ImmunoTools IT-Box-Cy55M-Award 2013

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Collagen VI regulates peripheral nerve regeneration by increasing the recruitment and activation of macrophages

Macrophage is one of the most important immune cells that are recruited into the peripheral nerves following injury, which in turn contributes to peripheral nerve regeneration by releasing axon growth factors, removing myelin debris and remodelling the extracellular matrix (ECM). On the other side, ECM proteins have a significant role in regulating the recruitment and activation of macrophages. For my Ph.D. project, I am using a genetic mouse model to study the function and mechanisms of ECM in peripheral nerve regeneration. For the mechanistic studies, we focused on the recruitment of macrophages, and the results we obtained until now show that lack of collagen VI, a major ECM protein expressed in the peripheral nerves, can impair peripheral nerve regeneration and induce less macrophage recruitment after nerve injury. However, the detailed molecular basis for this defect remains unknown.

We hypothesized that lack of collagen VI can affect the production of cytokines that impair the recruitment and activation of macrophages after peripheral nerve injury, which in turn delays peripheral nerve regeneration. Therefore, we plan to use the peripheral nerve injury model in both wild type and collagen VI knockout mice to analyse the cytokine expression profile in peripheral nerves. In the meanwhile, we will conduct experiments to investigate the role of collagen VI in macrophage activation or polarization. Many of the recombinant murine cytokines from the ImmunoTools *IT-Box-Cy55M*, such as rm M-CSF, rm TNFα, rm IFNgamma, rm IL-4, rm IL-10 rm IL-1beta, rm MCP1/CCL2, rm MIP-1α/ CCL3, rm TNFα and rm VEGF, are interesting to be used for such mechanistic studies. The data from this experiment will allow establish the role of inflammatory cytokines involved in peripheral

nerve regeneration defects in collagen VI null mice, and will also give us a molecular understanding of the role of immune system in peripheral nerve regeneration.