Oxidative demethylation of 3-meC damaged DNA By ALKBH3

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17/05/2024

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. ↗

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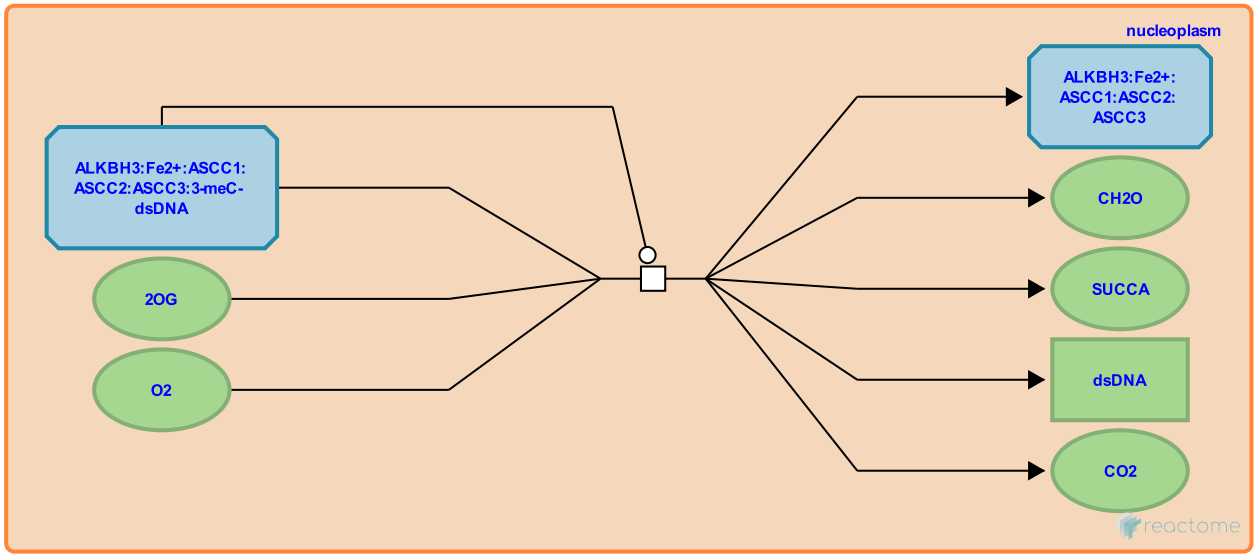
Stable identifier: R-HSA-112124

Type: transition

Compartments: nucleoplasm



ALKBH3, a homolog of E.coli AlkB (Trewick et al. 2002), removes the methyl group from 3-methylcytosine (3-meC) in a reaction dependent on alpha-ketoglutarate, oxygen and Fe2+. ALKBH3 directly reverses the alkylating damage of DNA in the form of 3-meC, releasing formaldehyde (Duncan et al. 2002). The reversal of alkylating damage of dsDNA by ALKBH3 requires the presence of DNA helicase ASCC3, a component of the activating signal co-integrator complex (Dango et al. 2011). ALKBH3 can also repair methylated RNA (Aas et al. 2003).

Literature references

Lindahl, T., Duncan, T., Bates, PA., Sedgwick, B., Trewick, SC., Koivisto, P. (2002). Reversal of DNA alkylation damage by two human dioxygenases. *Proc Natl Acad Sci U S A, 99*, 16660-5. ↗

Editions

2004-02-04	Edited, Reviewed	Joshi-Tope, G.
2004-02-04	Authored	Pegg, AE.
2014-12-13	Revised	Orlic-Milacic, M.
2014-12-16	Edited	Orlic-Milacic, M.
2015-02-06	Reviewed	Gillespie, ME.