Investigation on the Aged Red Blood Cell Removal Process within the Spleen, A Review

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Abstract

The spleen plays a key role in the human immune system and serves as a filter that can remove Red Blood Cells which need to be eliminated. The spleen consists of two functionally and morphologically distinct compartments referred to as the white pulp and red pulp. The function of white pulp is to initiate immune reactions to blood-borne antigens, and the function of red pulp is filtering and removing aged and defected Red Blood Cells and foreign materials from the blood stream. It is found that the spleen uses some combination of cell morphology and deformability to identify and remove aged cells from the blood flow. This precise blood filtration mechanism is still unknown, however some investigations have been carried out. A number of studies have used *in vivo*, *ex vivo*, and *in vitro* experiments to investigate this natural filtration method, and computational modelling has also been applied. The main objective of this study is to review and critically analyse the current methods used to investigate the mechanisms of spleen filtration. This study will focus especially on features that will enable the development of a computationally efficient numerical model to mimic the complete behaviour of blood filtration in the spleen.

Key words: Red Blood Cells, RBC, Spleen, Blood Filtration