Lepto-my-Cells: Effect of Leptomycin-B on Human Embryonic Kidney Cancer Cell (HEK-293) Proliferation

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PURPOSE: To investigate the effect of Leptomycin-B (LMB) on the subcellular distribution of a histone deacetylase protein (HDAC4) in HEK-293 cancer cells and how this response affects kidney cancer cell proliferation. EXPERIMENTATION: HEK-293 cancer cells were plated into 6 wells. The first three wells acted as controls: celled were transfected with nothing, with KSII empty vectors, or with GFP-vectors. The remaining three wells were transfected with GFP-HDAC 4. The subcellular distribution of GFP-vectors and GFP-HDAC 4 in the HEK-293 cells were observed before and after LMB treatments of 0.5, 1, and 5 µg/µl using a fluorescence microscope. Fresh HEK-293 cells were then treated with 0, 2.5, 5, and 10 µg/µl of LMB, and their cell growth recorded over a 5-day period using an IncuCyte. Since the lowest concentration of LMB showed the largest reduction in HEK-293 cells, fresh HEK-293 cells were treated with lower concentrations (0, 0.5, 1, 2.5 µg/µl), to determine the most efficient dose that would limit cancer cell proliferation without affecting non-cancerous Mouse Embryonic Fibroblasts (MEF cells). All cells were stained with Trypan blue to verify the accuracy of the data from the IncuCyte. RESULTS AND CONCLUSION: LMB translocated endogenous HDAC4 proteins of HEK-293 cancer cells from the cytoplasm to the nucleus. Under the conditions of this experiment, the optimal concentration of 1 ug/ul decreased the rate of proliferation of cancer cells without affecting non-cancerous MEF cells. Further experimentation on LMB's potential to suppress HEK-293 cancer cell proliferation could lead to a possible kidney cancer treatment.

Awards Won:
Fourth Award of $500