

JOINT EVENT

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Microfluidics as a novel technology to produce bio-mimics**Naresh Yandrapalli**

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Cell as a building block of multi-cellular organisms is one of the most sophisticated pieces of machinery developed by nature. So far, a lot has been done to understand multiple cascades of reactions occurring within a cell. Bottom-up methodologies have been an immense help in achieving this. Techniques such as electroformation, gentle hydration and micro-jetting have been developed to produce cellular mimics. While these techniques resulted in better models to understand the effect of external factors on the cell, they cannot be used to produce cellular mimics that can help study the development of a cell itself or to produce artificial cells for application purposes. It is important to develop methods that can help create such artificial cells for two main reasons: (a) cells are one of the most efficient machinery in the living world that can be mimicked for efficient and sustainable production; (b) understanding cells can help better manipulate during medical and health purposes. Emulsion-based method is the most effective and promising technology to mass produce vesicular structures that can have large internal components like proteins, enzymes, genetic material and even compartments. In our lab, we try to achieve this by using the same emulsion methods but inside microfluidic chips. In this work, we tried to develop microfluidic methods to produce not only cellular mimics, giant vesicles, but also compartmentalized systems with various functional components such as biotin-streptavidin system. Such systems are a step forward towards the advancement of applied bottom-up technologies in the field of synthetic biology.

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