Abstract

B-cells of peripheral blood in humans represent a heterogeneous cellular environment displaying many important functions in the immune system. Recently, there is an increasing amount of evidence that B cell subpopulations are involved in the pathogenesis of many different diseases. However, there is little or no knowledge on how the individual differentiation stages of B lymphocytes are involved in pathological processes, and how they are distributed and represented under the physiological state and under pathological conditions.

There is a reasonable assumption that, as with dendritic cells, NK / NKT cells and T lymphocytes, also B cell populations will contain minor and/or rare subpopulations reaching relative frequencies in the range of 0.01% to 0, 1 ‰.

The primary aim of this thesis was to investigate the extent of phylogenetic and ontogenetic heterogeneity of the peripheral B cell population and lymphopoietic tissues on the basis of a comparative study across different vertebrate species.

Another goal of the work was to use polychromatic flow cytometry with 183 individuals, out of them 50 controls and 133 patients with different (immune) pathologies or tumors in order to identify an optimal combination of surface features, and to use it to detect and demonstrate the existence of minor/rare subpopulations.

In total, more than 40 new, yet unpublished, rare subpopulations have been observed, some of which are ontogenetically early and resemble B lymphocytes from the intrauterine developmental phase.

The most interesting finding is the existence of B cell subpopulations that do not carry any of the immunoglobulin isotypes on their surface or are CD20CD27-double negative. Both of them might, most likely, represent progenitor stages that penetrated into peripheral blood.

The current thesis presents a pilot study, which will be followed by a post-graduate thesis focused on more detailed analysis including the clinical picture, the morphological and molecular biological properties of observed rare subpopulations.

Keywords:

B lymphocyte, peripheral lymphopoiesis and ontogenesis, flow cytometry, immunophenotype, evolution of adaptive immunity