IQM Tools – Efficient State of the Art Modeling across Pharmacometrics and Systems Pharmacology

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Objectives: Increased demand for support of model-based drug development through pharmacometric and systems pharmacology type of analyses requires tools that meet requirements regarding user-friendliness, flexibility, efficiency, compliance, and state of the art methodology. It can be argued that there is no single tool, currently used in the pharmaceutical industry, that fulfills all of these requirements, but that each individual modeler must maintain an own set of partly inherited and subsequently adapted scripts. The personal preferences of a modeler regarding software may lead to the adaptation of an analysis problem to the software, rather than adapting the tool and methodology to the project at hand.

Methods: IQM Tools [1] has been developed as a software package for the well-established mathematical analysis software MATLAB [2]. Guiding principles for the implementation have been user-friendliness, flexibility, extensibility, and compliance. IQM Tools enables a seamless access to available pharmacometric parameter estimation tools, such as NONMEM [3] and MONOLIX [4], enables a straightforward transition from mechanistic systems pharmacology to descriptive pharmacometric models, and efficiently supports reproducibility and compliance, including automated report generation in the Microsoft Word format.

Results: IQM Tools is designed in a modular fashion and consists of three main packages: IQM Lite, IQM Pro, and IQM Report. IQM Lite offers an environment for model building, simulation, optimization, and statistical functions, whereas IQM Pro provides resources for data analysis, NLME modeling, and trial simulations. IQM Report adds automated report generation.

Conclusions: IQM Tools supports and increases the efficiency, quality, and compliance of model-based analyses in pharmacometrics, systems pharmacology, and systems biology by incorporating and extending the capabilities of existing tools. The user-friendliness of the package considerably lowers the threshold for the conduct of pharmacometric analyses, which also makes it useful both for complex analyses and for educational purposes. IQM Tools is published as open source software and available for download [1].

References: