

Jayendra Chauhan & Grace Nunnelee

Characterization and In Vitro Differentiation of Myeloid Derived Suppressor Cells

Myeloid-derived suppressor cells (MDSC) are a population of heterogeneous cells whose further characterization could lead to the development of an antitumor drug due to the heavy role of MDSC in cancer cell growth and metastasis. Research into MDSC is limited due to their severe heterogeneity and inability to be produced in large quantities in vivo. The purpose of this experiment was to develop an efficient method of in vitro differentiation and to further characterize MDSC. In order to study these enigmatic cells, MDSC were differentiated in vitro using bone marrow derived from the C57BL-6 (black-6) laboratory mouse strain and conditioned medium required for differentiation from BALB/c 4T1, murine mammary carcinoma cells. The amount of G-MDSC and M-MDSC, the two recognized populations of MDSC, present was measured with flow cytometry utilizing the fluorescently tagged CD11b, Ly6C, and Ly6G antibodies. Additionally, an evaluation of the effects of interleukin-6 (IL-6) on MDSC differentiation was performed. The presence of this cytokine was determined through an ELISA, and the overall effects of IL-6 on MDSC differentiation was quantitatively measured through IL-6 depletion and addition assays. This study suggests that MDSC can be differentiated in vitro, producing significant amounts of M-MDSC and G-MDSC that are physiologically and morphologically similar to those differentiated in vivo. In addition, IL-6 was determined to be crucial to MDSC differentiation. The experimentation yielded MDSC with a Ly6C⁺Ly6G⁺ phenotype, which has not yet been recorded, potentially indicating discovery of a new cell type, or high plasticity of MDSC.