

Microdissected “Cuboids” for Microfluidic Drug Testing of Intact Tissues

This device uses a motorized tissue slicer to dissect tissue pieces into sub-millimeter-size cuboidal shapes for screening. This method allows for controlled delivery and testing of different reagents to reduce cytotoxicity testing.

What is the Problem?

Pre-clinical animal tests fall short as predictors of efficacy, toxic doses, and drug metabolism later observed in human trials. If systems can be developed that accurately predict drug responses in humans, advances in drug treatment or prevention would be dramatically streamlined, and time frames for drug development shortened considerably. Functional assays can potentially complement and extend genomics-based approaches for personalized oncology, but need to be used on live tissue. An acute challenge in functional precision cancer medicine arises from the fact that dissociated cells are generally insufficient for the functional assays; to preserve the tumor microenvironment, these assays should be performed on intact tissue, whose availability is scarce. Tissue samples that are available suffer from inconsistent cutting techniques that limit the consistency of data generated from assay testing.

What is the Solution?

The solution entails the dissection of tissue pieces into a mono-disperse distribution of sub-millimeter-size cuboidal shapes. This method relies on a motorized tissue slicer, which cuts equally sized cuboidal or cylindrical pieces. This method is more precise than current manual tissue cutting techniques. Size homogeneity of these tissue fragments is crucial for biological studies and microfluidic technologies. This is combined with a microfluidic platform that allows for high-throughput screening in a standard multi-well platform assembled atop the microfluidic device. The platform enables culture in arrays without significant diffusion or communication between them and allows for controlled delivery and testing of different reagents.

What Differentiates it from Solutions Available Today?

Current methods involve a biopsy that is subsequently manually cut, which leads to inconsistent size homogeneity. Tissue samples with homogeneous volume and shape has been shown to reduce variability in cytotoxicity testing. High throughput testing of these homogeneous samples will contribute to functional precision cancer medicine.

Technology ID

BDP 8678

Category

Selection of Available
Technologies
Diagnostic

Authors

Albert Folch

Learn more



Patent Information:

[WO2021061522A1](#)

References

1. Lisa F. Horowitz, Adam D. Rogriguez, Allan Au-Yeung, Albert Folch(44562), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8205430/>, Lab Chip