Refining the Analysis and Tracking of Cell Behavior to Improve Understanding on How Metabolites Impact Glioblastoma Cell Lines

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Metastasis is the growth of cancer at a secondary site, whether it be through the bloodstream or other pathways in the body. Metastasis is dependent on a multitude of factors, with cell motility and proliferation being some of the key ones. When the motility and proliferation is increased, the time it takes for that cancer to spread into the bloodstream and metastasize at another location decreases. There are certain behaviors in cancer cells that environmental aspects can influence. These aspects are known as metabolites, and they affect traits such as apoptosis, proliferation, and motility. We have designed a method that is able to analyze cancer cell behavior in single-metabolite culture media, with a higher quality of data when compared to bulk assays. While our trial sizes are smaller, this also does not affect either quantity or time, with one cycle of data extraction only taking up a little less than a day. We then used this method to analyze how metabolites alter metastasis. Our method consists of three main steps, preparation, imaging, and data collection. This procedure was also developed with aggressive cell lines in mind, meaning the “flow” of the steps accommodates as such. We found that our results roughly corresponded with what other people have found before us. However, we noticed that our results had a closer match to the behavior of the metabolite itself, rather than studies that used protocol that did not account for its inconsistencies. Although not much could be extrapolated from our motility data, we have found that cells in the metabolite glutamine behaved significantly differently than cells in other metabolites. With this, we plan to investigate closely the effect of glutamine with procedures such as RNA sequencing and t-SNE graphs.