Multiple Microenvironments of the Cancer Invasion Trajectory in One Device

Background:
There are approximately 455 new cases of cancer per 100,000 men and women per year, and mortality rate for cancer is approximately 172 per 100,000 men and women per year. With so many new cases and a high mortality rate, there are extensive studies being done on cancer metastasis and screening for anti-cancer therapies. Currently, the 3-D ECM models that are used to mimic an in vivo system are not reproducible in the human body, as these matrices do not capture what cancer cells experience during metastasis (moving from tumor to surrounding tissue). Additionally, the current models are complex, have limited configurable geometry, and the sub-cellular mechanisms involved in the ECM have proved difficult when attempting to develop anti-cancer therapies.

Technology Description:
Researchers at Washington University have developed and validated a device that mimics an in vivo system. It allows for the tracking of drug effects on cancer cells as they move through dissimilar environments along the invasion trajectory (from primary tumor to secondary metastatic sites) within one system. The cells are cultured in tumor-like environments, suggesting that the measurements and drug analyses are more representative of in vivo situations. There is increased reliability of drug treatments at the primary tumor site, as the effect of the drug through the invasion trajectory and secondary site can be easily tracked. This system is more capable of mimicking the human body, in that it incorporates both the tumor and surrounding tissue properties to capture the gene expression of invading cells. This system is simple, has easy-to-use configurable geometry, and is more reproducible than many current 3D models.

Indications: Cancer Screening & Anti-Cancer Therapies

Key Advantages:
- Easy-to-use configurable geometry
- Reproducible in the human body
- Potential for more focused targets


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