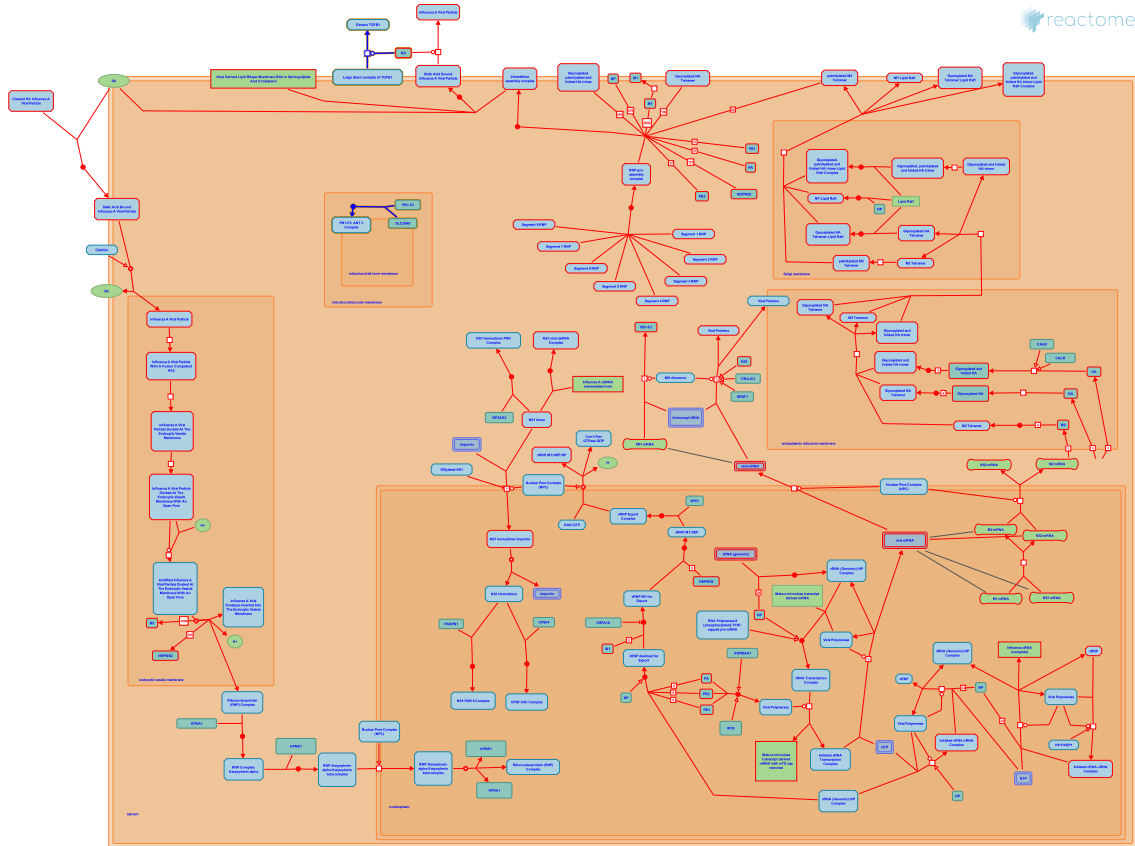


Influenza Virus Induced Apoptosis



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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

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- 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. [↗](#)
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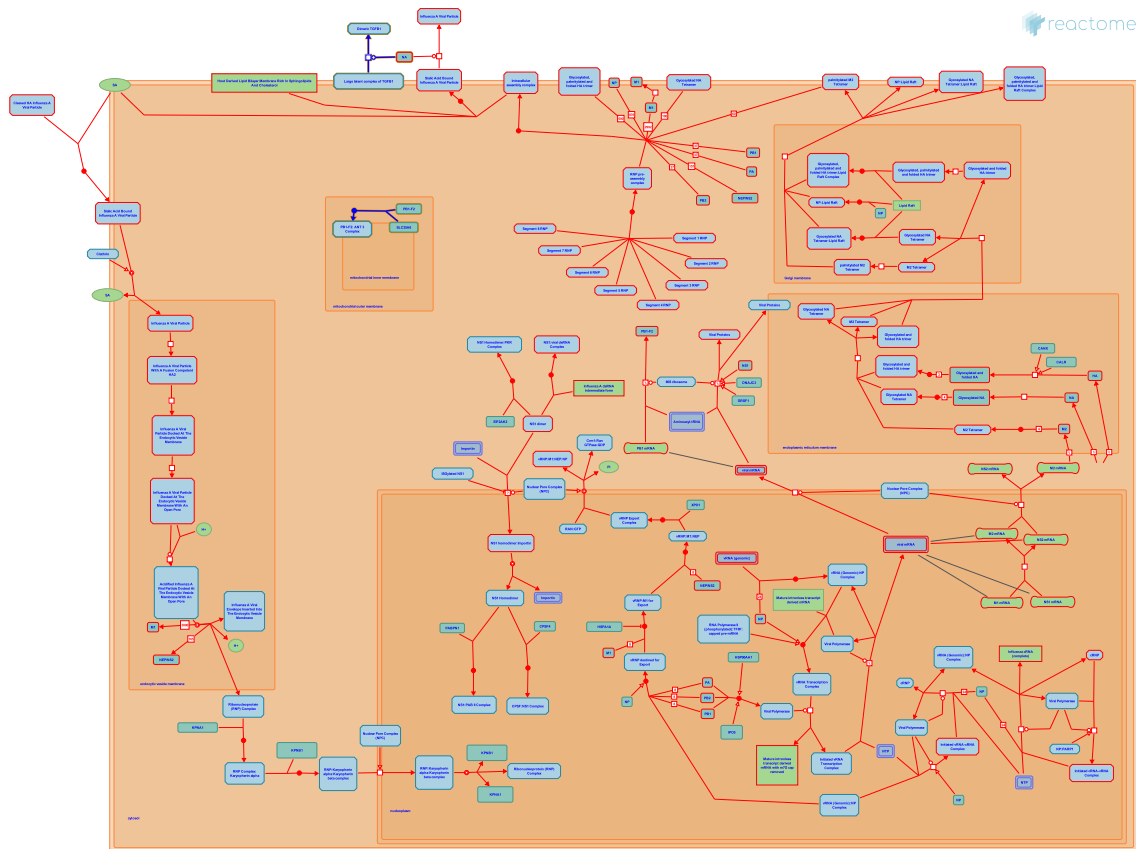
Reactome database release: 75

This document contains 1 pathway and 2 reactions ([see Table of Contents](#))

Influenza Virus Induced Apoptosis ↗

Stable identifier: R-HSA-168277

Diseases: influenza



Influenza A virus induces apoptosis in a variety of ways including activation of host TGF-beta by expression of viral NA, M1 and M2 proteins, and by the binding of viral PB1-F2 to host mitochondrial adenine nucleotide translocator 3 (ANT3).

Literature references

Palese, P., Shaw, ML. (2001). Orthomyxoviridae: The Viruses and Their Replication. *Fields Virology, 5th edition* D.M. Knipe and P.M. Howley, Editors. 2006, Lippencott Williams and Wilkins: Philadelphia ISBN-10: 0-7817-6060-7, 1647-1689. ↗

Editions

2004-05-12	Reviewed	Gale M, Jr.
2013-11-18	Authored, Edited	Gillespie, ME.

NA activation of TGF-beta ↗

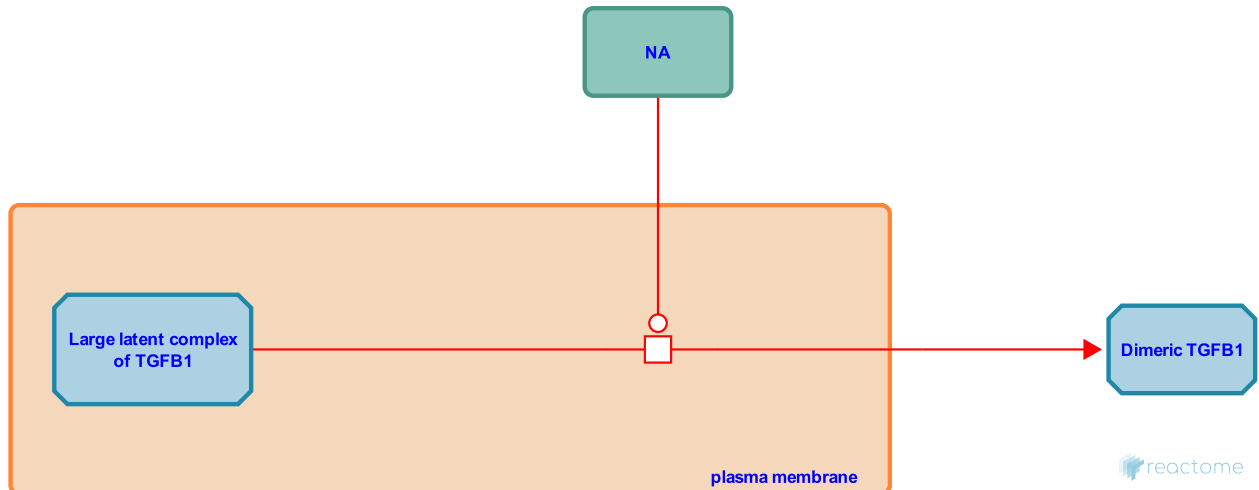
Location: [Influenza Virus Induced Apoptosis](#)

Stable identifier: R-HSA-168865

Type: transition

Compartments: plasma membrane

Diseases: influenza



Influenza A virus induces apoptosis in a variety of ways including by activation of host TGF-beta by viral neuraminidase (NA).

Literature references

Morris, SJ., Price, GE., Barnett, JM., Hiscox, SA., Smith, H., Sweet, C. (1999). Role of neuraminidase in influenza virus-induced apoptosis. *J Gen Virol*, 80, 137-46. ↗

Li, N., Ren, A., Wang, X., Fan, X., Zhao, Y., Gao, GF. et al. (2015). Influenza viral neuraminidase primes bacterial coinfection through TGF- β -mediated expression of host cell receptors. *Proc. Natl. Acad. Sci. U.S.A.*, 112, 238-43. ↗

Editions

2004-05-12	Reviewed	Gale M, Jr.
2013-11-18	Authored	Gillespie, ME.

PB1-F2 binds to the mitochondrial adenine nucleotide translocator 3 ANT3, inducing apoptosis ↗

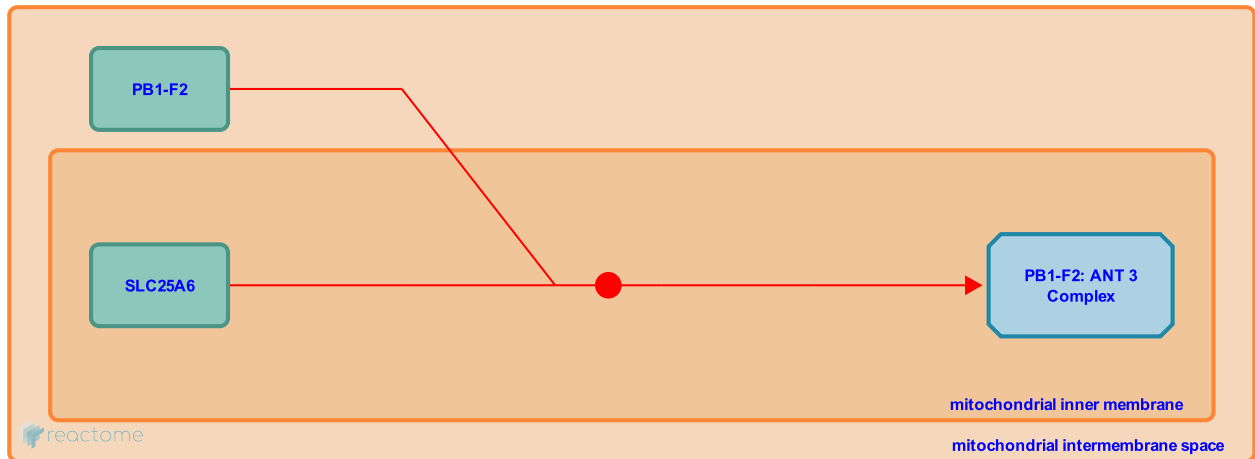
Location: [Influenza Virus Induced Apoptosis](#)

Stable identifier: R-HSA-168878

Type: binding

Compartments: mitochondrial inner membrane, mitochondrial intermembrane space

Diseases: influenza



Influenza A virus induces apoptosis in a variety of ways including binding of viral PB1-F2 to host mitochondrial adenine nucleotide translocator 3 (ANT3).

Literature references

Chanturiya, AN., Basanez, G., Schubert, U., Henklein, P., Yewdell, JW., Zimmerberg, J. (2004). PB1-F2, an influenza A virus-encoded proapoptotic mitochondrial protein, creates variably sized pores in planar lipid membranes. *J Virol*, 78, 6304-12. ↗

Editions

2004-05-12	Reviewed	Gale M, Jr.
2013-11-18	Authored	Gillespie, ME.

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