Synthesis of diphthamide-EEF2

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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**


Reactome database release: 79

This document contains 1 pathway and 4 reactions (see Table of Contents)
Synthesis of diphthamide-EEF2

Stable identifier: R-HSA-5358493

Compartments: cytosol

Eukaryotic elongation factor 2 (EEF2) catalyzes the GTP dependent ribosomal translocation step during translation elongation. This function requires the presence of a posttranslational modification, the conversion of histidine residue 715 to diphthamide (2′[3 carboxamido 3 (trimethylammonio)propyl]L histidine) (Van Ness et al. 1978). No other protein is known to undergo this modification. The diphthamide residue is also the target of ADP ribosylation catalyzed by diphtheria toxin, which inactivates EEF2 and leads to cell death (Collier 1975; Pappenheim 1977).

Diphthamide synthesis proceeds in four steps: the transfer of 3 amino 3 carboxypropyl group from S adenosylmethionine to histidine 715 of EEF2, the addition of four methyl groups to the 3 amino 3 carboxypropyl moiety, the demethylation of the methylated carboxylate group to form diphthine, and the amidation of the diphthine carboxyl group (Liu et al. 2004; Lin et al. 2014; Schaffrath et al. 2014; Su et al. 2013; Uthman et al. 2013).

Literature references


https://reactome.org
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DPH2 transfers a 3-amino-3-carboxypropyl group from AdoMet to residue 715 of nascent EEF2

Location: Synthesis of diphthamide-EEF2

Stable identifier: R-HSA-5358494