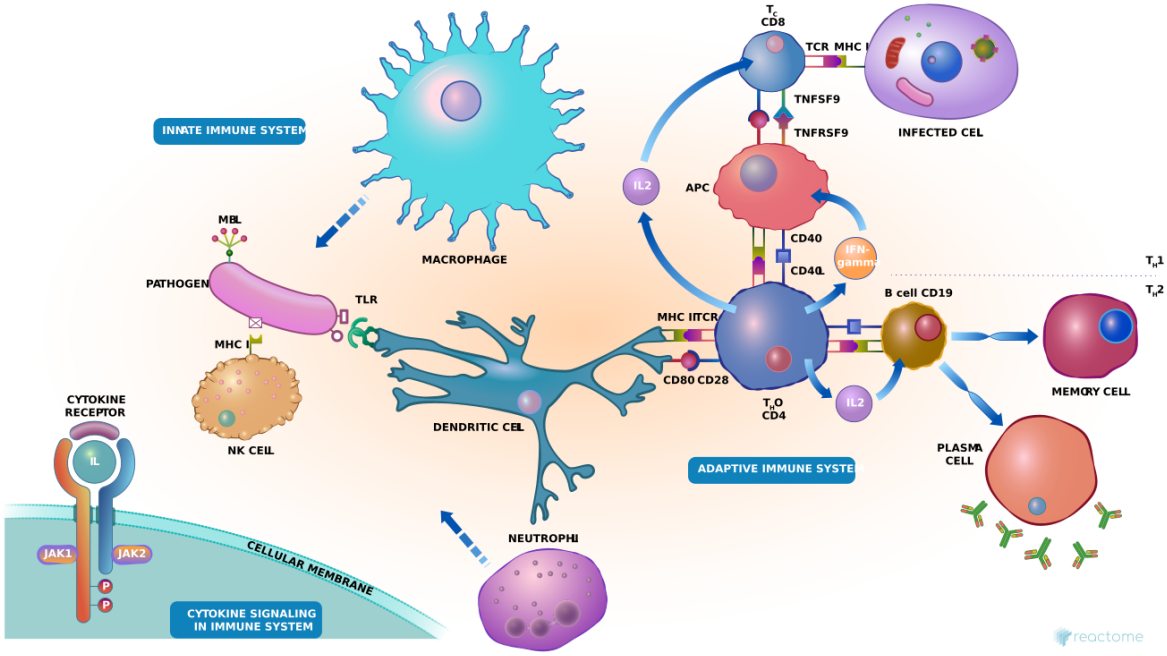
Immune System



Abdul-Sater, AA., Bluestone, JA., D'Eustachio, P., Elliott, T., Esensten, J., Gale M, Jr., Garapati, P V., Gay, NJ., Gillespie, ME., Heemskerk, JW., Jupe, S., Luo, F., May, B., Ouwehand, WH., Pinteaux, E., Ray, KP., Schindler, C., Trowsdale, J., Zwaginga, JJ., de Bono, B.

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

07/02/2022

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. ↗

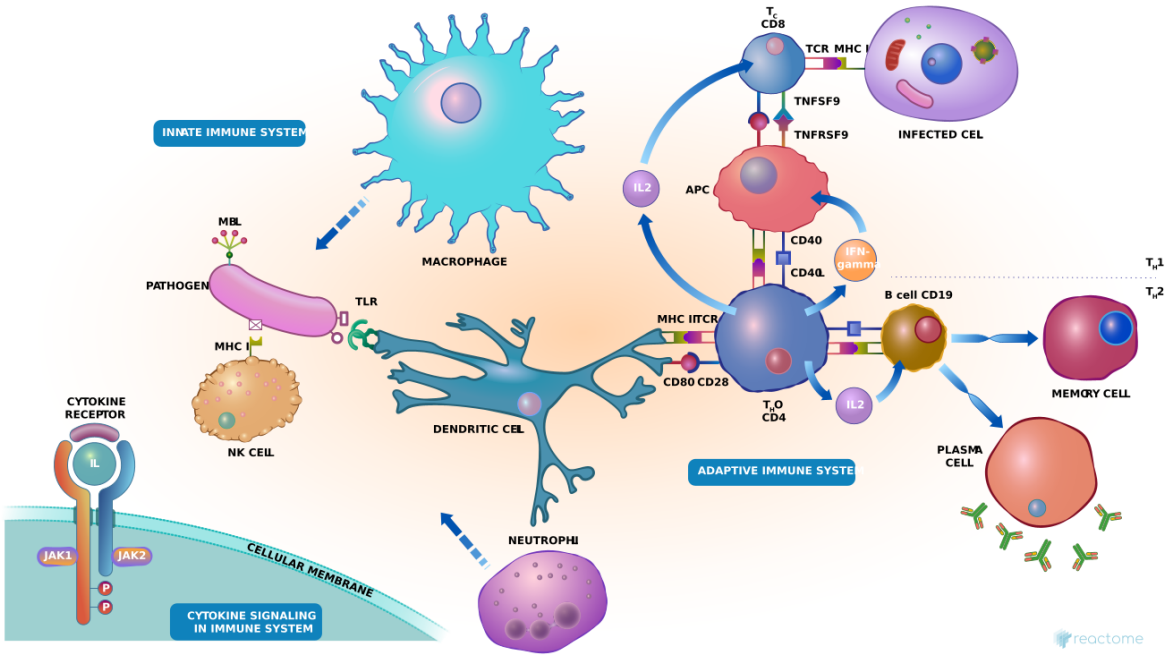
Fabregat, A., Korninger, F., Viteri, G., Sidiropoulos, K., Marin-Garcia, P., Ping, P. et al. (2018). Reactome graph database: Efficient access to complex pathway data. *PLoS computational biology, 14*, e1005968. ↗

Reactome database release: 79

This document contains 4 pathways (see Table of Contents)

Immune System

Stable identifier: R-HSA-168256



Humans are exposed to millions of potential pathogens daily, through contact, ingestion, and inhalation. Our ability to avoid infection depends on the adaptive immune system and during the first critical hours and days of exposure to a new pathogen, our innate immune system.

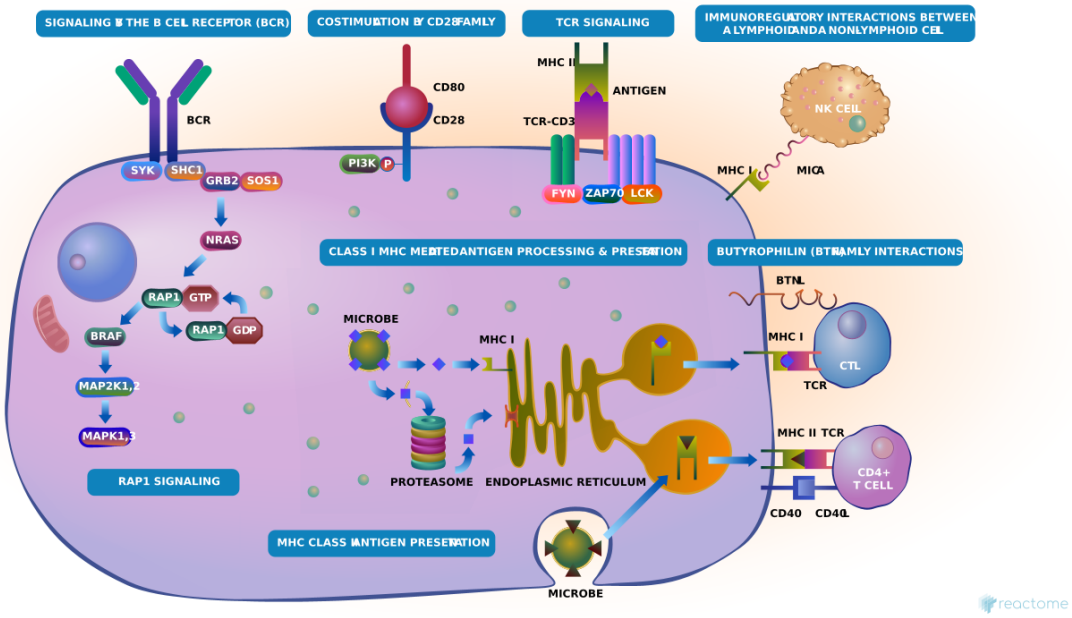
Editions

2006-03-30	Authored	Gillespie, ME., de Bono, B., Luo, F., Ouwehand, WH.
2006-04-19	Reviewed	D'Eustachio, P., Gay, NJ., Gale M, Jr., Zwaginga, JJ.

Adaptive Immune System

Location: Immune System

Stable identifier: R-HSA-1280218



Adaptive immunity refers to antigen-specific immune response efficiently involved in clearing the pathogens. The adaptive immune system is comprised of B and T lymphocytes that express receptors with remarkable diversity tailored to recognize aspects of particular pathogens or antigens. During infection, dendritic cells (DC) which act as sentinels in the peripheral tissues recognize and pick up the pathogen in the form of antigenic determinants and then process these antigens and present them to T cells. These T cells of appropriate specificity respond to the antigen, and either kill the pathogen directly or secrete cytokines that will stimulate B lymphocyte response. B cells provide humoral immunity by secreting antibodies specific for the pathogen or antigen.

Literature references

Minnicozzi, M., Sawyer, RT., Fenton, MJ. (2011). Innate immunity in allergic disease. *Immunol Rev, 242*, 106-27.

Cooper, MD., Pancer, Z. (2006). The evolution of adaptive immunity. *Annu Rev Immunol, 24*, 497-518.

Janeway CA, Jr., Medzhitov, R. (2002). Innate immune recognition. *Annu Rev Immunol, 20*, 197-216.

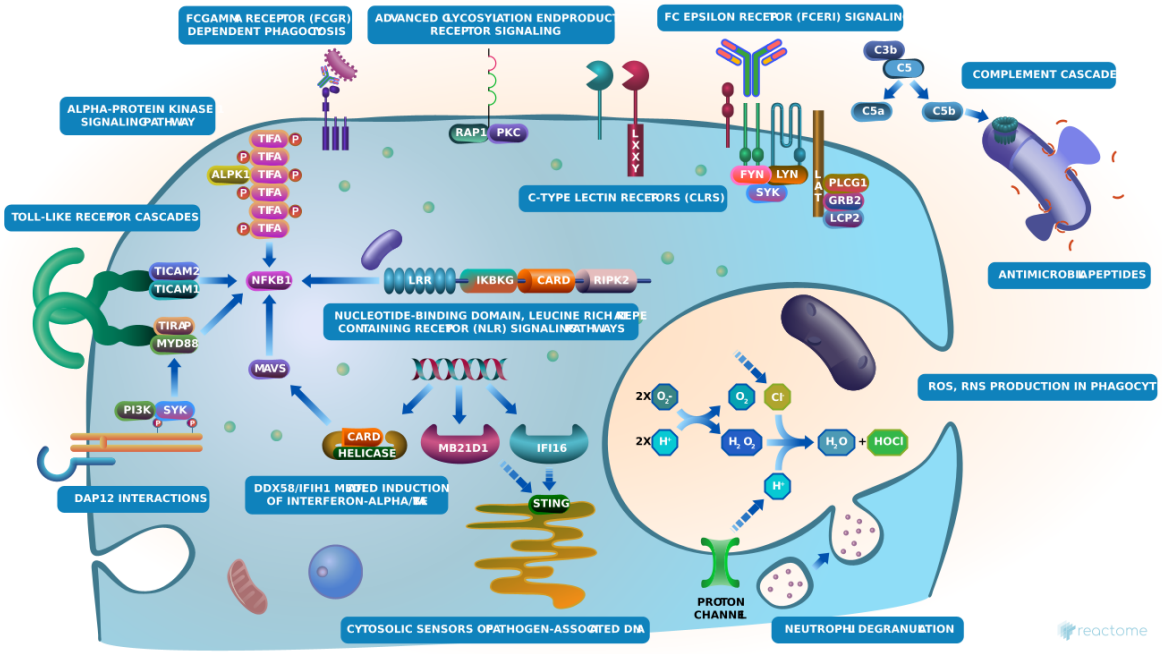
Editions

2011-05-22	Authored, Edited	de Bono, B., Garapati, P V., May, B., Jupe, S.
2011-05-29	Reviewed	Trowsdale, J., Bluestone, JA., Esensten, J., Heemskerk, JW., Elliott, T.

Innate Immune System ↗

Location: Immune System

Stable identifier: R-HSA-168249

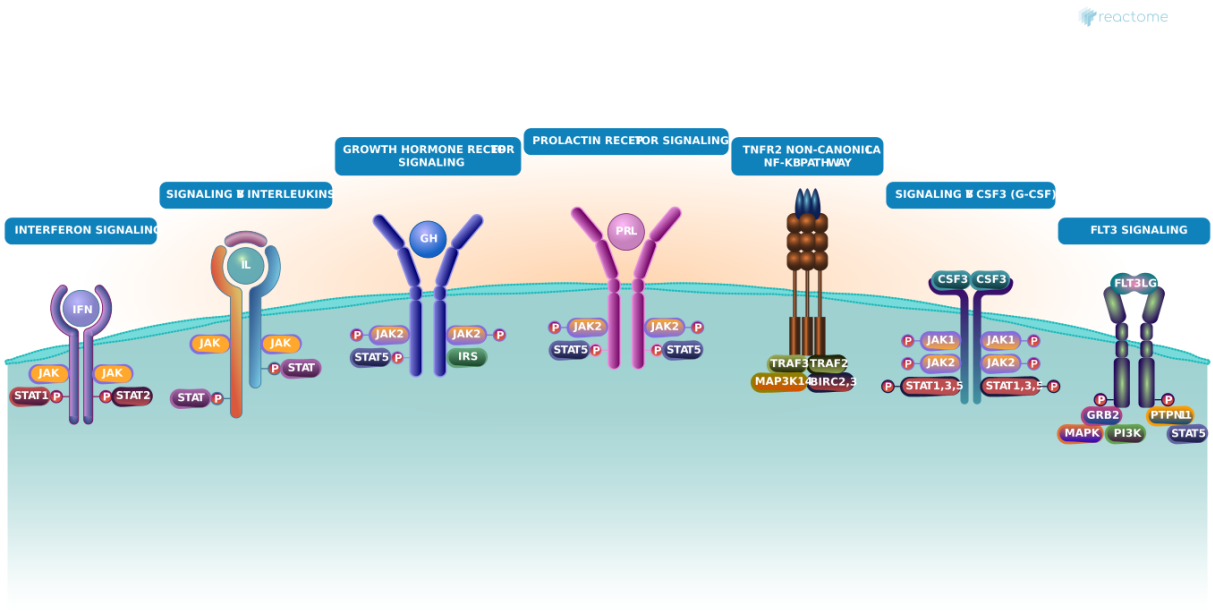


Innate immunity encompases the nonspecific part of immunity tha are part of an individual's natural biologic makeup

Cytokine Signaling in Immune system ↗

Location: Immune System

Stable identifier: R-HSA-1280215



Cytokines are small proteins that regulate and mediate immunity, inflammation, and hematopoiesis. They are secreted in response to immune stimuli, and usually act briefly, locally, at very low concentrations. Cytokines bind to specific membrane receptors, which then signal the cell via second messengers, to regulate cellular activity.

Literature references

Feldmann, M., Oppenheim, J. (2002). Cytokines and the immune system, Cytokine Reference. *Elsevier Science*.

Wiser, J., Scheuermann, R. (n.d.). IMMPORT:Bioinformatics for the future of immunology. Retrieved from https://www.immport.org/immportWeb/queryref/geneListSummary.do

Santamaria, P. (2003). Cytokines and chemokines in autoimmune disease: an overview. *Adv Exp Med Biol, 520*, 1-7. ↗

Ibelgaufts, Horst. (n.d.). COPE. Retrieved from http://www.copewithcytokines.org/cope.cgi

Editions

2011-05-22	Authored, Edited	Ray, KP., Garapati, P V., Jupe, S.
2011-05-29	Reviewed	Pinteaux, E., Schindler, C., Abdul-Sater, AA.

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