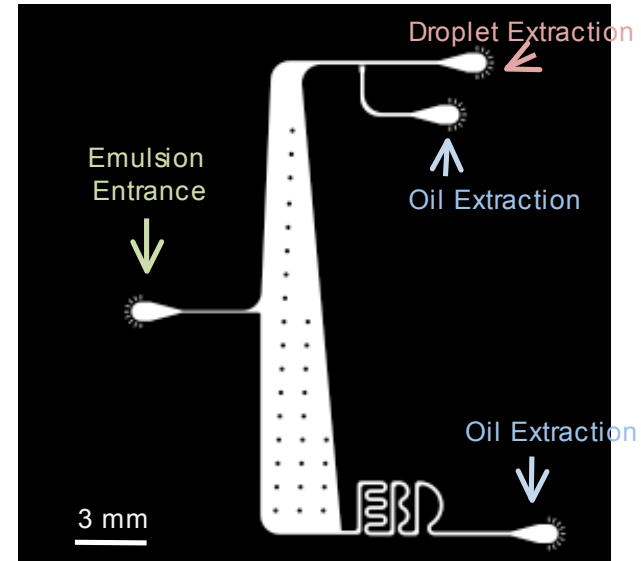


Optimization of Microfluidic Biological Testing through Densification

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Microfluidics refers to flowing liquid through devices containing micro-scale channels that allow for precise control of the liquid. With this technology emulsions, a mixture of two liquids that are not soluble in each other, can be used to make micro-sized water droplets in oil. Each droplet can be considered to essentially be its own test tube so many repetitive and time consuming processes can be performed at a much faster rate. Many of these experiments include putting cells into the water droplets and letting them incubate before continuing the experiment. In this case, having the small surface area of a glass slide does not come in handy so to optimize this surface area, a volume fraction of the oil surrounding the droplets needs to be removed. The design for this densification of droplets utilizes the fact that the droplets are much less dense than the oil so they float to the top of a chamber where they are then directed to the incubation slide. The larger system of devices that this densification device will be used is aimed to optimize a detection technique for antibodies in cells. The study of these antibodies have many valuable medical application for drug research spanning from alternative cancer therapies to organ transplant drugs.



The figure above is a diagram of the densification device. The lower extraction has loops in it to add resistance in the channel so it is a less favorable path of travel for the droplets.

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