SPR Imaging Protein Chip for Drug Discovery

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Protein-protein interactions are essential in various cellular regulation processes. Because of the potential for drug discovery, much attention has been paid to the development of small molecule inhibitors that target protein-protein interactions. Conventional well-based assay systems are often limited in their ability to screen small molecule inhibitors because they require a substantial amount of small molecules as well as target proteins. Therefore, protein microarrays have been recognized as a valuable tool for such tasks since they require only a nanoliter scale sample volume with a few picograms of the target proteins. The SPR imaging system has been developed to detect protein-ligand interactions in an array format on the surface of two-dimensional gold thin film. The major advantage of the technique is to detect molecular interactions in a high-throughput mode without the use of labels. We previously developed various types of modified gold thin film surfaces that could detect affinity-tagged proteins such as glutathione S-transferase (GST)-tagged, hexahistidine (His_6)-tagged, and maltose binding protein (MBP)-tagged proteins. The affinity-tagged protein samples were spotted onto the affinity ligand-modified gold chip, and the interactions were successfully detected with the SPR imaging system. In this study, we show the applicability of SPR imaging-based protein microarrays for the high-throughput screening of small molecules targeting the protein-protein interaction.