Collagen type I degradation by

MMP1,2,8,13, PRSS2

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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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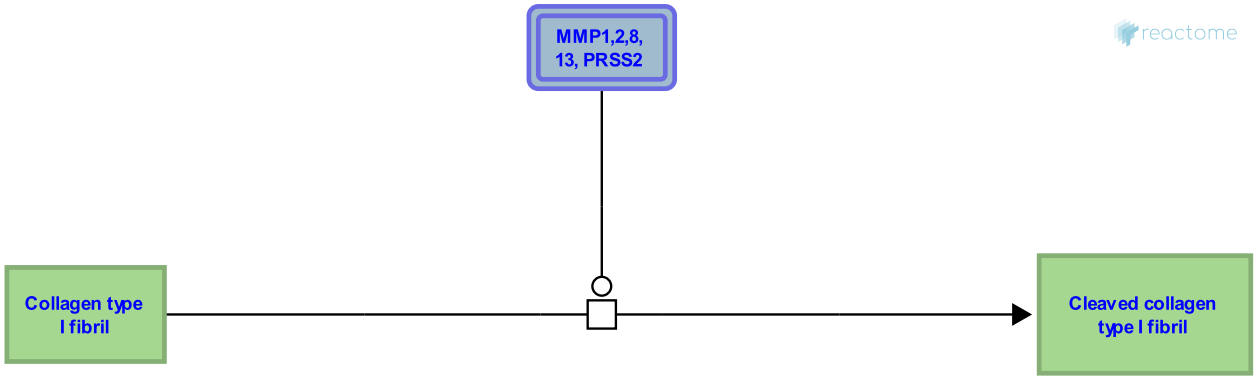
Stable identifier: R-HSA-1454822

Type: transition

Compartments: extracellular region



MMP1 (Welgus et al. 1981), MMP8 (Hasty et al. 1987), and MMP13 (Knauper et al. 1996) known in the literature as collagenases I, II and III respectively are able to digest the intrahelical bonds of collagen type I. MMP2, also known as Gelatinase-A, was found to cleave collagen type I fibrils (Aimes & Quigley 1995). Though this was disputed (Seltzre & Eisen 1999) there is a structural explanation for the apparent discrepancies in experimental data (Patterson et al. 2001). In addition trypsin-2 is able to degrade native soluble type I collagen (Moilanen et al. 2003). Degradation is represented here at a theoretical end point where every alpha strand has been cleaved.

Literature references

Visse, R., Fields, GB., Lauer-Fields, JL., Nagase, H., Yoshida, N., Dinakarpandian, D. et al. (2004). Collagenase unwinds triple-helical collagen prior to peptide bond hydrolysis. *EMBO J, 23*, 3020-30.

Hibbs, MS., Hasty, KA., Jeffrey, JJ., Welgus, HG. (1987). The collagen substrate specificity of human neutrophil collagenase. *J Biol Chem, 262*, 10048-52.

Eisen, AZ., Jeffrey, JJ., Welgus, HG. (1981). The collagen substrate specificity of human skin fibroblast collagenase. *J Biol Chem, 256*, 9511-5.

Quigley, JP., Aimes, RT. (1995). Matrix metalloproteinase-2 is an interstitial collagenase. Inhibitor-free enzyme catalyzes the cleavage of collagen fibrils and soluble native type I collagen generating the specific 3/4- and 1/4-length fragments. *J Biol Chem, 270*, 5872-6.

Smith, B., López-Otin, C., Knight, G., Knäuper, V., Murphy, G. (1996). Biochemical characterization of human collagenase-3. *J Biol Chem, 271*, 1544-50.

Editions

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