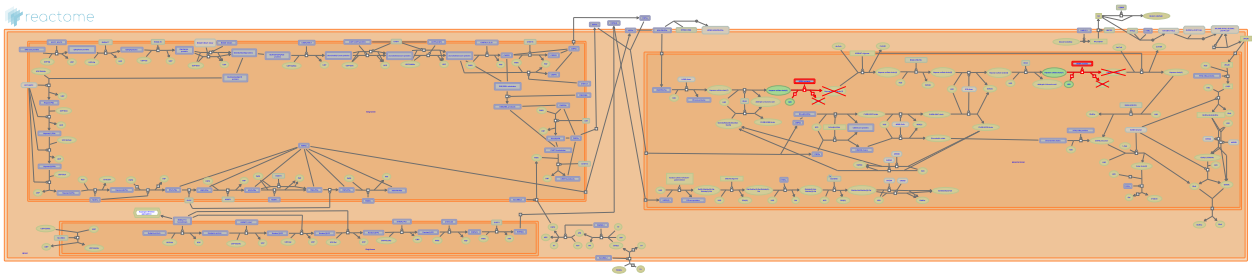
MPS IIIA - Sanfilippo syndrome A



Alves, S., Coutinho, MF., Jassal, B., Matos, L.

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This is just an excerpt of a full-length report for this pathway. To access the complete report, please download it at the Reactome Textbook.

01/05/2024

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. ↗

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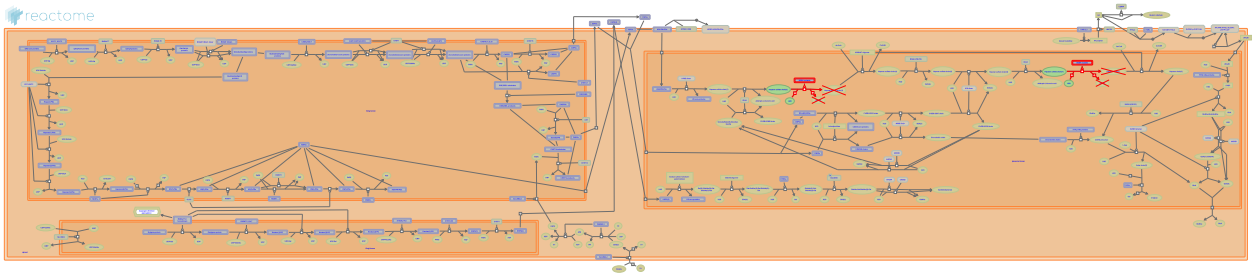
Fabregat, A., Jupe, S., Matthews, L., Sidiropoulos, K., Gillespie, M., Garapati, P. et al. (2018). The Reactome Pathway Knowledgebase. *Nucleic Acids Res, 46*, D649-D655. ↗

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. ↗

MPS IIIA - Sanfilippo syndrome A ↗

Stable identifier: R-HSA-2206307

Diseases: mucopolysaccharidosis III



Mucopolysaccharidosis III (MPS III, Sanfilippo syndrome) was described in 1963 by a pediatrician named Sylvester Sanfilippo (J. Pediat. 63: 837-838, 1963, no reference). Mucopolysaccharidosis IIIA (MPS IIIA, Sanfilippo syndrome A, MIM:252900) is a rare, autosomal recessive lysosomal storage disease characterised by severe CNS degeneration in early childhood leading to death between 10 and 20 years of age. A deficiency of the enzyme N-sulphoglucosamine sulphohydrolase (SGSH, MIM:605270), which normally hydrolyses the sulfate group from the terminal N-sulphoglucosamine residue of heparan sulfate (HS), leads to the build-up of HS in cells and tissues and its presence in urine (van de Kamp et al. 1981, Yogalingam & Hopwood 2001, de Ruijter et al. 2011). The gene encoding N-sulfoglucosamine sulfohydrolase, SGSH, was cloned in 1995 (Scott et al.1995) and, later, shown to contain 8 exons spanning approximately 11 kb (Karageorgos et al. 1996).

Literature references

Blanch, L., Morris, CP., Orsborn, A., Guo, XH., Hopwood, JJ., Sutherland, GR. et al. (1995). Cloning of the sulphamidase gene and identification of mutations in Sanfilippo A syndrome. *Nat Genet, 11*, 465-7. ↗

Niermeijer, MF., van de Kamp, JJ., Giesberts, MA., von Figura, K. (1981). Genetic heterogeneity and clinical variability in the Sanfilippo syndrome (types A, B, and C). *Clin Genet, 20*, 152-60. ↗

Hopwood, JJ., Yogalingam, G. (2001). Molecular genetics of mucopolysaccharidosis type IIIA and IIIB: Diagnostic, clinical, and biological implications. *Hum Mutat, 18*, 264-81. ↗

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Weber, B., Anson, DS., Guo, XH., Hopwood, JJ., Karageorgos, LE., Blanch, L. et al. (1996). Structure and sequence of the human sulphamidase gene. *DNA Res., 3*, 269-71. ↗

Editions

2012-04-26	Authored, Edited	Jassal, B.
2012-08-27	Reviewed	Coutinho, MF., Matos, L., Alves, S.

Defective SGSH does not hydrolyse Heparan sulfate chain(7) ↗

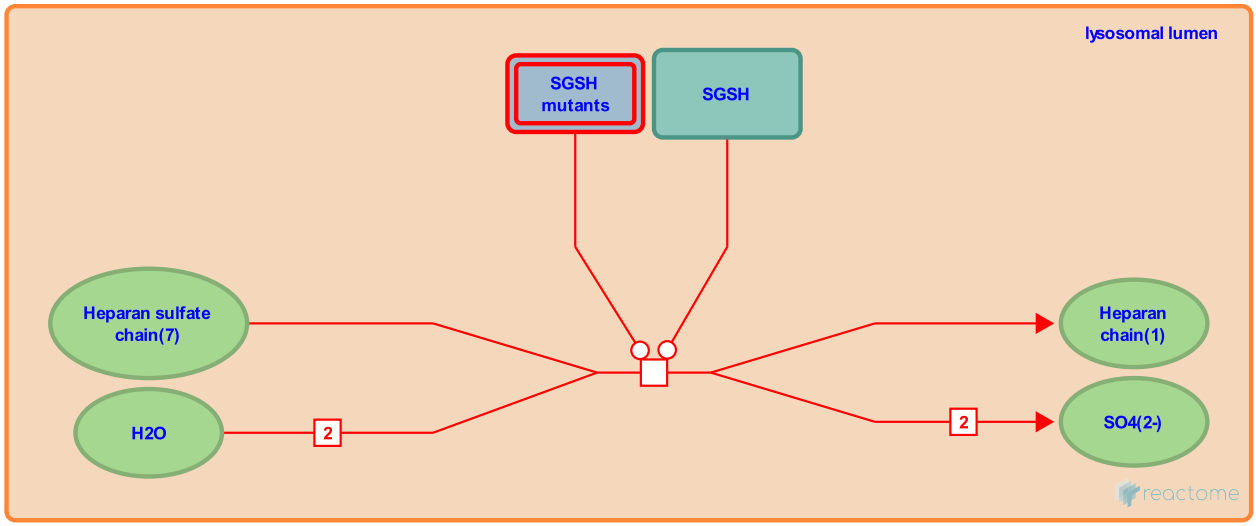
Location: MPS IIIA - Sanfilippo syndrome A

Stable identifier: R-HSA-2263444

Type: transition

Compartments: lysosomal lumen

Diseases: mucopolysaccharidosis III



MPS IIIA (Sanfilippo syndrome A, mucopolysaccharidosis IIIA, MIM:252900) is a rare, autosomal recessive lysosomal storage disease. A deficiency of the enzyme N-sulphoglucosamine sulphohydrolase (SGSH, MIM:605270), which normally hydrolyses the sulfate group from the terminal N-sulphoglucosamine residue of heparan sulfate (HS) leads to the build up of HS in cells and tissues, characterised by severe CNS degeneration in early childhood leading to death between 10 and 20 years of age.
Four mutations (R74C, R245H, S66W, and 1091delC) are known to be prevalent in Polish (Bunge et al. 1997), Dutch (Weber et al. 1997), Italian (Di Natale et al. 1998), and Spanish (Montfort et al. 1998) populations, respectively. These mutations abolish the activity of SGSH being associated with the classic severe phenotype.

Literature references

Zaremba, J., Hopwood, JJ., Weber, B., Ince, H., Van Diggelen, OP., Steglich, C. et al. (1997). Identification of 16 sulfamidase gene mutations including the common R74C in patients with mucopolysaccharidosis type IIIA (Sanfilippo A). *Hum Mutat, 10*, 479-85. ↗

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Chabás, A., Guidi, S., Coll, MJ., Garcia-Giralt, N., Vilageliu, L., Montfort, M. et al. (1998). Mutation 1091delC is highly prevalent in Spanish Sanfilippo syndrome type A patients. *Hum Mutat, 12*, 274-9. ↗

Villani, GR., Esposito, S., Balzano, N., Di Natale, P. (1998). Identification of molecular defects in Italian Sanfilippo A patients including 13 novel mutations. *Hum Mutat, 11*, 313-20. ↗

Editions

2012-05-21	Authored, Edited	Jassal, B.
2012-08-27	Reviewed	Coutinho, MF., Matos, L., Alves, S.

Defective SGSH does not hydrolyse Heparan sulfate chain(2) ↗

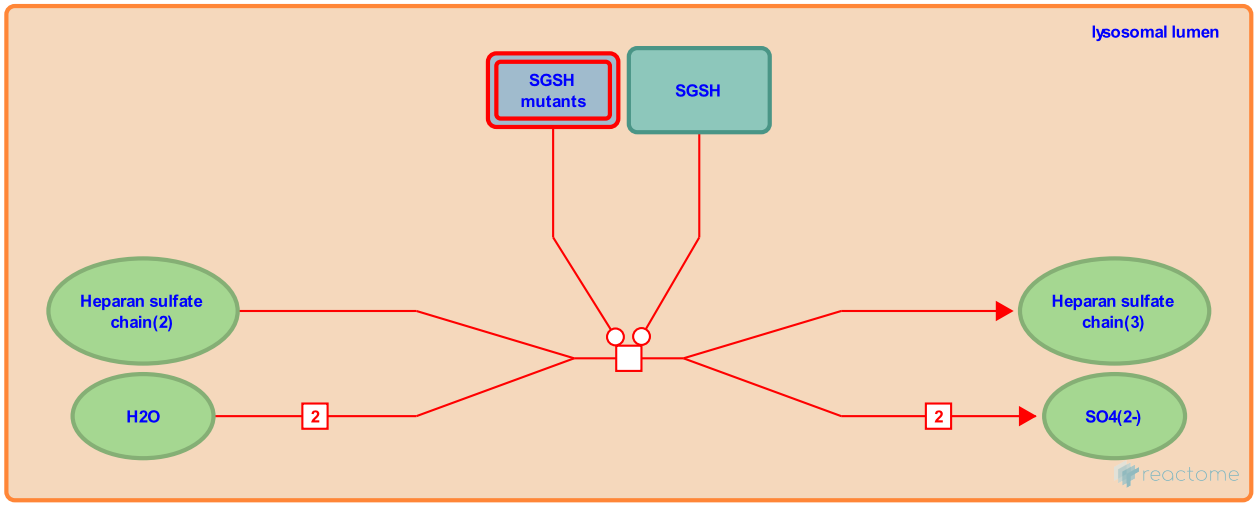
Location: MPS IIIA - Sanfilippo syndrome A

Stable identifier: R-HSA-9036050

Type: transition

Compartments: lysosomal lumen

Diseases: mucopolysaccharidosis III



MPS IIIA (Sanfilippo syndrome A, mucopolysaccharidosis IIIA, MIM:252900) is a rare, autosomal recessive lysosomal storage disease. A deficiency of the enzyme N-sulphoglucosamine sulphohydrolase (SGSH, MIM:605270), which normally hydrolyses the sulfate group from the terminal N-sulphoglucosamine residue of heparan sulfate (HS) leads to the build up of HS in cells and tissues, characterised by severe CNS degeneration in early childhood leading to death between 10 and 20 years of age.
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Editions

2012-05-21	Authored, Edited	Jassal, B.
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