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Siglec-9 Expression During Neutrophil Apoptosis and its Role in Neonatal Inflammation and Chronic Lung Disease

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Neutrophils are a specialized type of white blood cell that mediate inflammatory immune responses following microbial invasion. Upon infection, neutrophils migrate to the infected tissue, help clear the infection, go into apoptosis, and are then cleared by macrophages. In neonatal neutrophils, the apoptotic pathway appears to be delayed (Allgaier et al., 1998). As a result, in some premature neonates, the neutrophils persist in the environment and continue to initiate an inflammatory immune response, leading to chronic lung disease (Oei et al., 2003). Siglec-9 is a specific protein thought to be involved in the apoptotic pathway of neutrophils, stimulating the programmed cell death (Von Gunten et al., 2005). This study examines the levels of Siglec-9 expression in both adult and neonatal neutrophils upon stimulation of a bacterial peptide. Dose response studies, as well as time response studies were conducted. For both experimental designs, the neutrophils were isolated from whole blood samples, stimulated by a bacterial peptide, and lastly Siglec-9 expression in cells was analyzed using Flow Cytometry. It was found that there were no statistical differences in the levels of Siglec-9 expression in neonatal and adult neutrophil populations. In the time response studies, it was found that adult neutrophils had no statistical change in Siglec-9 expression. However, in the neonatal neutrophils there was a significant decrease in Siglec-9 expression after 30 minutes of stimulation. This suggests that the decrease in the level of Siglec-9 expression upon bacterial stimulation may be involved in the apoptotic delay seen in neonatal neutrophils.