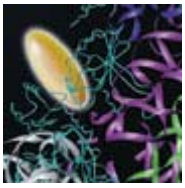
WINNER



2005 R&D 100 Awards Winner

MESA: Measuring Enzyme-Substrate Affinities

MESA is a low-cost assay for detecting the binding of drugs to proteins (and other biomolecules and cell structures) without the biasing influence of added fluorescent molecular labels. The assay images drug-protein binding using atoms intrinsic to drug molecules themselves. Because of this label-free detection, MESA captures and quantitates all drug-protein binding, including potentially therapeutic and potentially toxic bindings. This allows MESA measurements to generate a complete therapeutic index early in the drug-development process. Today's high drug-development failure rate—the primary cause of the high cost of new drugs—is driven by the inability to measure more than an infinitesimal number of protein-drug interactions. MESA's ability to measure a very large number of these interactions and its resulting early detection of toxicity could save hundreds of millions of dollars in drug-development costs.

Applications

- Drug Development: Screens label-free drugs against all body proteins in 24–72 hours, compared with extant technologies that test drug effects on less than 0.5% of body proteins.
- Personalized Medicine: Allows screening of individual patients for potential drug responses, enhancing drug prescribing and reducing adverse reactions.
- Target Validation: Facilitates identification of new protein targets for drug therapies, a necessity for treating currently intractable or incurable diseases.
- Label-Free Accuracy: Provides far more accurate data than that obtained with fluorescently labeled molecules.