A Low Cost, Tunable Model for Studying Hypoxia-Driven Growth in A375 Melanoma Cancer Cells Using Jacketed Breathable Silicone-Walled Shake Flasks?

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This project centers around the ultimate goal of making cancer research more affordable and accessible to labs and students around the world. Cancer cells that grow in low-oxygen environments tend to become more aggressive and resistant to treatment, making hypoxia an important area of study. However, the equipment used to study hypoxia in a lab setting costs thousands of dollars, which puts it out of reach for most researchers. This project investigates whether a jacketed, breathable silicone-walled shake flask system can be used to recreate low oxygen conditions in A375 melanoma cancer cells while still allowing them to grow. To test this, A375 cells were cultured for five days in four different flask conditions, each allowed a different amount of oxygen in, while everything else, such as seeding density and media volume stayed the same. At the end of five days, cells were stained with trypan blue and counted using an automated cell counter to measure viability and proliferation. Breathable flasks produced 10 to 15 times more cells than non-breathable flasks and maintained doubling times of around 24 to 25 hours, which is close to normal for A375 cells. The jacketed, restricted flask successfully stressed the cells with low oxygen while still keeping them alive and growing. Media pH also remained stable in breathable conditions, confirming that the results were due to oxygen changes and not acidity. These findings show that this simple flask system is a practical and low-cost way to study how low-oxygen environments drive cancer cell behavior.

Awards Won: