The Effects of S1P and FTY720 on OP-9 Bone Marrow Stromal Cell Morphology and S1P (subnumber 1)/S1P (subnumber 3) Expression

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Sphingosine 1-phosphate (S1P) is a bioactive signaling sphingolipid produced by red blood cells and activated platelets. It is a ligand for 5 known G-protein coupled receptors (S1P 1-5) and regulates various cellular processes. S1P1 is a G-protein-coupled receptor which has an important role in regulating endothelial cell cytoskeletal structure, migration, capillary-like network formation and vascular maturation. In addition, S1P3 signaling is important in the regulation of lymphocyte maturation, migration, and trafficking and bone marrow cell mobilization. Bone marrow stromal cells (BMSC) are connective tissue cells which exist in the bone marrow and regulate cell mobilization. OP-9 cells are a line of murine BMSC. It is important to study stromal cells since they can control the localization of cells that contribute to tissue regeneration, like stem cells. We hypothesize that S1P and FTY720 will alter cell size, shape, and receptor expression. These changes should cause the cell to lift up processes and decrease overall length and area of the cell cytoskeleton. In this case, the experimental group of S1P + FTY720 is expected to decrease the area and length of the cytoskeleton even more than the single drug compound of S1P or FTY720 will. A decrease in S1P1 and/or S1P3 on the cells surface is also anticipated because S1P is known to cause the internalization of S1P1.