Abstract

Early postnatal period is characterised by generally immature phenotype of the newborn's immune system. The maturation of the immune system including setting appropriate regulatory responses is occurring during this period and encountering pioneering bacteria colonizing neonate plays an important role. In the early days after birth, the immune system of a newborn is very limited, and the adaptive part is mostly represented by antibodies transferred from the mother by cord blood (CB) in the womb and then by colostrum and mother's milk after labour. Therefore, innate immunity plays a key role in defence (against pathogens) in neonates and is largely represented by neutrophils.

This study aims to better understand neutrophil biology and phenotype in umbilical CB, compared to neutrophils from peripheral blood (PB) of mothers and healthy non pregnant women (referred to as HC). The assessment of neutrophil phenotype based on surface markers was performed using flow cytometry. Expression of genes linked to antimicrobial function was measured using quantitative PCR. Functional properties of neutrophils, metabolic activity during activation and phagocytosis, and suppressive properties were assessed using the SeaHorse machine and flow cytometry, respectively.

Here we confirm the presence of immature $CD16^{low}CD64^{high}$ and $CD16^{low}CD62L^{+}$ neutrophil subpopulations in CB of neonates, which could be responsible for the increased expression of genes associated with antimicrobial response. Upon challenge with inflammatory stimulus (e.g. *Escherichia coli* or lipopolysaccharide), neutrophils from both CB and maternal PB exerted normal activation and oxidative burst.

Key words: neutrophils, cytokines, phagocytosis, myeloperoxidase, defensins