Protein patterning based on self-assembled polymer layers and micro-contact printing

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The usefulness to generate patterns of biomolecules on specific material surfaces is essential for biosensor, biochips, lab on a chip, tissue engineering, and fundamental study of biology. The layer-by-layer self-assembly of polyelectrolytes provides a general and powerful method to build tailored ultrathin films of defined thickness, composition and structure on the defined surface. We have introduced efficient method for protein patterning onto designed surface produced by 'layer-by-layer' adsorption of polyelectrolytes and microcontact printing. Four types of polyelectrolytes were used in our studies: polyallyamine hydrochloride and poly(diallyldimethylammonium chloride) of cationic type, poly(sodium 4-styrene sulfonate) and poly acrylic acid of anionic type. The property of modified surface provides periodic oscillations in contact angle values, using technique of direct image analysis of shape of sessile drops, which indicates that the multilayers were correctly terminated by polycation and polyanion, respectively. Based upon the LbL and microcontact printing, the fluorescein isothiocyanate-labeled bovine serum albumin could be selectively patterned onto desired surface with various pattern sizes and shapes.