

Fluidic Device for Long-Term Explant Culture and Imaging

USC Case #2017-237

Market Opportunity:

The global market for regenerative medicine is set to reach \$30 billion by 2021 due to the growing population of the elderly and an increased prevalence of chronic diseases. Two roadblocks in testing potential drugs that enhance organ development and regeneration are that organ explants cannot be grown in culture over the long term, and culture conditions are not conducive to high throughput testing. A technology that circumvents these issues will speed up drug discovery in the regenerative medicine market. People have attempted long-term explant cultures. However, a lack of blood flow into and around the organ will result in shrinkage or non-functioning of the organs. A technology that circumvents these issues will speed up drug discovery in the regenerative medicine market.

USC Solution:

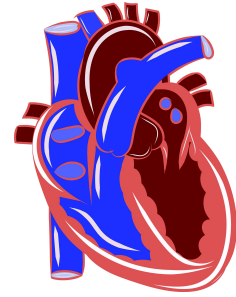
USC and CHLA researchers have designed and fabricated a fluidic device to maintain flow into the culture, which overcomes the problem of lack of blood flow into and around the organ and ensures the structure of the organs is maintained. Using this fluidic device researchers were able to keep zebrafish hearts and mouse embryos alive for up to 7 to 9 days. They also maintain a stable position for confocal and live imaging.

Value Proposition

- Novel fluidic device setup for long-term cultures of organ explants and mouse embryos
- Facilitates high throughput screening of drug candidates
- Maintains structure, function, and position of explants in culture for microscopy

Keywords:

Heart-on-a-chip, devices, explants, cultures, organs, fluidic chambers, confocal imaging, regenerative medicine



Applications

- Research tool for drug discovery in regenerative medicine

Stage of Development

- Validated using zebra fish hearts and mouse embryos
- Available for exclusive and non-exclusive license

Intellectual Property

Status:

Patent Filing in Process

Key Publication:

[“Microfluidic heart on a chip for higher throughput pharmacological studies.”](#)
Agarwal et al., 2013. *Lab Chip*.
13(18):3599-608. doi:
[10.1039/c3lc50350j](https://doi.org/10.1039/c3lc50350j).

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