ImmunoTools IT-Box-Cy55M-Award 2013

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The role of TNF-α in kainic acid induced hippocampal neurodegeneration in C57BL/6 mice

The inflammatory cytokine, tumor necrosis factor-α (TNF-α) is a 17-kDa protein, mainly produced by activated macrophages and T cells in the immune system and by microglia and astrocytes in the CNS. Initially it was characterized as having anti-tumor activity, but it was later found to play pleiotropic, often contradictory biological roles. Its functions are mediated through binding with two receptors, TNFR1 and TNFR2. Overexpression of TNF-α is implicated in the pathogenesis of several CNS disorders in humans, especially bacterial meningitis, MS and cerebral malaria, where inflammatory cells contribute significantly to locally elevated TNF-α levels. TNF-α also bears neuroprotective properties in contrast to its well-known deleterious role as a proinflammatory cytokine, which implies an intricate biological balance in immune and inflammatory responses mediated by TNF-α. Recently, it has been demonstrated that increased brain levels of TNF-α result in significant inhibition of seizures in mice induced by intrahippocampal injection of KA. Therefore, it is speculated that TNF-α could play a double role in the CNS, which may depend on different conditions: enhancing NF-κB pathway processing or attenuating NF-κB activity, while simultaneously promoting other pro-apoptotic TNF-α signals. Studies in our laboratory have demonstrated that mice lacking TNFR1 exhibit more severe seizure activity, hippocampal neurodegeneration and increased microglial activation, suggesting that TNF-α effects its protective role through TNFR1 signaling. In my PhD study, we aim to clarify the role of TNF-α in KA-induced neurotoxicity and to elucidate its possible involvement in signalling pathways by using TNF-α knockout and wild-type mice. We will use rm GM-CSF in the microglia cell culture and rm TNFα/ rm IFNgamma/ rm IL-10 can be used to stimulate the microglia cells in vivo study.

ImmunoTools IT-Box-Cy55M for Xiangyu Zheng
includes 55 recombinant mouse cytokines

rm EGF, rm Eotaxin / CCL11, rm FGF-a / FGF-1, rm FGF-b / FGF-2, rm FGF-8, rm Flt3L / CD135, rm G-CSF, rm GM-CSF, rm GRO-a / CXCL1, rm GRO-b / CXCL2, rm IFNgamma, rm IL-1alpha, rm IL-1beta, rm IL-2, rmIL-3, rm IL-4, rm IL-5, rm IL-6, rm IL-7, rm IL-9, rm IL-10, rm IL-11, rm IL-13, rm IL-15, rm IL-16, rm IL-17A, rm IL-17C, rm IL-17F, rm IL-19, rm IL-20, rm IL-21, rm IL-22, rm IL-25 / IL-17E, rm IL-27, rm IL-31, rm IL-33, rm IP-10 / CXCL10, rm LIF, rm MCP1 / CCL2, rm M-CSF, rm MIP-1α/ CCL3, rm MIP-1β / CCL4, rm MIP3α / CCL20, rm MIP3β / CCL19, rm NGF-beta, rm PDGF-AA, rm PDGF-BB, rm RANTES / CCL5, rm sCD40L / CD154, rm SCF, rm SDF-1α / CXCL12a, rm SDF-1β / CXCL12b, rm TNFα, rm TPO, rm VEGF DETAILS