therapeutic drug monitoring (TDM) ensures that immunosuppressive-drug concentrations are not too high (reducing the risks of toxicity) or too low (reducing the risks of rejection) in patients. TDM plays a key role in helping clinicians maintain blood and plasma levels of immunosuppressive drugs within their respective therapeutic ranges.

Creating healthier life

“We at Thermo Fisher Scientific continue to invest in developing the latest therapeutic drug monitoring immunoassays, specifically the immunosuppressant drug monitoring assays, providing transplant doctors more tools to support determining the correct dosage of medication an organ-transplant patient needs to prevent the rejection of his transplant. As pharmaceutical companies continue to develop new drugs, and doctors continue to look at new combination therapies, these new assays play a significant role in maintaining the health of the patient.

“As noted by C.E. Pippenger, PhD, professor, Grand Valley State University’s Department of Biomedical/Health Sciences and Steven Wong PhD, professor of pathology at the Medical College of Wisconsin and director of Clinical Toxicology and Pharmacogenetics: ‘Accurate monitoring is the cornerstone of rational and successful patient therapeutic drug management; from monitoring to management … [creates] a healthier life’.”

Azem Syed
Vice President of Marketing, Sales, and OEM Business
Diagnostic Division for Clinical Diagnostics
Thermo Fisher Scientific
Fremont, CA

Pediatrics and pharmacogenetics

“Developing better methods for individual drug dosing is the motivating force behind many of my clinical pharmacology research projects. I have been the principal investigator for several studies examining variations in how pediatric patients absorb and metabolize drugs, and what role genetics may play in these variations and therapeutic responses. Imagine if we could accurately predict drug exposure and response before even the first dose was given. Armed with the right tools, we could predict the likelihood that the drug and the dosing regimen selected would give the best possible response with the least chance of side effects.

“The immunosuppressive drugs that children who have received organ transplantation must take lifelong to suppress their own immune reaction to transplants are potent and often have serious side effects. The drug mycophenolate mofetil (MMF, CellCept) shows large variations..."
in how patients handle this drug when used with other standard immunosuppressive agents in children receiving kidney transplants. I am leading a study to establish predictive computer models for personalized dosing of MMF in pediatric kidney transplant patients.

“Results reveal large differences in how fast children absorb, break down, and eliminate MMF. Knowing how their patients metabolize drugs can help pediatricians tailor dosing to their patients’ needs. We work to develop predictive models to help correlate drug dosing regimens with early and long-term outcomes. Building on this study has been another project designed to determine if known differences in genes influence drug metabolizing enzymes and drug targets related to MMF action. Do differences in these genes change the concentration of MMF in the blood over time and influence clinical response and the chance of developing side effects to the drug? This research question is among many that the pharmacogenetics study addresses.

“As computer models are developed, they also will be implemented by the Genetic Pharmacology Service (GPS) at Cincinnati Children’s. The method of combining genetic testing and population models for personalized dosing offered by GPS is new and unique throughout the country, and especially in pediatrics.”

Alexander A. Vinks, PharmD, PhD, FCP
Professor and Director
Pediatric Pharmacology Research Unit and Laboratory
of Applied Pharmacokinetics & TDM
Cincinnati Children’s Hospital Medical Center
Cincinnati, OH

Dramatic TDM increases coming

“The demand for immunosuppressive therapeutic drug monitoring is likely to increase dramatically due to recent developments such as better transplant clinical protocols, the use of different therapeutic combinations as part of standard treatments, improved transplant survival outcomes, and the increasing numbers of patients with conditions such as chronic kidney disease and others that will require organ transplants.

“While immunosuppressives are necessary in transplant patients, the target level for these drugs requires constant monitoring to assure appropriate drug levels. Our company has a wide array of drug tests available on its systems, including several immunosuppressive drugs.”

Jack Zakowski, PhD, FACB
Director
Scientific Affairs and Professional Relations
Beckman Coulter Inc.
Brea, CA