Photon Science Seminar - 16 January 2018 - Paul Scherrer Institute

Focal Molography

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Focal molography is a new, label-free detection method for the *in situ* analysis of molecular interactions in biological samples [1, 2, 3]. It quantifies the presence of molecules at recognition sites by directly probing the nanoenvironment of the sites through optical interference.

The method transduces affinity modulation into refractive index modulation caused by target molecules that are bound to a precisely assembled nanopattern of molecular recognition sites, termed the 'mologram'. The mologram is designed so that laser light is scattered at specifically bound molecules, generating a strong signal in the focus of the mologram via constructive interference, while scattering at nonspecifically bound molecules does not contribute to the effect. We discuss the synthesis of mologrames on the surface of a chip by sub-micrometer near-field reactive immersion lithography (RIL) on a light-sensitive monolithic graft copolymer layer. We demonstrate the selective and sensitive detection of biomolecules, which bind to the recognition sites of the mologram in various complex biological samples.

Focal molography allows the label-free analysis of non-covalent interactions in complex biological samples, without a need for extensive sample preparation. This enables new features and applications of assays based on molecular binding.

References:

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