GRAVITYPLUSTM SYSTEM FOR AUTOMATED MASS PRODUCTION OF ORGANOTYPIC 3D MICROTISSUES

Universität Zürich

inSphero
Biomimetic Microtissue Technology

Problem – Challenge

Resource-efficient drug discovery requires reliable and precise information about the effects of drug compounds on animal and human tissue. Today's routinely used monolayered cell cultures deliver data of limited physiological significance with regard to the effects in the organism. Their lack of a 3-dimensional tissue-like structure and function impede a better predictability on drug effectiveness and toxicity.

Replacing current cell models by more organotypic 3D microtissues can significantly improve the biological relevance and increase the predictability of cell-based assays. And – 3D microtissues can help already at an early stage of the discovery process thus reducing the late-stage failure rate. Better model systems which reflect cell and tissue physiology more closely will further help to increase the efficiency of the drug development process. Obstacles that have impeded the routine use of advanced cell culture models in the past comprise manual and often complex low-throughput fabrication, high variability and high prices compared to standard cultures.

Solution

InSphero has developed a microtissue production technology, the GravityPLUSTM system, which is the first platform for scaffold-free and automated high-throughput production of 3D tumor and primary microtissues. The patent-pending principle of the GravityPLUSTM technology originates from the hanging-drop method, which allows for gentle gravity-driven microtissue formation at the liquid-air interface of small medium droplets. By avoiding contact to any foreign material it allows the cells to reform a tissue in a natural manner. The microfluidic design and surface engineering used for the plate assures consistent and rapid filling, stable drop formation, reliable media exchange, and supplementation of required supplements and/or cells. The GravityPLUSTM technology enables InSphero for robust and consistent high-volume production of 3D microtissues..

The technology was originally developed by Drs. Jens Kelm and Wolfgang Moritz at the University of Zurich and the University Hospital Zurich.