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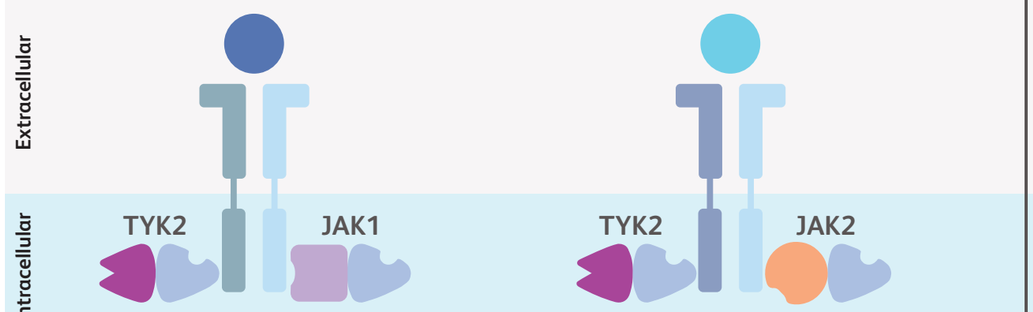
TYK2-mediated Signaling

TYK2 is an intracellular kinase involved in the relay of immune signals initiated by specific cytokines[1,2]

TYK2 and JAK1/2/3 proteins typically form different dimers to mediate cytokine signals that can influence immune and/or systemic responses.[1-4]
TYK2 plays a critical role in mediating intracellular signaling pathways of proinflammatory cytokines such as IL-23, IL-12, and Type I IFN.[5-7]
The TYK2 pathway has not been shown to mediate signals involved in blood cell development and lipid metabolism.[5,8-10,23]

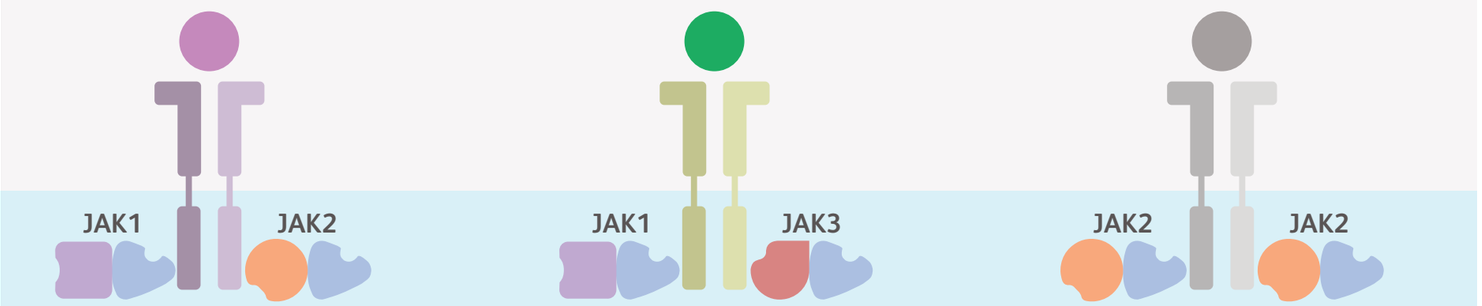
TYK2 pathway mediates signals from proinflammatory cytokines, including Type I IFN, IL-23, and IL-12[7,11]



Immune-specific responses[5,7,11-14,23]

- Dendritic cell maturation
- T-cell survival
- Antigen presentation
- Antibody production
- Th1 and Th17 differentiation
- Dendritic cell activation
- IL-17, TNFα, and IFNγ secretion

JAK1/2/3 pathways mediate responses from many cytokines, chemokines, and growth factors[7,11]

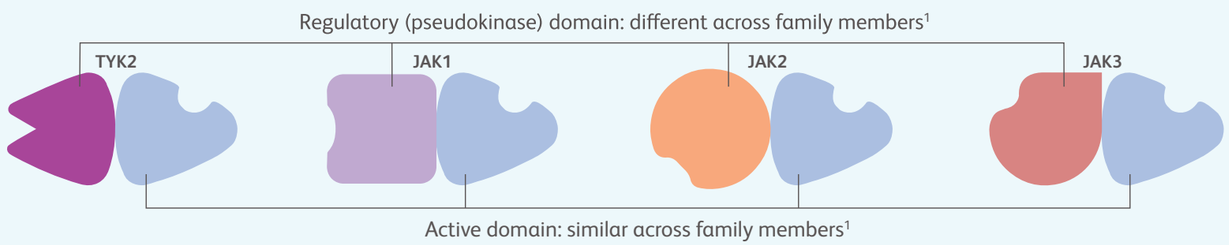


Predominantly involved in Immune-specific and broad systemic responses[3,5,7,10,11,15-22]

- Th1 differentiation
- Osteoclast formation
- Neuronal survival
- Lipid metabolism
- Granulopoiesis
- Lymphoid cell maturation and function
- T-cell survival
- Th2 differentiation
- Treg maintenance
- Glucose metabolism
- Eosinophil, basophil, and mast cell regulation
- Hematopoiesis
- Growth factor response
- Metabolic activity regulation
- Myelopoiesis

Please note that this list of cytokines and effects modulated by the different TYK2/JAK and JAK/JAK pairs is not exhaustive. Certain cytokines might also be modulated by JAK and TYK2 trimers.[5]

TYK2 and JAK1/2/3 proteins belong to the same kinase family and are structurally distinct from one another[1,2]



EPO=erythropoietin; GH=growth hormone; GM-CSF=granulocyte-macrophage colony-stimulating factor; IFN=interferon; IL=interleukin; ILC=innate lymphoid cell; JAK=Janus kinase; MHC=major histocompatibility complex; Th=helper T cell; TNF=tumor necrosis factor; TPO=thrombopoietin; Treg=regulatory T cell; TYK2=tyrosine kinase 2.

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