The role of innate lymphoid cells (ILC) in cancer development and progression

Immunotherapy has led to recent advances in cancer treatment. However, despite the curative potential of immunotherapy, resistance and disease recurrence develops in some patient groups. A key challenge in cancer immunotherapy is to inhibit the multiple immunosuppressive circuits present in the tumour microenvironment (TME) and to foster immunomodulatory processes aimed at promoting tumour eradication. In this context, cells of the innate immune system play a key role in dictating the polarity of the TME. Innate lymphoid cells (ILCs) represent the most recently identified family of innate cells, which act as first responders in maintaining tissue homeostasis and protecting epithelial barriers. ILCs are regulated by signals from the tissue microenvironment and, interactions between ILCs and other resident cells and tissue-infiltrating cells, have a significant impact on the regulation of host immune responses. ILCs can be classified into three major groups based on their transcription factors and secreted cytokines reflecting CD4 T helper subpopulations (Th1, Th2 and Th17). Group 1 ILCs (ILC1) express T-bet and secrete IFN-ɣ. Group 2 ILCs (ILC2s) express GATA3 and secrete IL-13 and IL-5. Group 3 ILCs (ILC3s), express RORɣT and secrete IL-22 and IL-17. Several studies have shown that ILCs mediate tumour immune responses by showing both pro- and anti-tumour effects, according to the tumour type and the mouse model studied. Nevertheless, few studies concern the identification of regulatory factors that dictate the pro- or anti-tumour role of ILCs. Therefore, the aim of the present project is to identify and decipher the role of different mediators (such as hormones, vitamins, cytokines or gasotransmitters) in regulating the biology of ILCs in the context of tumour immunity, in order to identify new therapeutic possibilities in cancer patients.