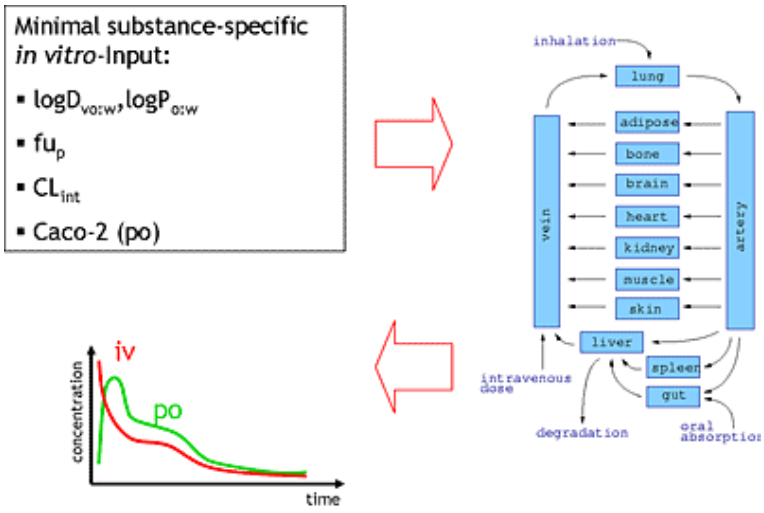
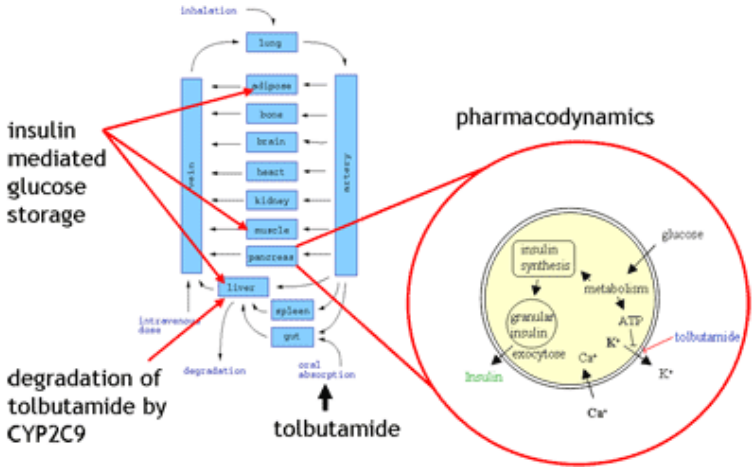
Pharmacometrics

Pharmacometrics /Mathematical Modelling in Pharmacokinetics & Drug Effect

Pharmacometrics is the study of the drug-organism interaction, in particular the investigation of absorption, distribution, metabolism, excretion and toxicological (ADMETox) processes, and its connection to drug effect. In the past decade, considerable progress has been made with the use of computational approaches, in particular in the early stage of the drug discovery process. As a result, modelling and simulation is now possible prior to any in vivo experiments.



The aim of this project is to develop coupled models of drug pharmacokinetics and cellular response to study the overall drug effect. Current areas of interest include understanding drug resistance and optimizing drug therapy in HIV / AIDS , and targeting receptor signalling systems in cancer therapy. Moreover, we develop models to capture the effects of natural variability. The mathematical aspect include non-linear sensitivity analysis based on a recently developed adaptive semi-discretization in time of the associated PDE solved w.r.t. a time-dependend Galerkin ansatz space.



In cooperation with Computing in Technology (CiT (http://www.cit-wulkow.de/)), we developed the modular, application-specific and user-friendly virtual lab Medici-PK for modelling and simulation in pharmaco/kinetics/dynamics. We cooperate with Bayer Schering Pharma (http://www.bayerscheringpharma.de), Boehringer Ingelheim (http://www.boehringer-ingelheim.de),and Merck (http://www.merck.de/en/index.html), the Federal Institute for Risk Assessment Berlin (http://www.bfr.bund.de), the Martin-Luther-Universität Halle-Wittenberg (Prof. Charlotte Kloft (http://www.clinical-pharmacy.eu/), Clinical Pharmacology) and ETH Zürich (Prof. NIko Beerenwinkel (http://www.bsse.ethz.ch/cbg/people/nikob)).
This project is supported within the Graduate Research Training Program PharMetrX (http://www.pharmacometrics.de), by the Deutsche Forschungsgemeinschaft (DFG) within the Research Center MATHEON (http://www.matheon.de/), and the International Max Planck Research School for Computational Biology and Scientific Computing IMPRS CBSC (http://www.imprs-cbsc.mpg.de/).

 http://compphysiol.math.uni-potsdam.de/