Beta-catenin translocates to the nucleus

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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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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. ↗

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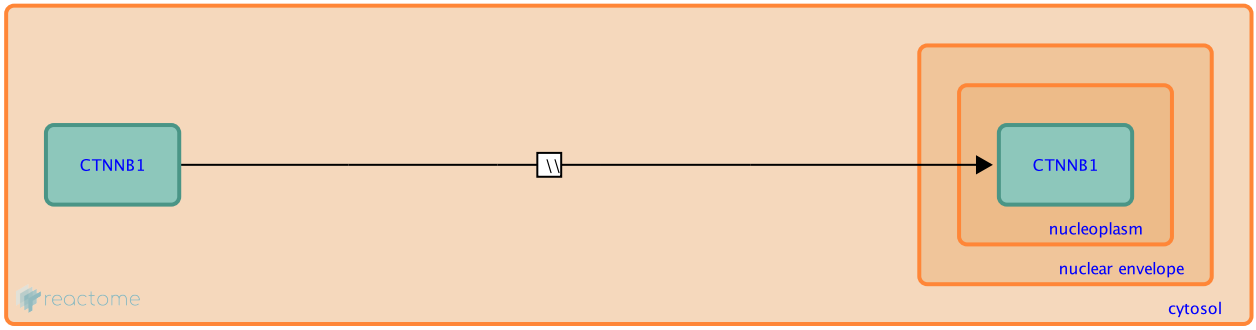
Compartments: cytosol, nucleoplasm



Although it is well established that stabilized beta-catenin is translocated to the nucleus upon WNT pathway activation, the mechanisms that control beta-catenin localization are not fully elucidated. Beta-catenin has neither an NLS nor an NES, and its localization likely arises as the result of a complicated balance between shuttling and retention in both the nucleus and the cytoplasm (reviewed in MacDonald et al, 2009, Saito-Diaz et al, 2013). Nuclear entry of beta-catenin is independent of importins and RanGTPase (Fagotto et al, 1998; Yokoya et al, 1999) and beta-catenin has been suggested to interact directly with the nuclear pore complex by virtue of the structural similarity of its ARM domains to the importin-beta HEAT repeats (Kutay et al, 1997; Malik et al, 1997). Beta-catenin may also 'piggy-back' into the nucleus in complex with other proteins such as FOXM1 (Zhang et al, 2011) or BCL9 (Townsley et al, 2004). Once in the nucleus, interaction with TCF, BCL9 and Pygopus may function as an anchor for beta-catenin (Tolwinski and Wieschaus, 2001; Townsley et al, 2004; Krieghoff et al, 2006). Many of the components of the destruction complex, including APC and AXIN are also found in the nucleus and are thought to contribute to beta-catenin localization (Henderson and Fagotto, 2002; Cong and Varmus, 2004). Finally, recent work has revealed a role for Rac1 GTPase and Jun N-terminal kinase 2 (JNK2) in the nuclear localization of beta-catenin upon WNT pathway activation, although the mechanism for this remains to be elucidated (Wu et al, 2008).

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