

Simple method for selective patterning of proteins using micro valve system

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We present microfluidic MITOMI chip for patterning biomolecules and screening chemical reaction. We can selectively control the patterning of reactive spot areas in the microarray chip through actuating the pressure-controlled button valves. The pressurized button valves play a role as mechanical blocking for selective patterning. To demonstrate feasibility of selective patterning, we use BSA, and fluorescence tagged BSA (FITC-BSA). According to sequential steps, first, button valves are deform to block the channel and generate the spot under pressure and followed by flushing the BSA. second, releasing the button valves followed by flowing FITC-BSA. The various spot areas are controlled by varying pressure providing manipulation of biomolecular patterning area. This method have many advantages such as requiring small sample volumes, operating on-chip and carrying out high throughput screening. We envision that this method potentially applicable to controlled patterning areas with various biomolecules, single cell analysis including in situ observation and their biomolecular chemical reaction.