Tropoelastin associates with microfibrils

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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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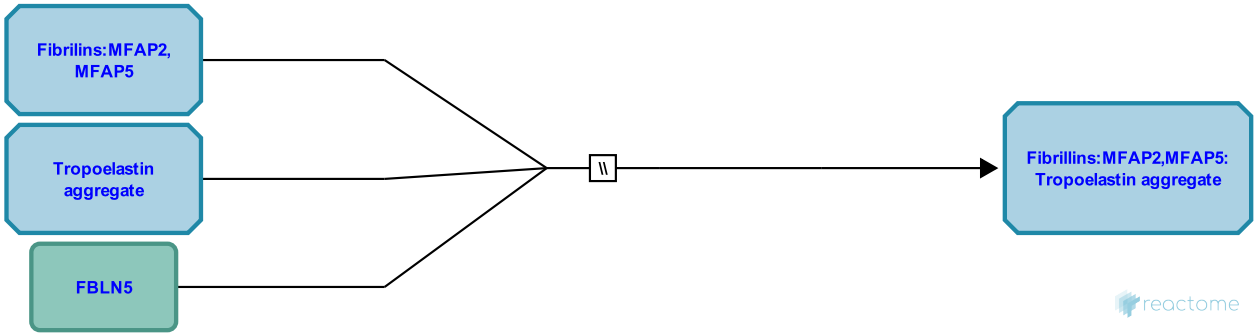
Stable identifier: R-HSA-2129353

Type: omitted

Compartments: extracellular region



Elastin, the highly insoluble core protein of elastic fibers, is secreted as a soluble protein monomer referred to as tropoelastin. Under physiological conditions the monomers phase separate and coalesce into spherical packages (Clarke et al. 2006), a process known as coacervation. Packages of accumulated elastin are delivered to fibrillin-based fibres in a mechanism that is correlated with cell migration during embryonic development (Czirok et al. 2006). A transglutaminase cross-link between domain 4 of tropoelastin and domain 16 of fibrillin-1 (FBN1) may stabilize initial deposition (Clarke et al. 2005). Elastin is subsequently cross linked by members of the lysyl oxidase family via lysine residues, resulting in mature, insoluble fibres (Sato et al. 2007, Wise & Weiss 2009).

Fibulin-5 (FBLN5) expressed by vascular smooth muscle cells plays an essential role in the formation of elastic fibres, mediating interactions between elastin and fibrillin (Yanigasawa et al. 2002, Freeman et al. 2005). FBLN5 binds tropoelastin but not mature elastin (Zheng et al. 2007), regulating coacervation (Yanigasawa et al. 2009). FBLN5 can bind FBN1 monomers and fibrils (Freeman et al. 2005), but it is not clear whether this is necessary for elastin polymerization. FBLN5 also binds elastin cross-linking enzymes lysyl oxidase like (LOXL)-1, -2, and -4 (Hirai et al. 2007). Overexpression of Fbln5 increases elastin deposition and formation of desmosine cross-links (Nonaka et al. 2009). EMILIN can affect the process of elastic fibre formation (Bressan et al. 1993). It binds elastin and fibulin-5 and appears to coordinate their common interaction (Zanetti et al. 2004).

Literature references

Clarke, AW., Arnspang, EC., Mithieux, SM., Korkmaz, E., Braet, F., Weiss, AS. (2006). Tropoelastin massively associates during coacervation to form quantized protein spheres. *Biochemistry, 45*, 9989-96. ↗

Editions

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