Use of Non-spherical Hydrogel Microparticles for Shape-coded Suspension Protein Microarrays

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Suspension arrays for protein-based assays have been developed using shape-coded poly (ethylene glycol)(PEG) hydrogel microparticles to overcome the problems with current systems which use color-coded rigid microparticles. We fabricated various shapes of photo-crosslinked PEG microparticles with acrylic acid to provide functional groups that enables protein immobilization via EDC/NHS method. Hydrogel microparticles were monitored in different pH buffer solutions. The swelling ratio of hydrogel microparticles was increased with increase of pH. After that, IgG or IgM species of primary antibody, were chemically bonded on the surface of the hydrogel microparticles with different shapes and sizes. therefore, we could selectively captured specific binding molecules in the mixture of primary antibody conjugated hydrogel microparticles. This technique is facile recognition of the type of antibodies by the shapes and sizes of the hydrogel particles, and the simple process of particle preparation by photopatterning. This technique can be used for various multiplexed bioassays that require simultaneous measurement of multiple analytes by incorporating appropriate receptor molecules onto the hydrogel matrix.