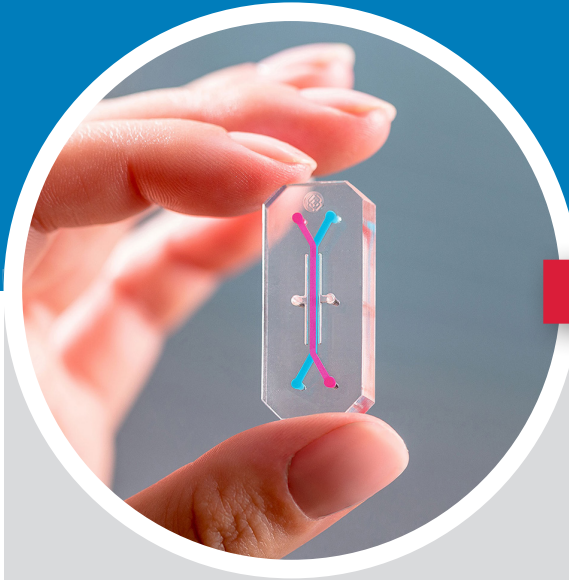


# ORGANS-ON-CHIPS TECHNOLOGY

The FDA has entered into a multi-year research and development agreement to evaluate new testing technology that creates human organ systems in miniature on micro-engineered chips about the size of a AA battery. This revolutionary technology has the potential to help scientists gain a better understanding of the effects of medicines, disease-causing bacteria in foods, chemicals, and other potentially harmful materials on the human body.

There are three components: organ-chips, instrumentation, and software apps.



## ORGAN-CHIPS

- The organ-chips are designed to accurately recreate the natural physiology and mechanical forces that cells experience in the human body.
- The chips are lined with living human cells and their tiny fluidic channels reproduce blood and/or air flow just as in the human body. Their flexibility allows the chips to recreate breathing motions, or undergo muscle contractions.
- Each organ-chip, such as the lung, liver, intestine or brain, is about the size of a AA battery.
- The chip's transparency allows researchers to see the organ's functionality, behavior, and response, at the cellular and molecular level.



## INSTRUMENTATION

- The organ-chips are placed into a research system similar to a computer. The instrument is designed to recreate the human body's living environment – including blood flow and breathing motions.
- Scientists can use the modular instruments to introduce medicines, chemicals, and other toxins to the chip's environment to test the organ's response and behavior.
- The modular nature of the system allows scientists to observe and analyze the cells within the organ-chips using a variety of research tools and instrumentation.
- In some cases, organ-chips can be connected together so that scientists can observe how the different organ systems interact, and better understand the impact that different foreign substances introduced into a chip's environment have on the human body.



## SOFTWARE APPS

- During this process, scientists can extract data that can be collected and analyzed with the help of modern software, such as an app you would download on a tablet.
- The software is designed to provide precise control of the organ system's living microenvironment.
- The software offers the ability to configure cell architecture, tissue-to-tissue interfaces, mechanical forces and the biochemical surroundings.

Images and source material courtesy of Emulate Inc.