

## Reactome Multi-Scale Pathway Visualisation

Henning Hermjakob<sup>1</sup>

Molecular Networks Team, European Bioinformatics Institute (EMBL-EBI), Cambridge, UK.<sup>1</sup>  
hhe@ebi.ac.uk

Reactome (<https://reactome.org>) [1] is a free, open-source, open-data, curated and peer-reviewed knowledge base of biomolecular pathways, currently covering 2,106 Pathways; 10,712 protein coding genes; 11,302 reactions; 27,452 literature references and 1,800 small molecules. Pathways are arranged in a hierarchical structure, allowing the user to navigate from high level concepts like immune system to detailed pathway diagrams showing biomolecular events like membrane transport or phosphorylation. The Reactome curation strategy focuses on the annotation of “normal” pathways in human. However, we increasingly annotate disease-specific pathway modifications, grouped in three major classes: loss of function (typically metabolic disease phenotypes), gain of function (typically cancer phenotypes), and host-pathogen interactions.

Here, we present new developments in the multi-scale Reactome visualization system that facilitate navigation through the pathway hierarchy and enable efficient reuse of Reactome visualizations for users' own research presentations and publications.

For the higher levels of the hierarchy, Reactome now provides scalable, interactive textbook-style diagrams in SVG format, which are also freely downloadable and editable (Fig 1). Repeated diagram elements like 'mitochondrion' or 'receptor' are freely available as a library of graphic elements at <https://reactome.org/icon-lib>. Detailed lower-level diagrams are now downloadable in editable PPTX format as sets of interconnected objects, as well as in standard png format.

[1] Sidiropoulos K, Viteri G, Sevilla C, Jupe S, Webber M, Orlic-Milacic M, Jassal B, May B, Shamovsky V, Duenas C, Rothfels K, Matthews L, Song H, Stein L, Haw R, D'Eustachio P, Ping P, Hermjakob H, Fabregat A. Reactome enhanced pathway visualization. *Bioinformatics*. 2017 Nov 1;33(21):3461-3467.

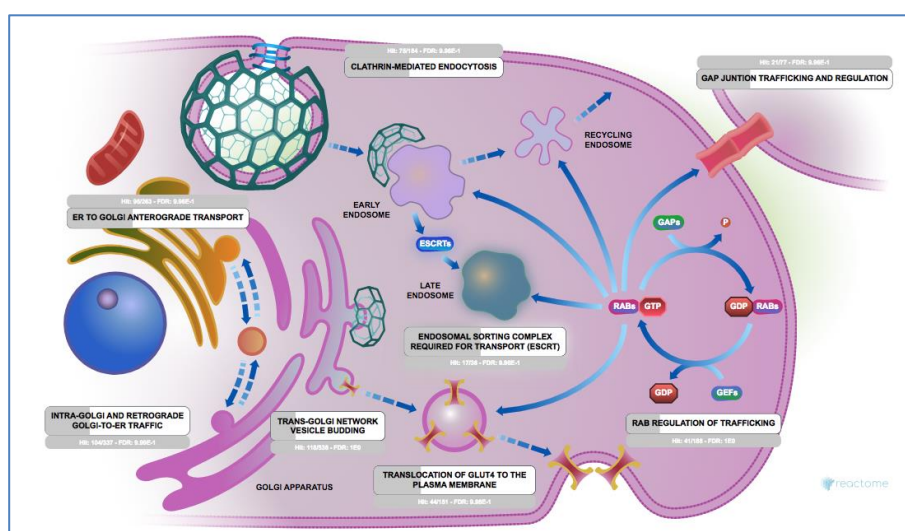


Fig 1: Reactome Diagram example: Vesicle-mediated transport