Problem - Static conditions in In-Vitro Experiments: Translating in-vitro results to the complex in-vivo environment of the human body remains a major challenge in drug development. While in-vitro conditions can be well standardised, they lack the dynamic nature and complexity of biological systems, making it difficult to predict how a drug will behave in a real-life setting. A key limitation of traditional in-vitro experiments is their static nature, with cells growing in a horizontal layer in multiwell plates. To compensate, researchers often turn to costly and time-consuming animal studies, even for formulations that may ultimately be ineffective. Existing in-vitro solutions are expensive and require significant training, making them inaccessible to many research groups. More affordable and detailed in-vitro characterisation can help researchers spend their limited funds on the most promising formulation, maximising their output and impact on drug development. Having encountered this problem in our own laboratory work, we have developed our own cost-effective alternative: the FlowCube.

Solution - The FlowCube: The FlowCube (Fig. 1) is an innovative and versatile device that enables researchers to perform cell interaction experiments on vertically positioned cell layers in a dynamic environment, overcoming the limitations of conventional multiwell plate experiments where static conditions, sedimentation or floating can affect results. The FlowCube improves the quality and reliability of experimental data, enabling more accurate characterisation and evaluation of drug formulations. It also leads to a more precise pre-selection of drug formulations for further in-vivo testing. This can then increase the power and validity of the required animal studies. The FlowCube is easy to use and requires minimal setup and training, allowing researchers to focus on their work without the need for expensive or complex equipment.

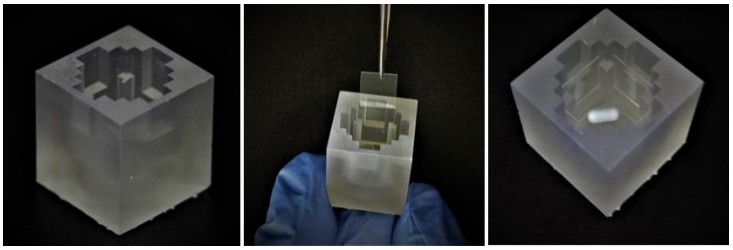

Figure 1: FlowCube

Market Opportunity: The FlowCube fills the gap between low-cost, static multiwell plate experiments and expensive, advanced technologies, offering an optimal balance of affordability and functionality. Our initial focus is Austria's dynamic life sciences sector, which includes 55 research institutes with a combined annual budget of €1.6 billion and over 200 R&D-focused companies. To enhance scalability, we are currently implementing a moulding process to lower production costs while maintaining high quality. This approach allows for a wide range manufacturing materials, ensuring the FlowCube meets various experimental needs and remains a versatile tool for laboratories.

Team: The FlowCube core team includes Katharina Skoll, Maria Anzengruber, and Michael Meindl-Mayrhofer. Michael oversees business strategy and finances, while Katharina and Maria lead scientific development and research expansion. Developed during their PhD studies at the University of Vienna, the project benefits from the support of skilled colleagues and enthusiastic Masters students who contribute their energy and creativity.

Traction and Development: The FlowCube was created out of necessity and now a fully functional 3D-printed prototype as well as a moulded prototype have become a valuable tool in our daily research. A patent application to protect the design and function of the FlowCube was filed. Our ongoing efforts are focused on refining the product by developing new designs and testing different shapes and materials.

Vision: Our goal is to make the FlowCube a standard device in life science labs globally, streamlining workflows and enhancing the consistency of experimental data. With affordable production and customization options, we aim to provide labs worldwide with a reliable and versatile tool that advances research in pharmaceutical development and beyond.