Engineering Neutrophil Response in Inflammation

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ABSTRACT

Despite several research progress in defining neutrophil functions and behavior in tissue repair, much remains to be determined in tissue-specific responses of human neutrophils. Neutrophils, the most abundant leukocyte in humans and an essential component of the immune system are known to be recruited to the site of injury within minutes following trauma. In the presence of acute inflammation, the role of neutrophil is well established but in the presence of chronic inflammatory condition like atherosclerosis, cystic fibrosis, type 2 diabetes mellitus etc., the role and kinetics of neutrophil stay unclear. Biomaterials-based strategies for modulating the immune system have gained considerable momentum in the last decade. Herein, we have tried to use a similar approach by using an *in-vivo* mouse model of peritoneal chitosan microsphere implantation to study the kinetics of neutrophil in inflammatory conditions. Chitosan microspheres were prepared by cross linking chitosan ionically by tripolyphosphate (TPP). We also labeled the neutrophils *in-vivo* so that their movement and trafficking can be followed temporally and spatially in the bone marrow, blood and peritoneal fluid of mice. The turnover rate of neutrophil was seen to be high in the peritoneum of the chitosan microsphere implanted mice. Also the chitosan microspheres were retrieved and analyzed for fibrotic deposition on their surface.