

Accelerating the Pace of Drug Discovery: A Novel Organ-On-A-Chip Platform

Health

Javelin Biotech is developing a predictive platform for preclinical drug discovery that merges human tissue chips and digital twin technology to accelerate pharmaceutical development.

Re:Build Fikst was approached by the small team of tissue engineers, biologists, and senior leadership to help develop the hardware platform that accompanies the novel biology approach invented by Javelin. The Re:Build Fikst team designed and built physical prototypes for the tissue engineers to run experiments and learn what was important to their process.

Challenges

The industry standard is to utilize animal or simplified in vitro models in the preclinical drug discovery process. However, both of these methods lack the sophistication required to develop clinically mimetic tissue that is capable of providing longitudinal and human-relevant data. To provide an improved approach, the Javelin chip needed to be a small-volume, recirculating system that could be easily used by various types of scientists.



Solutions

Re:Build Fikst collaborated with the Javelin team at each stage of the development process to identify the technical and user needs for each prototype, which were then translated into concepts by Re:Build Fikst, evaluated using COMSOL, and incorporated into a test chip. DFM and DFA techniques were implemented to quickly and inexpensively make prototypes at the fidelity needed for different stages of the technology development process. From laser cut and pressure sensitive adhesive to machined plates that were diffusion bonded to laser welded injection molded chips, Re:Build Fikst supported the full design process from technology development through to low volume manufacturing, and are looking ahead to commercial scaling.

Value Delivered

Re:Build Fikst cut the design cycle time down to one week per chip iteration, which includes analysis, design, and manufacturing. This allowed the biologists to dynamically assess the field of solution options and optimize the functionality required for their technology. Having transitional manufacturing capabilities in-house enabled Re:Build Fikst to deliver chips made with the preferred materials at the quantities required at every step of the design process, empowering the Javelin team to prove out their technology.

INDUSTRIES:

- Biotech
- Pharmaceutical
- Health

SERVICES:

- Mechanical Engineering Design
- Custom Electronics Design
- Embedded Firmware
- Rapid Prototyping
- Computational Fluid Dynamics Simulation
- Design for Manufacturing
- Low Volume Production

APPLICATIONS:

- Pharmacokinetics
- Custom Tissue Engineering
- Drug Discovery
- Biology Research