Versatile Protein Photopatterning Technology and Its Application to Protein Chips

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The protein chip is one of the most dynamic parts studied in the biochip technology at present [1]. Addressing proteins on a particular position of surfaces with resolutions from the micron to the nanometer scale is necessary for the development of proteins chips. Various patterning methods of proteins, such as micromachining, microwriting, electrochemical stripping, photopatterning and microcontact printing, have been developed. Photochemical methods have at least two advantages, addressing of proteins in a microfluidic system [2] and reducing the pattern size [3]. In this study, a versatile protein photopatterning method was newly developed using a caging chemistry. Terminal carboxylic acid group of glass surface was esterified with 1-(4,5-Dimethoxy-2-nitrophenyl) diazoethane (DMNPD). The ester linkage was photolyzed at < 360, and the exposed carboxylic surface could be used to immobilize proteins by a general amine coupling method [4]. In addition, glutathione and nitrotriacetate surfaces, because they had caboxylic group, were used for photopatterning of His_6-tagged and GST-fusion proteins, repectively. The protein photopatterning technology developed in this study was applied in sub-micrometer patterning of proteins.

References

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