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A New Automated Isothermal Titration Calorimetry System for Increased Throughput

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Isothermal Titration Calorimetry (ITC) is the universal detection system for macromolecular interactions. Heat is either generated or absorbed in any chemical reaction, and ITC is used to study target-drug, protein-protein, protein-nucleic acid, antibody-antigen, and other biomolecular interactions. A single ITC experiment measures stoichiometry, binding constant, enthalpy and entropy of binding. Binding thermodynamics provides valuable information on structure-activity relationships and drug design. ITC systems which are currently available require manual filling and cleaning, and limits the number of binding interactions which can be studied per day. This poster describes a new automated ultrasensitive ITC system, designed for hands-off, 24-hour a day operation. The ITC cell and syringe are mated to a fully-integrated autosampling system, and samples are stored in 96-well plates. VPViewer™ software controls experimental set-up and operation, and Origin® software is provided for post-run data analysis of multiple experiments. The higher sample throughput allows generation of complete binding isotherms of up to about 20 samples per 24 hour period. Experimental results demonstrate the sensitivity and reproducibility of this ITC instrument.