

TCF7L1/TCF7L2/LEF1:CTNNB1 promote transcription of the MYC gene

Chuang, LS., Gillespie, ME., Ito, Y., Kikuchi, A., Orlic-Milacic, M., Rajakulendran, N., Rothfels, K.,
van Amerongen, R.

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

The contents of this document may be freely copied and distributed in any media, provided the authors,
plus the institutions, are credited, as stated under the terms of [Creative Commons Attribution 4.0 Inter-
national \(CC BY 4.0\) License](#). For more information see our [license](#).

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. [↗](#)
- Sidiropoulos, K., Viteri, G., Sevilla, C., Jupe, S., Webber, M., Orlic-Milacic, M. et al. (2017). Reactome enhanced pathway visualization. *Bioinformatics*, 33, 3461-3467. [↗](#)
- 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. [↗](#)
- Fabregat, A., Korninger, F., Viteri, G., Sidiropoulos, K., Marin-Garcia, P., Ping, P. et al. (2018). Reactome graph database: Efficient access to complex pathway data. *PLoS computational biology*, 14, e1005968. [↗](#)

Reactome database release: 70

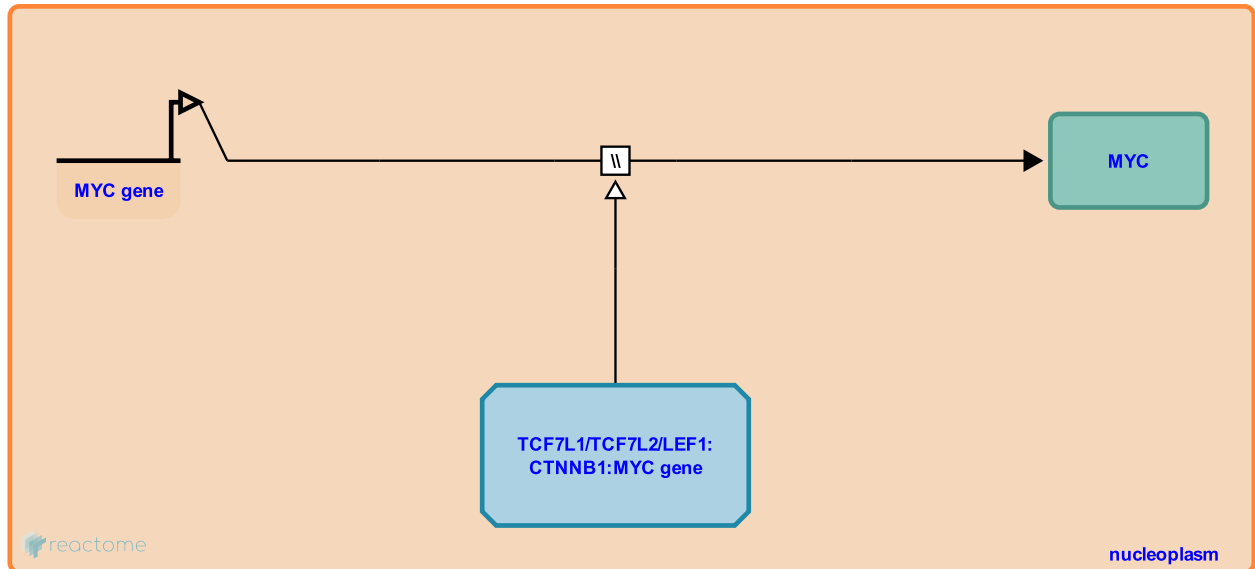
This document contains 1 reaction ([see Table of Contents](#))

TCF7L1/TCF7L2/LEF1:CTNNB1 promote transcription of the MYC gene ↗

Stable identifier: R-HSA-4411357

Type: omitted

Compartments: nucleoplasm



TCF7L1 (also known as TCF3), TCF7L3 (also known as LEF1) and TCF7L2 (also known as TCF4) have been demonstrated to bind to the MYC gene in vivo and in vitro and to mediate beta-catenin dependent transcription (Park et al, 2009; He et al, 1998; Sierra et al, 2006). Aberrant beta-catenin dependent activation of the MYC gene contributes to oncogenic signaling and cellular proliferation in colorectal and other cancers (see for instance Sansom et al, 2007; Moumen et al, 2013; reviewed in Wilkins and Sansom, 2008; Cairo et al, 2012).

Binding of RUNX3 to the CTNNB1:TCF7L2 and possibly to the CTNNB1:LEF1 and TCF7L1 complexes, prevents binding of CTNNB1 complexes to the MYC promoter, thus negatively regulating MYC transcription (Ito et al. 2008).

Literature references

- Park, JI., Venteicher, AS., Hong, JY., Choi, J., Jun, S., Shkreli, M. et al. (2009). Telomerase modulates Wnt signalling by association with target gene chromatin. *Nature*, 460, 66-72. ↗
- He, TC., Sparks, AB., Rago, C., Hermeking, H., Zawel, L., da Costa, LT. et al. (1998). Identification of c-MYC as a target of the APC pathway. *Science*, 281, 1509-12. ↗
- Sierra, J., Yoshida, T., Joazeiro, CA., Jones, KA. (2006). The APC tumor suppressor counteracts beta-catenin activation and H3K4 methylation at Wnt target genes. *Genes Dev.*, 20, 586-600. ↗

Editions

2013-08-23	Authored	Rothfels, K.
2013-10-02	Edited	Gillespie, ME.
2014-01-22	Reviewed	Rajakulendran, N.
2014-02-14	Reviewed	van Amerongen, R.
2014-04-22	Reviewed	Kikuchi, A.
2017-01-31	Reviewed	Ito, Y., Chuang, LS.
2017-01-31	Edited	Orlic-Milacic, M.