Expression of Arginase in Murine Colon Cells During Wound Healing Confirms the Presence of Myeloid Derived Suppressor Cells

Zhang, Joseph (School: Gwinnett School of Mathematics, Science, and Technology)

This research broadens the understanding of the murine immune system in inflammatory bowel disease simulations, highlighting the presence of a newly classified cell group, Myeloid Derived Suppressor Cells (MDSC) in chronic ulcerative colitis conditions. MDSC have only been recently researched almost exclusively in the cancer field. This study supports the postulation that the newly organized MDSC appear not only during cancer conditions, but also during hyperinflammation colitis conditions. The hypothesis is as follows: due to the increased infiltration of MDSC into the colon during ulcerative colitis recovery, Arginase 1 (a cell surface receptor not found on normal colon cells) expression should increase in the colon. The microenvironments of the colon and bone marrow of dextran sodium sulfate induced colitis mice models were investigated by observing changes in Polymorphonuclear leukocyte (PMN) numbers and MDSC numbers by Western Blotting staining for CD11B, Ly6G, Beta Actin, and Arginase 1 as well as a separate DAPI staining to observe tissue structural changes. The coloration of the stainings support the postulation that the colon microenvironment indeed contains an abnormal population of Arginase 1 cell surface receptors, likely attributable to the presence of MDSC cells. This implication opens research for studies on the abnormal differentiation of MDSC cells causing transmigration into the colon environment. The experiment raises questions about why the immune cells differentiate differently from wild type, healthy mice during chronic colitis conditions, and the experiment leads to further research on the actions of MDSC and their effects on tumor/inflammation microenvironment.