Ac-PTGS2 dimer oxidises DHA to 17(R)-Hp-DHA

Hansen, TV., Jassal, B.

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

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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

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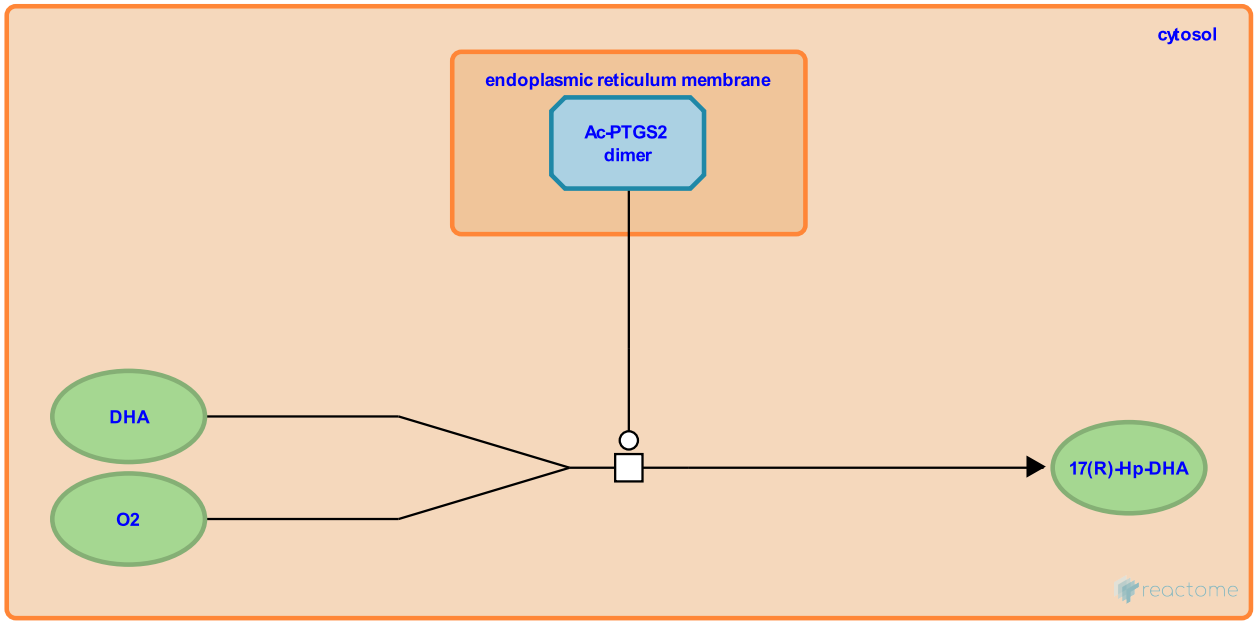
Stable identifier: R-HSA-9020261

Type: transition

Compartments: cytosol



Normally, cyclooxygenases (COX) carry out stereospecific oxygenation of arachidonic acid to generate prostaglandins. When treated with aspirin (acetylsalicylic acid, ASA), dimeric cyclooxygenase-2 (COX2, PTGS2 dimer) can be acetylated. ASA covalently modifies PTGS2 by acetylating a serine residue at position 530 within the cyclooxygenase active site (Lucido et al. 2016). Acetylated PTGS2 dimer (Ac-PTGS2 dimer) changes the oxygenation stereospecificity towards its substrates, perhaps by steric shielding effects (Tosco 2013), producing a shift in lipid mediator production. Ac-PTGS2 dimer is able to incorporate molecular oxygen into ω-3 fatty acid docosahexaenoic acid (DHA), present in inflammatory exudates, to form the 17(R) epimer 17(R)-hydroperoxy-docosahexaenoic acid (17(R)-Hp-DHA) (Serhan et al. 2002, Sun et al. 2007). The product can either be transformed into aspirin-triggered D-resolvins or aspirin-triggered protectin D1 (Serhan et al. 2015).

Literature references

Serhan, CN., Campbell, E., Colgan, SP., Oh, SF., Petasis, NA., Gotlinger, K. et al. (2007). Resolvin D1 and its aspirin-triggered 17R epimer. Stereochemical assignments, anti-inflammatory properties, and enzymatic inactivation. *J. Biol. Chem., 282*, 9323-34. ↗

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Editions

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