

Chemokine Receptors

Chemokines (CHEMOtactic cytoKINES) are an important subgroup of the inflammatory cytokine family. More than fifty chemokines are expressed in mammalian cells and are characterized by their relatively small size (~70-90 amino acids), by their conserved N-terminus and cysteine motifs. This group of proteins has been further categorized on the basis of the cysteine spacing in the motifs creating C, CC, CXC, and CX3C chemokine subfamilies^{3,9}.

All fifty chemokines exert their effects through twenty different chemokine receptors, belonging to the superfamily of G-protein coupled receptors (GPCRs) suggesting a certain level of promiscuity among the different receptors. All chemokine receptors couple to the pertussis sensitive G_i protein¹⁶.

Chemokines were first identified by their ability to mediate leukocyte chemoattraction. Apart from regulating the migration of leukocytes, they seem to be major players during inflammation and immunity^{2,7,15}. Indeed, chemokines could also be further classified as being inflammatory as many chemokines are extensively upregulated in response to inflammation, or housekeeping important for the homeostasis of certain cell types. Inflammatory chemokines are responsible for recruiting immune cells to the inflamed region, and housekeeping chemokines, expressed in

lymphoid or non-lymphoid tissues mediate the trafficking and targeting of cells^{8,10}. This is the case for CXCL12 and its receptor CXCR4 which are constitutively expressed in many tissues^{1,14}. The CXCL12/CXCR4 system is important for maintaining hematopoietic stem cells in the bone marrow, and regulates the migration and the development of neural stem cells in the brain and in the peripheral nervous system⁴. CXCR4 also regulates the axonal growth once these cells start to develop into neurons⁷. Chemokine receptors have been shown to undergo both homo and heterodimerization^{6,13}. For example, some HIV-1 virus subtypes infect cells via CCR5, CXCR4 or both receptors, though the first route of infection is usually through CCR5, while CXCR4 is used at later stages of infection^{5,13} indicating that chemokine signaling has a central role in HIV-1 cellular propagation.

In general, chemokines and their receptors guide leukocytes to sites of infection/inflammation. However, cases of chronic inflammatory disease and tissue damage occur when there is excessive recruitment of leukocytes. They could also be involved in the pathogenesis of neurological diseases like multiple sclerosis and many inflammatory diseases like atherosclerosis and inflammatory bowel disease. Recently, chemokines and their receptors have been found to be involved in cancer metastasis, namely breast

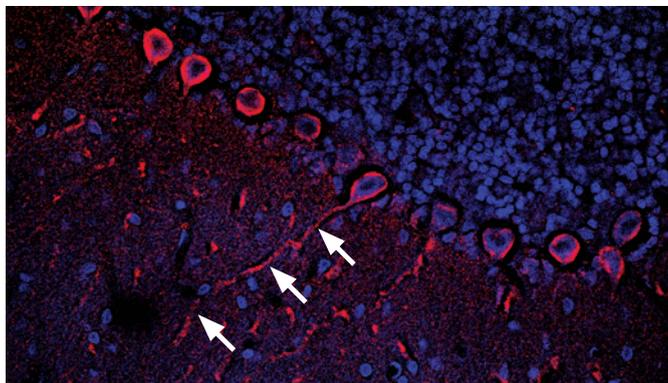
cancer³. The chemokine signaling also seems to be important for the communication between neural cells and the immune system, especially in the context of infection as is the case for CCL21, which is overexpressed as a result of brain lesion and activates microglia (important for the innate immune response in the nervous system) through CXCR3^{11,12}.

Alomone Labs is pleased to initiate the chemokine receptor portfolio with specific antibodies targeted to the following receptors: **Anti-CXCR1 (extracellular)** antibody (#ACR-011) and **Anti-CXCR4 (extracellular)** antibody (#ACR-014). These antibodies can be used in various applications, namely western blot, immunohistochemistry and indirect flow cytometry applications.

References

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Expression of CXCR4 in Rat Cerebellum.



Immunohistochemical staining of rat cerebellum frozen sections using Anti-CXCR4 (extracellular) antibody (#ACR-014), (1:100). CXCR4 is expressed in Purkinje cell bodies and axonal prolongations (arrows). Hoechst 33342 is used as the counterstain.
Experimental procedure and figure processed at Alomone Labs.

Related Products

Compound	Cat. #
Chemokine Receptor Antibodies	
Anti-CXCR1 (extracellular)	#ACR-011
Anti-CXCR4 (extracellular)	#ACR-014