Synthesis of Preproglucagon in intestinal L cells

Bloom, SR., May, B.

European Bioinformatics Institute, New York University Langone Medical Center, Ontario Institute for Cancer Research, Oregon Health and Science University.

19/05/2024

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. ↗

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. ↗

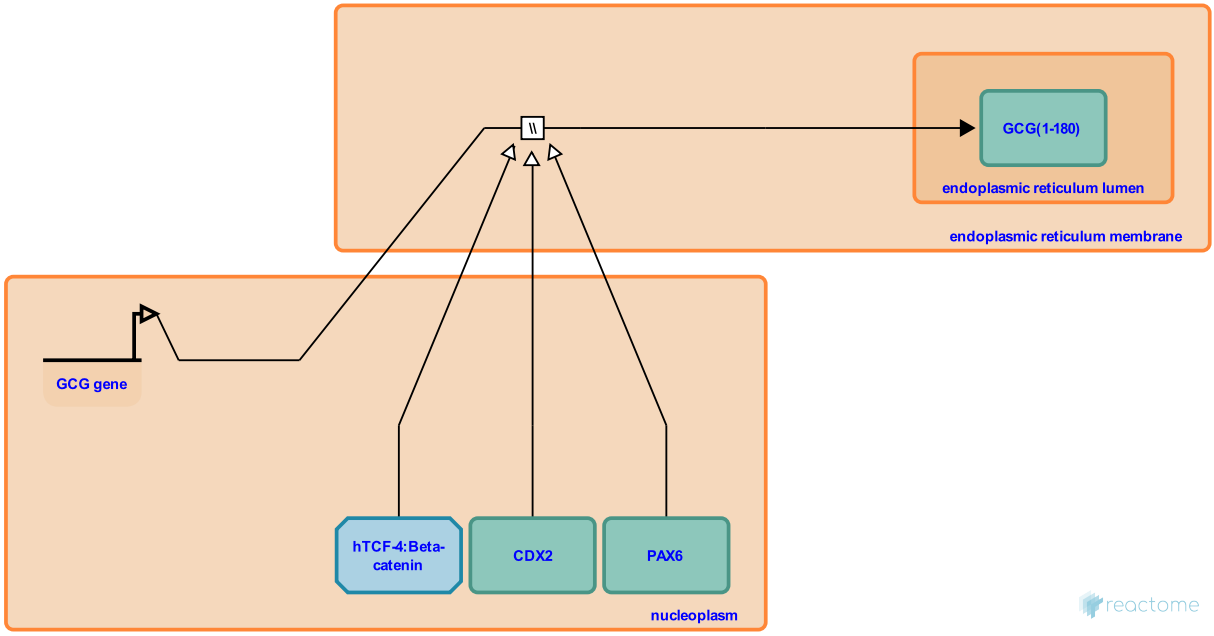
Fabregat, A., Korninger, F., Viteri, G., Sidiropoulos, K., Marin-Garcia, P., Ping, P. et al. (2018). Reactome graph database: Efficient access to complex pathway data. *PLoS computational biology, 14*, e1005968. ↗

Synthesis of Preproglucagon in intestinal L cells ↗

Stable identifier: R-HSA-381799

Type: omitted

Compartments: cytosol, endoplasmic reticulum membrane, endoplasmic reticulum lumen



TCF-4 and Beta-Catenin form a heterodimer that bind the G2 element of the promoter of the Proglucagon (GCG) gene in L2 cells of the intestine. CDX-2 binds an AT-rich sequence in the G1 enhancer element of the GCG promoter. Transcription of the GCG gene is enhanced by cAMP, calcium, and insulin and the Beta-Catenin:TCF-4 binding region of the promoter is necessary for this regulation. It is therefore postulated that the Wnt signaling pathway (Beta-Catenin) crosstalks with the cAMP-PKA pathway and/or the cAMP-EPAC pathway.
Beta-catenin:TCF-4 bound at the promoter of the GCG gene recruits RNA polymerase II. This regulation is inferred from experiments in mouse and rat cells.

Literature references

Anini, Y., Brubaker, PL. (2003). Muscarinic receptors control glucagon-like peptide 1 secretion by human endocrine L cells. *Endocrinology, 144*, 3244-50. ↗

Yanaihara, N., Sessa, F., Solcia, E., Rindi, G., Capella, C., Fiocca, R. et al. (1985). Glucagon- and PP-related peptides of intestinal L cells and pancreatic/gastric A or PP cells. Possible interrelationships of peptides and cells during evolution, fetal development and tumor growth. *Peptides, 6*, 223-9. ↗

Anini, Y., Brubaker, PL. (2003). Role of leptin in the regulation of glucagon-like peptide-1 secretion. *Diabetes, 52*, 252-9. ↗

Gremlich, S., Macé, K., Darimont, C., Nicolas-Métral, V., Rüegg, UT., Reimer, RA. (2001). A human cellular model for studying the regulation of glucagon-like peptide-1 secretion. *Endocrinology, 142*, 4522-8. ↗

Michopoulos, S., Juhaszova, M., Petraki, K., Carlson, O., Egan, JM., Doyle, ME. et al. (2006). Human duodenal enteroendocrine cells: source of both incretin peptides, GLP-1 and GIP. *Am J Physiol Endocrinol Metab, 290*, E550-9. ↗

Editions

2009-05-19	Authored	May, B.
2009-09-09	Edited	May, B.
2010-06-25	Reviewed	Bloom, SR.