A modular, microfluidic, mechanically active bioreactor for 3D, multi-tissue, tissue culture

Published date: Aug. 28, 2016

Technology description

Background

Most in vitro pharmaceutical and toxicological testing is conducted on cells in a Petri dish, where many effects of compounds/toxicants are missed. To overcome this, companies are increasingly using some 3D tissue models. However, no commercial system today can test interactions over multiple tissues and between tissues exposed to a compound. Currently over 24,000 new candidate compounds enter costly and time consuming animal and human testing each year without the benefit of an early screening tool. A drug development tool that can effectively and efficiently test and predict the effects and potential side effects of a candidate compound on human tissue is needed to help identify ineffective or potentially damaging compounds early in the translation process. Technology InterfacePLUS is a drug development tool that can effectively and efficiently test and predict the effects and potential side effects of a candidate compound on human tissue. InterfacePLUS is a platform in which multiple tissues or engineered tissue constructs can be cultured together reproducing the complexity that is present in the human body, offering drug developers a sophisticated assessment tool and the ability to fail early and fail fast screening out ineffective or potentially damaging compounds early in the translation process. The InterfacePLUS platform allows testing of 3D tissue models in a high throughput, streamlined manner, and it can also predict the side effects of candidate drugs. InterfacePLUS can then increase the amount of compounds screened out prior to animal or human testing and predict possible side effects of candidate drugs. InterfacePLUS is a plate with the dimensions and structure of a standard 96 well plate, with additional microfluidics and a chamber where multiple tissues can be cultured together within each chamber reproducing the complexity that is present in the human body, where each organ is composed of multiple tissue types. Each tissue can be cultured in its own specific environment to maintain it under ideal conditions. The different wells are connected by a microfluidic system that allows high throughput and connection between different organ types.

Application area

Screeen the effect of a compound on all tissues of an organ -Screen the interactions between different organs when exposed to a compound (e.g., a drug is processed by the liver that then releases molecules that affect the heart)

Advantages

Signficantly improvement of the drug discovery process -Save billions of dollars in drug development -Significantly reduce the withdrawal of new drgus

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