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A time-resolved method of a biosensor for drug screening

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A biosensor is a key and important technique not only for drug screening, but also for detections of protein association between bio-molecules. For example, inhaled anesthetic agents interact with many proteins and we can learn underlying principles from such studies. Nevertheless, it is not generally simple to detect such association or conformational change by conventional spectroscopy. Several techniques that can detect protein binding have been developed as a biosensor, and some of them are commercially available now. Surface plasmon resonance (SPR) method is one of highly sensitive methods. The principle of this technique is based on the refractive index change by the protein-protein binding and the refractive index dependence of the wavenumber for the surface plasmon excitation. A target protein is fixed on a metal surface and an analyte molecule is introduced on the surface. There have been reported many applications using this method. However, there are some inherent shortcomings for this method. For example, the target protein should be fixed on metal surface and it usually takes several tens minutes to accumulate proteins on the surface for detection. If one can detect the protein binding in solution phase with much shorter time, it could be complementary to the SPR method. Here, I will show that the diffusion detection of proteins by the laser induced transient grating (TG) method can be a suitable alternative way for detecting not only protein-protein binding but also protein-drug interaction. This technique is based on the time-resolved detection of the refractive index change by the bio-molecular interaction and detects the diffusion coefficients, which represent physical and chemical nature of the species. Some typical examples will be shown.

Biography

M.Terazima has completed his Ph.D from Kyoto University in Japan. He became an Assistant Professor at the Faculty of Science, Tohoku University at Sendai in 1986. He joined the Faculty of Science, Kyoto University in 1990 and was promoted to be a full professor. His current research interests include development of new methods to study reaction mechanisms of biological proteins, and for direct detection of energy and conformation of reactive species in time-domain. He authored more than 250 scientific papers.

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