Controlled antibody immobilization onto immunoanalytical platforms by synthetic peptide

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Abstract: Antibody immobilization on a solid surface is inevitable in the preparation of immunochips/sensors. Antibody-binding proteins such as proteins A and G have been extensively employed to capture antibodies on sensor surfaces with right orientations, maintaining their full functionality. Because of their synthetic versatility and stability, in general, small molecules have more advantages than proteins. Nevertheless, no small molecule has been used for oriented and specific antibody immobilization. Here is described a novel strategy to immobilize an antibody on various sensor surfaces by using a small antibody-binding peptide. The peptide binds specifically to the Fc domain of immunoglobulin G (IgG) and, therefore, affords a properly oriented antibody surface. Surface plasmon resonance analysis indicated that a peptide linked to a gold chip surface through a hydrophilic linker efficiently captured human and rabbit IgGs. Moreover, antibodies captured by the peptide exhibited higher antigen binding capacity compared with randomly immobilized antibodies. Peptide-mediated antibody immobilization was successfully applied on the surfaces of biosensor substrates such as magnetic particles and glass slides. The antibody-binding peptide conjugate introduced in this work is the first small molecule linker that offers a highly stable and specific surface platform for antibody immobilization in immunoassays.

Author Keywords: Antibody immobilization; Biochip; Biosensor; Fc-binding peptide; Immunoassay

Year: 2008
Source title: Analytical Biochemistry
Volume: 374
Issue: 1
Page : 99-105
Cited by: 13
Link: Scorpus Link
Document Type: Article
Source: Scopus

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