Analysis of Biomolecular Interactions using Microscale Thermophoresis (MST)

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The presentation gives an overview of **Microscale Thermophoresis (MST),** a unique technology for the measurement of biomolecule interactions. The term Microscale Thermophoresis refers to the directed movement of molecules in optically generated *microscopic temperature gradients*. This thermophoretic movement is determined by the entropy of the hydration shell around the molecules. Almost all interactions between molecules and virtually any biochemical process are linked to a change in size, charge and/or conformation of molecules which alter this hydration shell and therefore can be detected and quantified by MST.

Microscale Thermophoresis allows **quantification of binding affinities** of proteins, nucleic acids and small molecules as well as measurement of enzymatic activities. In addition also functional studies of small molecule inhibitors are possible. The steep microscopic temperature gradient is generated by an IR-Laser, which is strongly absorbed by water. The readout method of the interaction analysis is based on fluorescence: fluorescently labeled proteins/peptides/nucleic acids can be used as well as intrinsic tryptophane fluorescence or proteins expressed with GFP/YFP/RFP.

The presentation will cover: 1) Technical details and benefits of the Microscale Thermophoresis technology platform and 2) Examples of interaction measurements ranging from protein – ribosome, protein – protein, small molecule – receptor down to protein – ion binding studies to experiments where the interactions between receptors incorporated in vesicles and soluble proteins are analyzed.