

# RXRA:PPARD binds FABP5:atRA

Duester, G., Jassal, B., Napoli, JL.

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

The contents of this document may be freely copied and distributed in any media, provided the authors, plus the institutions, are credited, as stated under the terms of [Creative Commons Attribution 4.0 International \(CC BY 4.0\) License](#). For more information see our [license](#).

06/05/2024

## 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. [↗](#)

Reactome database release: 88

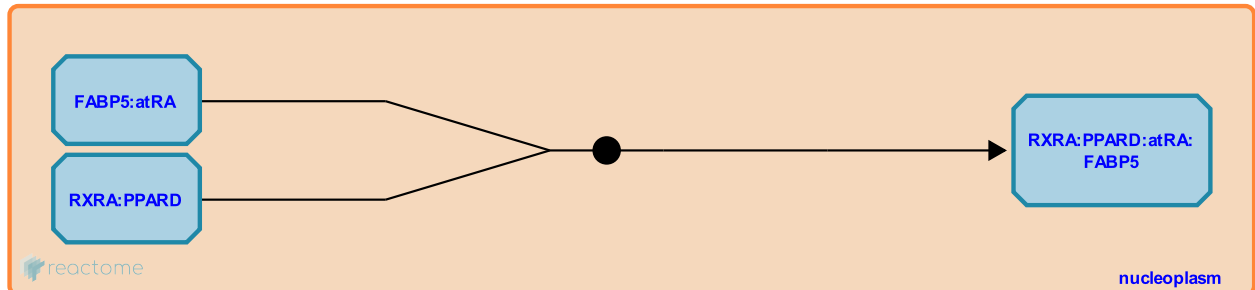
This document contains 1 reaction ([see Table of Contents](#))

## RXRA:PPARD binds FABP5:atRA [↗](#)

**Stable identifier:** R-HSA-5422942

**Type:** binding

**Compartments:** nucleoplasm



In the nucleus, all-trans-retinoic acid (atRA), binds to epidermal fatty acid-binding protein (FABP5), is transferred to the heterodimeric complex of retinoic acid receptor alpha (RXRA) and peroxisome proliferator-activated receptor delta (PPARD). When bound to PPARD, atRA can significantly increase the expression of proteins involved in fatty acid oxidation and energy metabolism via its induction of PPARD (Wolf 2010, Amengual et al. 2012, Noy 2013).

### Literature references

Amengual, J., Ribot, J., Bonet, ML., Petrov, P., Palou, A. (2012). Induction of carnitine palmitoyl transferase 1 and fatty acid oxidation by retinoic acid in HepG2 cells. *Int. J. Biochem. Cell Biol.*, 44, 2019-27. [↗](#)

Wolf, G. (2010). Retinoic acid activation of peroxisome proliferation-activated receptor delta represses obesity and insulin resistance. *Nutr. Rev.*, 68, 67-70. [↗](#)

Noy, N. (2013). The one-two punch: Retinoic acid suppresses obesity both by promoting energy expenditure and by inhibiting adipogenesis. *Adipocyte*, 2, 184-7. [↗](#)

### Editions

2014-05-07	Authored, Edited	Jassal, B.
2014-07-28	Reviewed	Duester, G.
2014-09-01	Reviewed	Napoli, JL.