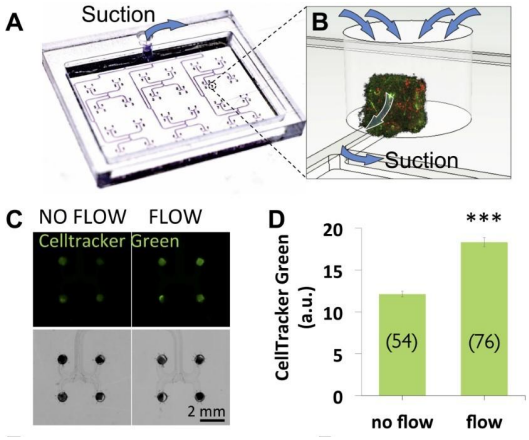
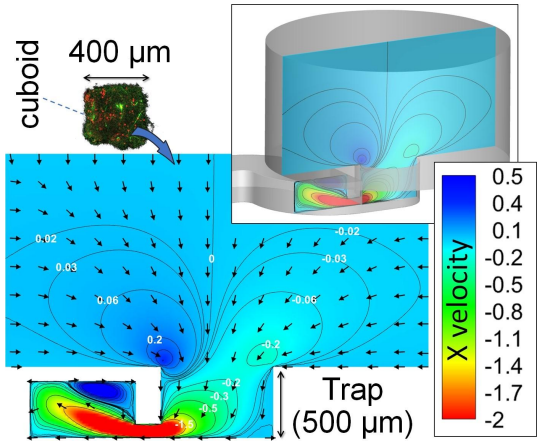
Different tissues have varying permeabilities, and different cells can tolerate varying amounts of shear stress. In many microfluidic systems, such as lab-on-a-chip and organ-on-a-chip, it is necessary to identify the tissues subjected to the flow.



The following figure shows the fluid dynamics simulation of a tissue trap. The arrows depict the magnitude and direction of the flow, while the colors represent the magnitude of the X velocity component of the flow, which plays a significant role in the trap's ability to capture tissue.



Sometimes, we need to apply a specific level of shear stress to cells to mimic the in vivo conditions in the human body. Additionally, cells may perish when subjected to excessive shear stress. Therefore, it is crucial, during the design and experimental testing phases, to determine the acceptable range of fluid velocity.

Many scientists working with similar devices may lack expertise in computational fluid dynamics and numerical simulations. Consequently, this software can be a valuable tool for users to ascertain the appropriate range of fluid velocity for maintaining cell viability. Users can input the dimensions and characteristics of the tissue, along with their velocity limitations. As a result, the software will provide them with a safe range of velocities.

"Pictures are from Folch's Lab Data."