The Effect of Hypoxia on Human Osteosarcoma Cells' Motility and Expression of HIF-1 and HIF-2

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The purpose of this experiment was to determine the effects of hypoxia on human osteosarcoma cells' ability to metastasize through examining cell motility, as well as expression of the HIF-1 alpha and HIF-2 alpha proteins. Hypoxia has been shown to increase the likelihood of metastasis in other cell lines, and has been shown to increase the amount of HIF-1 and HIF-2, proteins that act as transcription factors for VEGF, a protein that facilitates angiogenesis of blood vessels towards the tumors. Different groups of OS156 Cells were exposed to hypoxia for 4 hours, 6 hours, and 24 hours, and then allowed either no recovery, 24 hour recovery, or 48 hour recovery. In a functional migration assay, OS156 cells were removed from a portion of a plate before hypoxia, and the movement of cells back into the scratch was examined after the various time points of recovery. In an immuno-fluorescence assay, the amount of HIF1 alpha and HIF2 alpha was examined using a confocal microscope after the cells were exposed to the various time points of hypoxia and recovery. Cells that experienced more than 6 hours of hypoxia showed decreased cell motility, evident after 48 hours of recovery. HIF-2 moved towards the nucleus after six hours hypoxia. After 24 hours of hypoxia, not much difference was seen from cells in normoxia. Since the results suggest that osteosarcoma is less likely to metastasize in hypoxia, exposing tumors to hypoxic conditions may be a possible method of metastasis prevention. Patients with less of a risk of metastasis generally have a better prognosis and survival rate.