Tonya Pavlenko & Laura Gudvangen
Senior Division Medicine & Health

Internal Combat with Melanoma: Triggering an Immune Response Through the Up-Regulation of FAS Using Toll Ligand Combination Treatments

Melanoma is one of the most aggressively metastasizing forms of skin cancer; in the United States alone there are nearly 70,000 new cases of melanoma reported each year. The current and general treatment options of surgery, radiation therapy, and chemotherapy are invasive and strenuous on the human body. This project, in its present form, has discovered and pinpointed the immune recognition process that stimulates melanoma cell death through toll ligand combination treatments. The study explored multiple toll ligand combination treatment options and tested for multiple receptor and ligand expressions on both melanoma and lymphocytes. The stimulation and discovery of the FAS death inducing signaling complex supported the hypothesis demonstrating that the toll ligand combination PIC/R848 treatment was most effective in inducing melanoma apoptosis through the increased FAS expression on both melanoma and lymphocytes. The presence of protein expression was determined through the process of staining for the specific proteins FAS, CD74, Class I, and Class II. Melanoma and lymphocytes interacted in vitro and demonstrated the extent of immunogenicity of both cell types following treatment. The expression of FAS, CD74, Class I, and Class II was determined through the calculation of the geo mean in terms of percent maximum protein expression. Flocytometer analysis established numbers of cell death thus demonstrating which treatment was most effective in inducing apoptosis through the up-regulation of signaling proteins. This strategy of toll ligand combination treatment, which stimulates the FAS death inducing signaling complex, allows the immune system to recognize melanoma and combat it internally, thus avoiding the detrimental effects of current melanoma treatment options.