Understanding Meiotic Chromosomes Movement in Yeast using Microfluidic chip

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The ability to analyze cells at a single-cell level is important when researching cell heterogeneity. The previous methods are limited in their throughput, resolution and accuracy. To solve these problem, high resolution live cell images is used to observe cellular dynamics in response to drugs and stimuli. But monitoring the real-time behavior of arrays of single-cells is only achieved with much experimental difficulty due to the small size. Microfluidic systems have recently developed as a method for imaging techniques of single-cells in precisely controlled and changing microenvironments. Here, we have developed a simple microfluidic platform of trapping single-cells in aperture. The device exploits hydrodynamic forces to trap cells flowing near a narrow aperture. We achieved capture of cells with a trapping efficiency over 97 % moreover trapping efficiency of sing-cells over 50 %. The array format and optimized geometry allow for easy and efficient single-cell loading, while maintaining captured cells in a low shear stress environment for long-term experiments. The simplicity of the design, inexpensive materials make it a device for systems biology experiment.