

JAK/STAT Inhibitors

Janus kinases (JAKs) and signal transducers and activators of transcription (STATs) are two primary components of a signaling cascade that transmits extracellular messages across the cell membrane and into the nucleus where gene transcription is altered. The JAK/STAT signaling pathway is involved in cell growth, differentiation, survival, and pathogen resistance; components of this pathway are expressed in various cell types but are highly prevalent in immune cells. This pathway mediates the effects of interferons, cytokines, and growth factors. Dysregulation of JAK/STAT signaling is related to the development of many diseases. STATs are transcription factors that binds promotor regions of DNA and induce expression of downstream DNA sequences. In some cancers, STAT3 and STAT5 are constitutively activated, resulting in overactive signaling and unchecked gene transcription¹⁻². JAKs kinases that are activated by transmembrane receptors and are responsible for phosphorylating STATs. Gain-of-function mutations in JAK are linked to hematological malignancies such as thrombocythemia, myelofibrosis, and leukemia³⁻⁴.

Inhibitors of JAK signaling:

A9812 AZD-1480
B5000 BMS-911543
C9876 CYT-387
G4662 GLPG-0634
I5210 INCB18424
J0240 JAK2 Inhibitor V
P3209 Piceatannol
T2404 TG101348
T5720 Tofacitinib Citrate
T9969 Tyrphostin AG490
W2933 WHI-P131 (JANEX-1)

Inhibitors of STAT signaling:

C0171 Carboplatin
C5870 Corosolic Acid
C7097 Cryptotanshinone
D1850 Demethoxycurcumin
E6234 Epigallocatechin Gallate
N0163 2-(1,8-Naphthyridin-2-ly)phenol
S1872 Sesamin
S5868 Sorafenib
S8044 R,S-Sulforaphane
T0154 Tanshinone IIA

References:

1. Yu H, Pardoll D, Jove R. Nat Rev Cancer. 2009 Nov;9(11):798-809.
2. Berger A, Sexl V, Valent P, et al. Oncotarget. 2014 Oct 30;5(20):9564-76.
3. Vainchenker W, Constantinescu SN. Oncogene. 2013 May 23;32(21):2601-13.
4. Villarino AV, Kanno Y, Ferdinand JR, et al. J Immunol. 2015 Jan 1;194(1):21-7.

