ImmunoTools IT-Box-Cy55M-Award 2013

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The role of nuclear receptors in nervous system development

In the central nervous system (CNS) of vertebrates a large variety of cell types are specified from a pool of highly plastic neural stem/progenitor cells (NSCs) via a combined action of extrinsic morphogenetic cues and intrinsic transcriptional regulatory networks. Nuclear receptors (NRs) and their ligands are key regulators of fate decisions in NSCs during development and adulthood, through their ability to control transcription of downstream genes. In the last few years considerable progress has been made towards the understanding of the actions of nuclear receptors in NSCs as well as elucidating the mechanistic basis for these actions. The goal of my Ph.D. research project is to unravel the specific cellular and molecular mechanisms and pathways that NRs regulate during proliferation and differentiation of embryonic mouse and rat NSCs. More specifically, we focus on the ability of different NRs, such as LXRs, PPAR-α, SF-1, NR5A2 and NURR-1, to maintain or reduce NSC multipotency, suppress the differentiation or aid in the acquisition of a specific phenotype of NSCs. We have recently shown that NR5A2 is involved in the Prox1-mediated suppression of Notch1 expression during neuronal differentiation (Stergiopoulos and Politis, 2012, *Arch Biochem Biophys*; Kaltezioti et al., 2010, *PLoS Biol*.). In order to carry out these experimental approaches, we use different cell culture techniques in which cytokines and other growth factors are of great value. Multifunctional cytokines, like bFGF, EGF, LIF, TNF, IFN-gamma etc, are necessary for the induction of signaling pathways that trigger differentiation of NSCs into the three basic neural cell types; neurons and glial cells, such as oligodendrocytes and astrocytes. Deciphering the pathways that NRs regulate in NSCs will provide great insights into how to utilize these molecules and their pharmacological agonists/antagonists, as therapeutic agents in future applications of regenerative and stem cell-based medicine.

ImmunoTools IT-Box-Cy55M for Athanasios Stergiopoulos

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