

β-catenin

β-catenin is a multifunctional [protein](#) that plays a critical role in various cellular processes, including [cell-cell adhesion](#) and [signal transduction](#). It is a key component of the [Wnt signaling pathway](#), which is essential for regulating cell fate, migration, and proliferation during development. β-catenin also plays a central role in the maintenance of adherens junctions, where it binds to cadherins to help form the connection between adjacent cells.

In the context of the Wnt signaling pathway, β-catenin is involved in the regulation of gene expression. When Wnt signaling is active, β-catenin accumulates in the cytoplasm and translocates to the nucleus, where it binds to T-cell factor/lymphoid enhancer-binding factor (TCF/LEF) transcription factors to initiate the expression of target genes that regulate cell proliferation and differentiation.

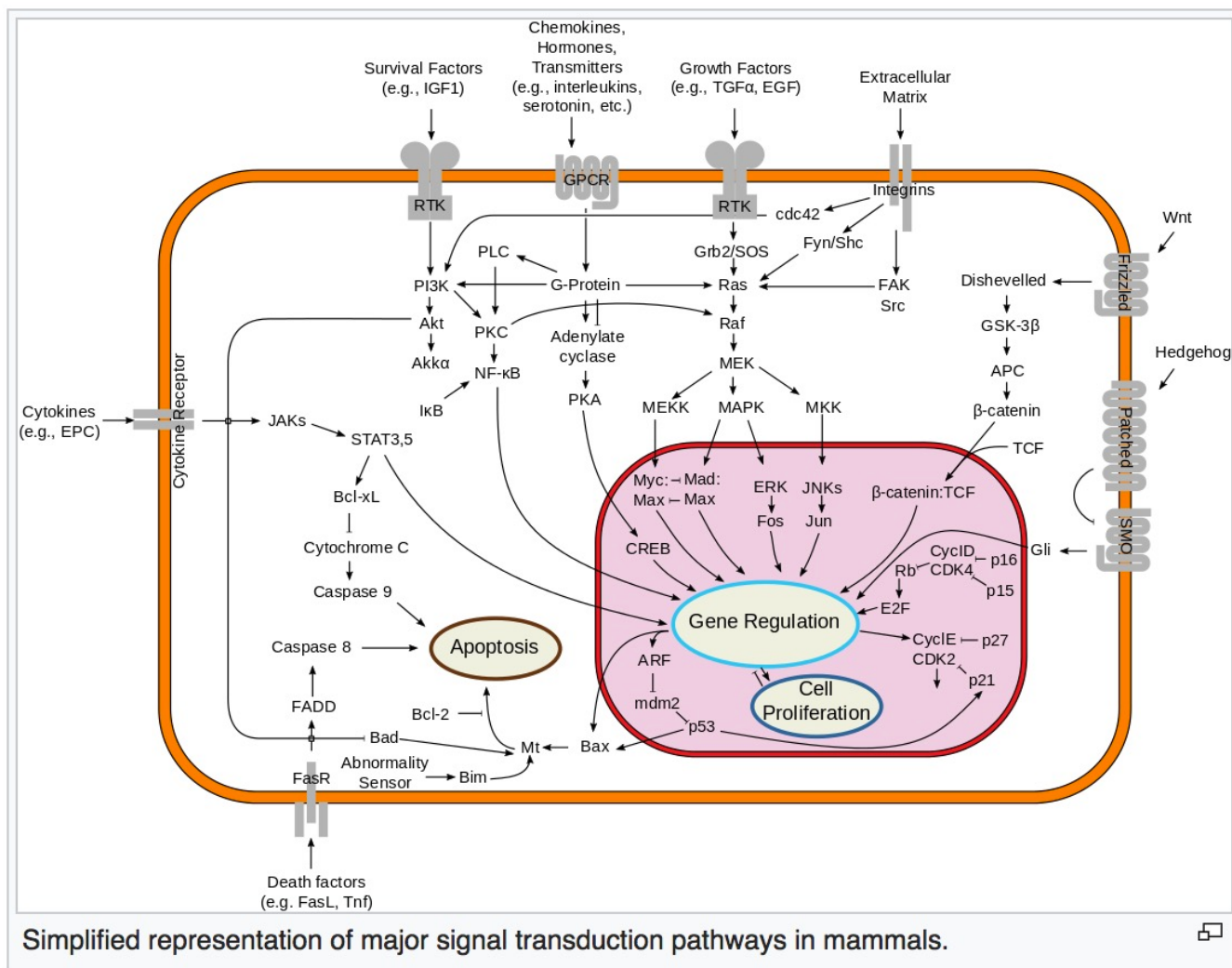
In cancer biology, aberrant activation of the Wnt/β-catenin pathway is commonly observed, leading to uncontrolled cell growth. Mutations that stabilize β-catenin or disrupt the degradation process can result in its accumulation and abnormal activation of downstream target genes, contributing to tumorigenesis, especially in cancers like colorectal cancer.

[Catenin](#) (cadherin-associated protein), beta 1, 88kDa (the HUGO-approved official symbol, [CTNNB1](#); HGNC ID, HGNC:2514), also called beta-catenin (or β-catenin), is a dual function protein, regulating the coordination of cell-[cell adhesion](#) and [gene transcription](#). In humans, the CTNNB1 protein is encoded by the CTNNB1 gene.

Beta catenin is a subunit of the [cadherin](#) protein complex and acts as an intracellular signal transducer in the [Wnt signaling pathway](#).

[Beta catenin](#) is a well-known crucial factor in [astrocytoma](#) progression and it is involved in [aquaporin 1](#) (AQP1) mediated [cell migration](#).

In a study, Zhang et al. revealed the function of AQP1 in astrocytoma progression and provided the first clinical evidence that AQP1 expression was positively correlated with β-catenin. Furthermore, they proved the functional role of AQP1/β-catenin pathway in astrocytoma progression. More importantly, they discovered that combination of AQP1 and β-catenin expression was an independent prognosis factor for astrocytoma patients and it was a better survival predictor than either AQP1 or β-catenin alone. In conclusion, the study provided a novel more precise prognostication for predicting astrocytoma prognosis based on combinatorial analysis of AQP1 and β-catenin expression ¹⁾.



It is a member of the catenin protein family and homologous to γ -catenin.

Mutations and overexpression of β -catenin are associated with many cancers, including hepatocellular carcinoma, colorectal carcinoma, lung cancer, malignant breast tumors, ovarian and endometrial cancer.

β -catenin is regulated and destroyed by the beta-catenin destruction complex, and in particular by the [adenomatous polyposis coli](#) (APC) protein, encoded by the tumour-suppressing APC gene. Therefore genetic mutation of the APC gene is also strongly linked to cancers, and in particular colorectal cancer resulting from familial adenomatous polyposis (FAP).

[Wnt/ \$\beta\$ -catenin signaling pathway](#) is frequently dysregulated in human tumors and plays a critical role in [tumorigenesis](#); however, the roles of [microRNAs](#) in mediating [Wnt/ \$\beta\$ -catenin](#) pathway are not well understood.

Expression of WNT3a, cytoplasmic β -catenin and TCF4 was significantly associated with the histological malignancy grade and with a worse prognosis for patients with glioma ²⁾.

1)

Zhang H, Qin F, Yang L, He J, Liu X, Shao Y, Guo Z, Zhang M, Li W, Fu L, Gu F, Ma Y. Combination of

AQP1 and β-catenin expression is an independent prognosis factor in astrocytoma patients. Oncotarget. 2017 Jul 26. doi: 10.18632/oncotarget.19562. [Epub ahead of print] PubMed PMID: 28767413.

2)

Denysenko T, Annovazzi L, Cassoni P, Melcarne A, Mellai M, Schiffer D. WNT/β-catenin Signaling Pathway and Downstream Modulators in Low- and High-grade Glioma. Cancer Genomics Proteomics. 2016 01-02;13(1):31-45. PubMed PMID: 26708597.

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