When it's not a match

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2019

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When it's not a Match; Cellular and genetic factors in alloantibody-mediated red blood cell clearance

Summary of the thesis written by S.M. Meinderts

Blood transfusion is a life-saving standard treatment for numerous hematological conditions such as cancer, anemia or trauma. Nonetheless, a red blood cell (RBC) transfusion can lead to alloimmunization, a serious complication in which the development of antibodies directed against the RBCs of the donor can induce enhanced RBC clearance. This complication can lead to life-threatening anemia.

The aim of this thesis was to gain a better understanding of antibody-driven RBC destruction. This knowledge may lead to new treatment strategies of antibody-mediated anemias and can in the future improve transfusion medicine. We have studied RBC degradation in the spleen, the organ that is crucial for this process. By investigating the different phagocytes in the spleen we identified an important role for neutrophils in antibody-mediated RBC clearance and subsequent activation of the immune system.

Additionally, we have studied which genetic factors are associated with alloimmunization in sickle cell disease (SCD) patients. SCD patients often receive RBC transfusions from an early age onwards and are particularly prone to develop antibodies against donor RBC. We identified potential genetic markers for alloimmunization in this group of patients. In the future our findings may help clinicians to recognize patients at risk for this complication, after which measures can be taken to prevent the development of antibodies against donor RBC.