

# ImmunoTools IT-Box-Cy55M-Award 2013



## Estrela do Céu Neto

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### Project: Innervation and Angiogenesis in Bone Healing: Role of Neuropeptide Y

Fracture healing is initiated through the induction of an acute inflammatory/immune response and subsequent increase of local production of inflammatory cytokines. Such pro-inflammatory cytokines includes interleukin-1 (IL-1), interleukin-6 (IL-6), tumour necrosis factor- $\alpha$  (TNF- $\alpha$ ), platelet-derived growth factor (PDGF), among others. This inflammatory reaction to the trauma acts to initiate the repair process and exerts substantial effects on the subsequent events such as angiogenesis and innervation. One of the neural arms discovered to be involved in bone healing is the neuropeptide Y (NPY) neuronal pathway.

Our goal is to determine the cellular and molecular mechanisms by which NPY neuronal pathway is involved in the mechanisms behind innervation/angiogenesis/ osteogenesis interactions, while addressing the complexity of the bone microenvironment during bone repair.

Cytokines and growth factors will be explored as possible candidates involved in the processes of angiogenesis and re-innervation of regenerating bone.

Confocal microscopy, flow cytometry analysis, ELISA, real time PCR and western blot techniques will be used to access the expression of different factors (NPY, Sema-3A, NGF, BDNF, NT-3 and VEGF expression) involved in above mentioned processes.

The **ImmunoTools IT-Box-Cy55M** would be of great benefit as many of the cytokines would be used to simulate the inflammatory microenvironment during the bone injury. Furthermore, growth factors involved in nerve growth, bone formation, vasculogenesis /angiogenesis and tissue repair (rm NGF-beta, rm PDGF-AA, rm-VEGF, rm-FGF-a) would be used to address the role of NPY during bone healing associated physiological processes.

The data will provide us new insights of NPY peripheral neuronal pathway and how its modulation can be used to control/modulate the bone healing process.

**ImmunoTools** IT-Box-Cy55M for Estrela do Céu Neto 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 IFN $\gamma$ , rm IL-1 $\alpha$ , rm IL-1 $\beta$ , rm IL-2, rm IL-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-1 $\alpha$  / CCL3, rm MIP-1 $\beta$  / CCL4, rm MIP3 $\alpha$  / CCL20, rm MIP3 $\beta$  / CCL19, rm NGF-beta, rm PDGF-AA, rm PDGF-BB, rm RANTES / CCL5, rm sCD40L / CD154, rm SCF, rm SDF-1 $\alpha$  / CXCL12a, rm SDF-1 $\beta$  / CXCL12b, rm TNF $\alpha$ , rm TPO, rm VEGF

[DETAILS](#)