

# SAAM II: Selected Software Use Cases in Modern PK-PD Data Analysis

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Simulation Analysis and Modeling II (SAAM II) is a compartmental (nonlinear ordinary differential equation, ODEs) model builder, including an intuitive graphical user interface, extensively used in a variety of contexts, including PK-PD. It is widely regarded as a user-friendly and powerful compartmental modeling designer, enabling quick and efficient creation of prototype models. As such, it is suitable for beginner and expert modelers alike.

## Key Features:

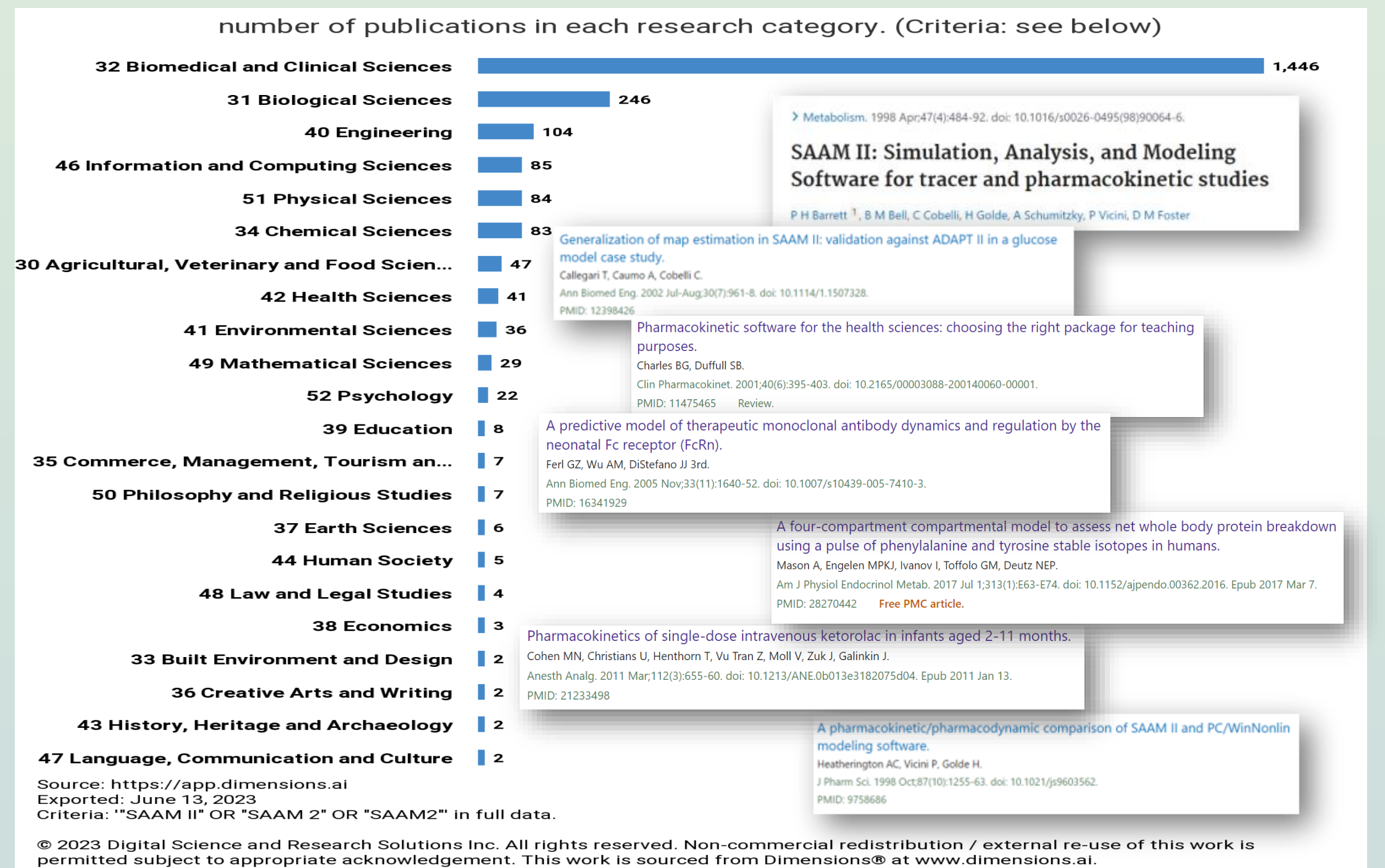
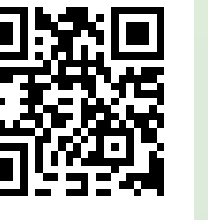
- Cutting-edge numerical algorithms for solving and fitting ODEs
- Includes a built-in Bayesian maximum a posteriori algorithm
- The C programming language ensures speed of execution
- Offers population two-stage methods (iterative and global) for enhanced modeling capabilities

## User Benefits:

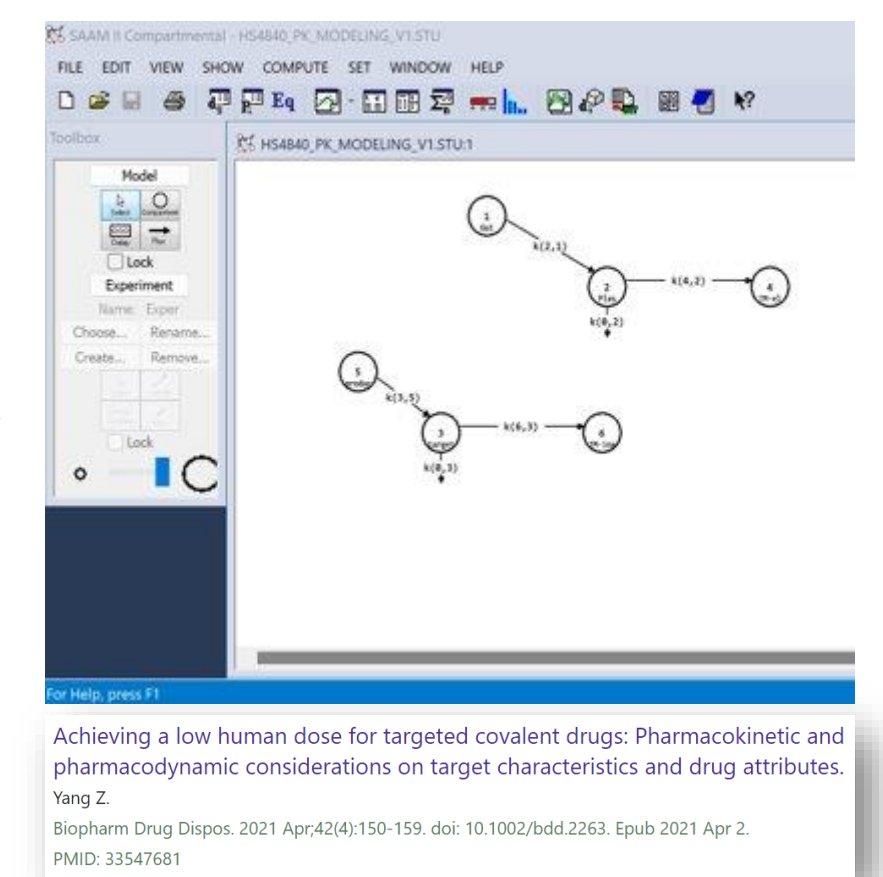
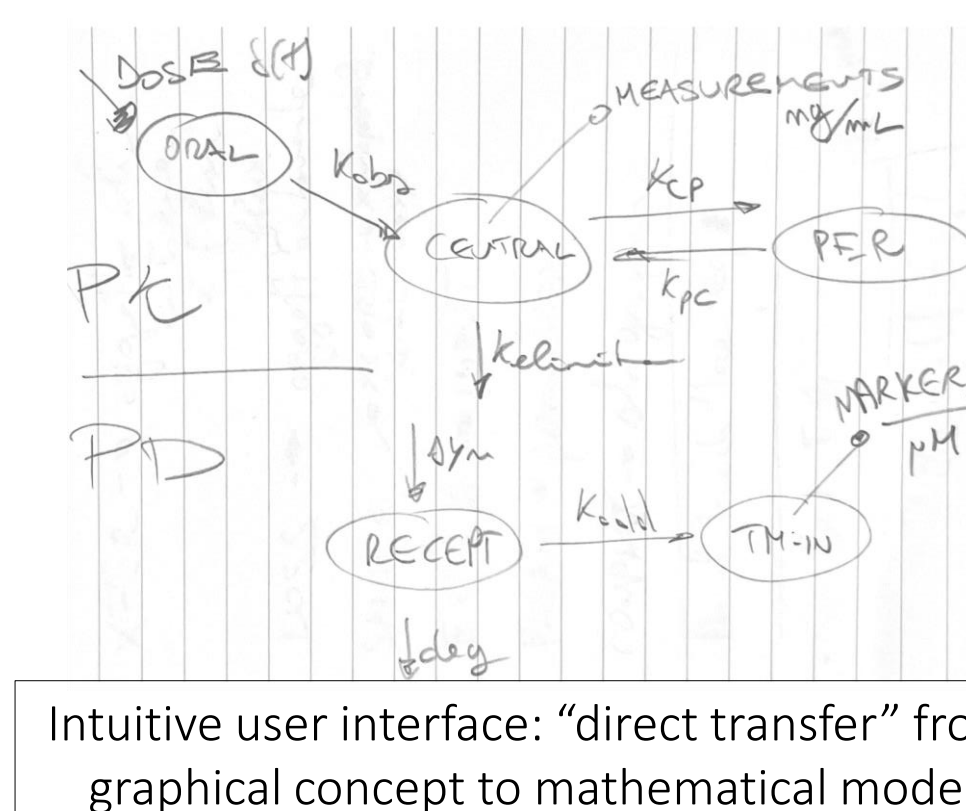
- Beginner modelers* can easily implement and execute simple ODE-based models, particularly (but not exclusively) those involving mass balance considerations
- Expert modelers* can conveniently handle and quickly prototype complex pharmacokinetic (PK) and nonlinear pharmacodynamics (PD) models, facilitating the selection of models for further testing or export to other software platforms



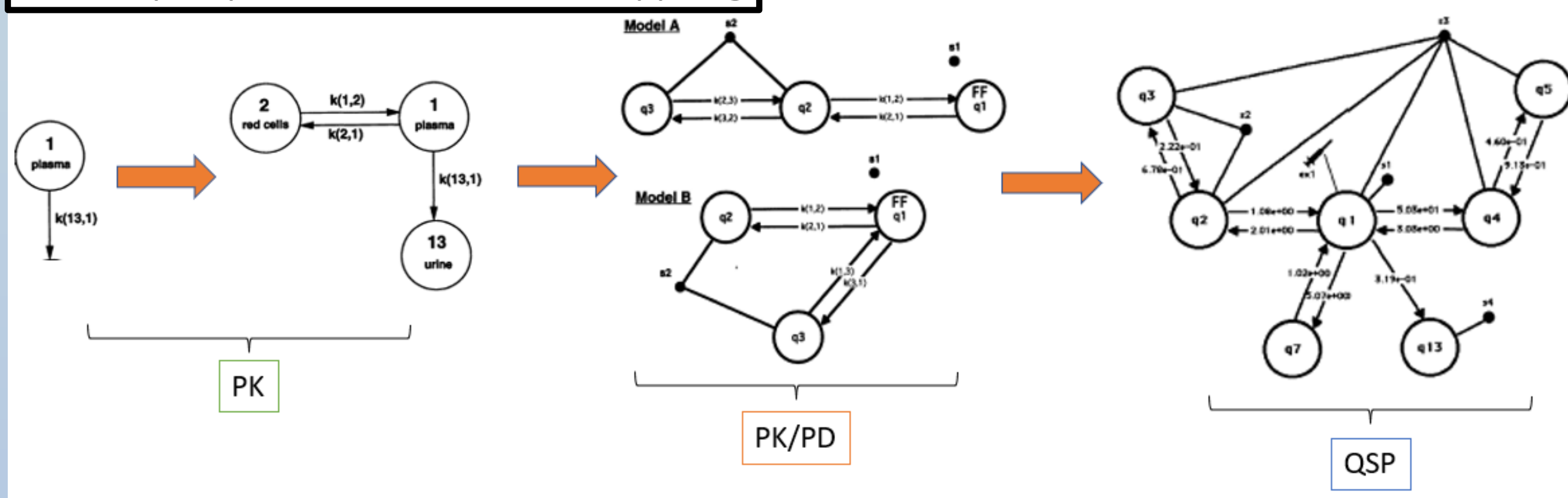
SAAM II is distributed by Nanomath LLC, Spokane WA  
More info available at [www.nanomath.us/saam2](http://www.nanomath.us/saam2)  
Or via email: [saam2@nanomath.us](mailto:saam2@nanomath.us)



## Example: Nonlinear PK-PD

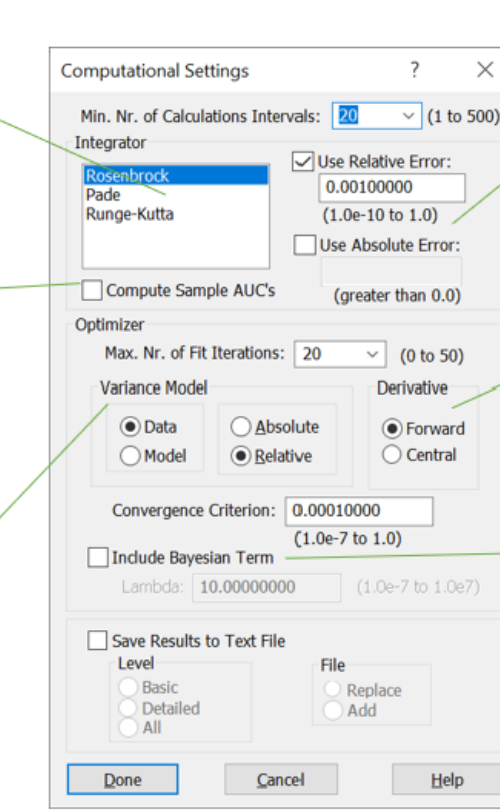


## Multi-purpose Model Prototyping



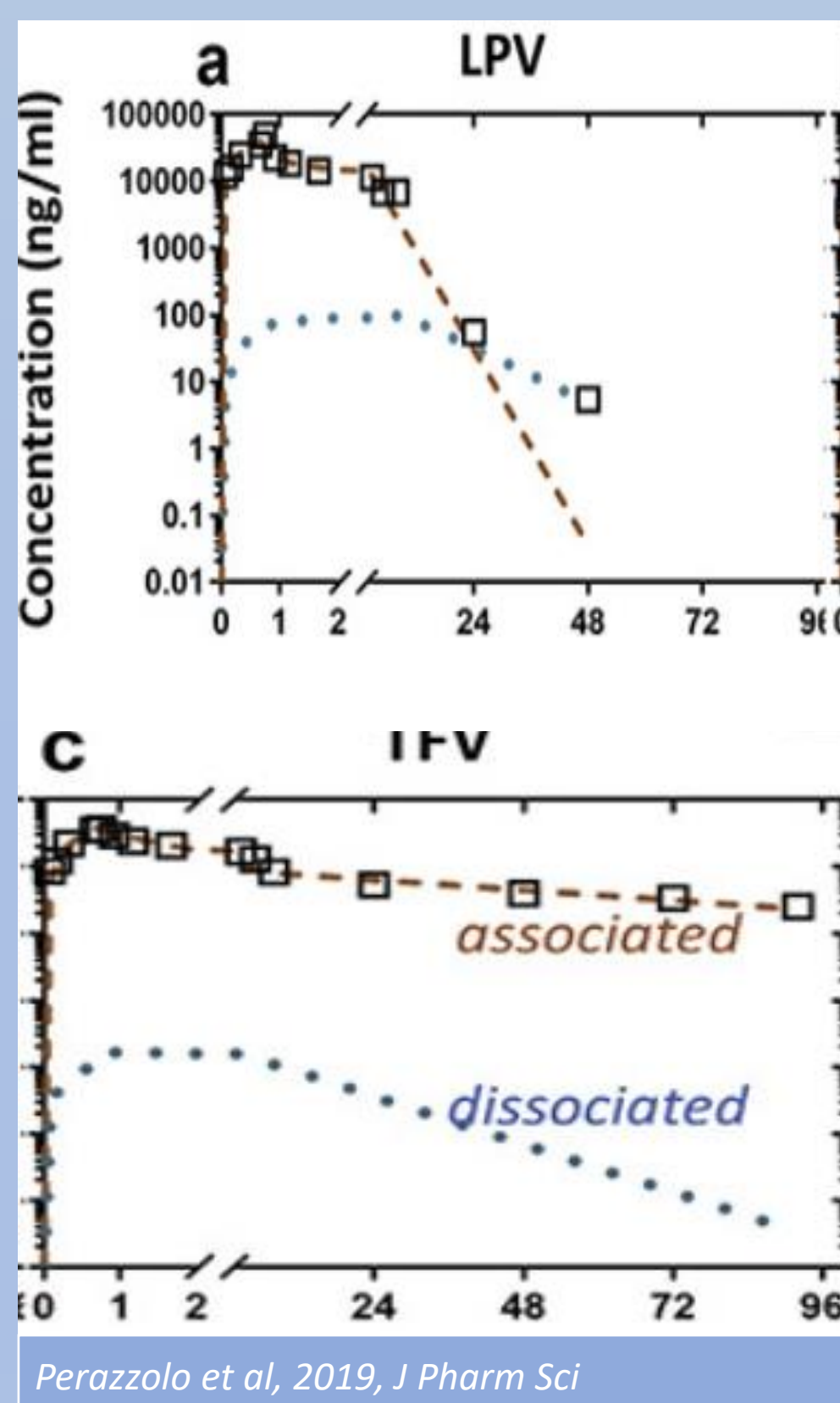
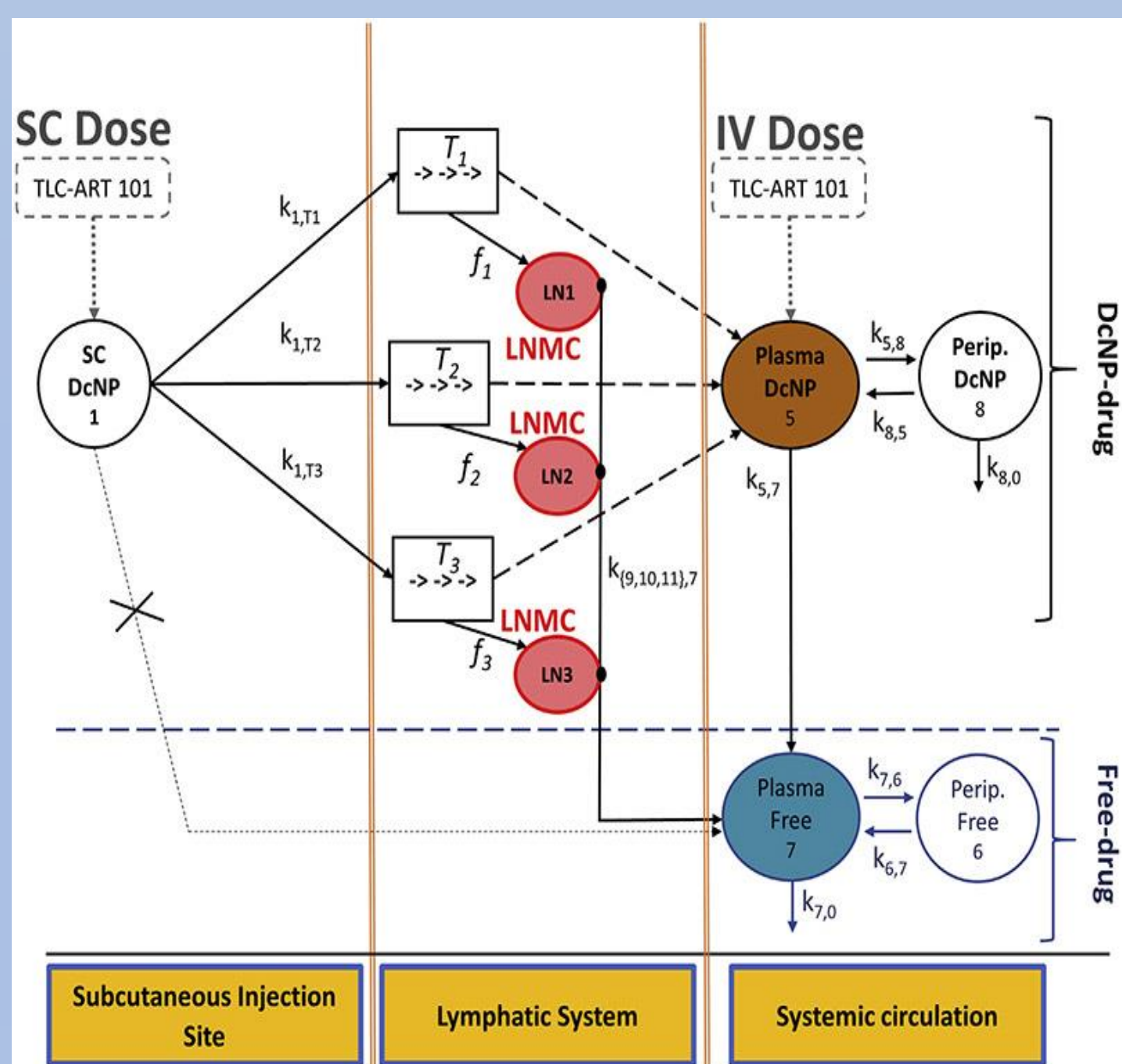
## Robust numerical algorithms

- Choice of several ODE integrators, optimized to solve nonlinear differential equations
- Areas Under the Curve (AUC) can be calculated for comparison with non-compartmental analysis
- Maximum Likelihood weighting function can be based on data (WLS) or model (ELS), with or without proportional error estimation (Absolute/Relative)



- Number of iterations can be adjusted
- Control of relative or absolute error on ODE integration (useful for speed and accuracy)
- Choice of forward or central numerical derivatives for speed
- Possibility of introducing empirical Bayesian terms (mean and variation) for use in maximum a posterior estimation

## Example: Stability of Delivery Formulations (LNP, vaccines...)

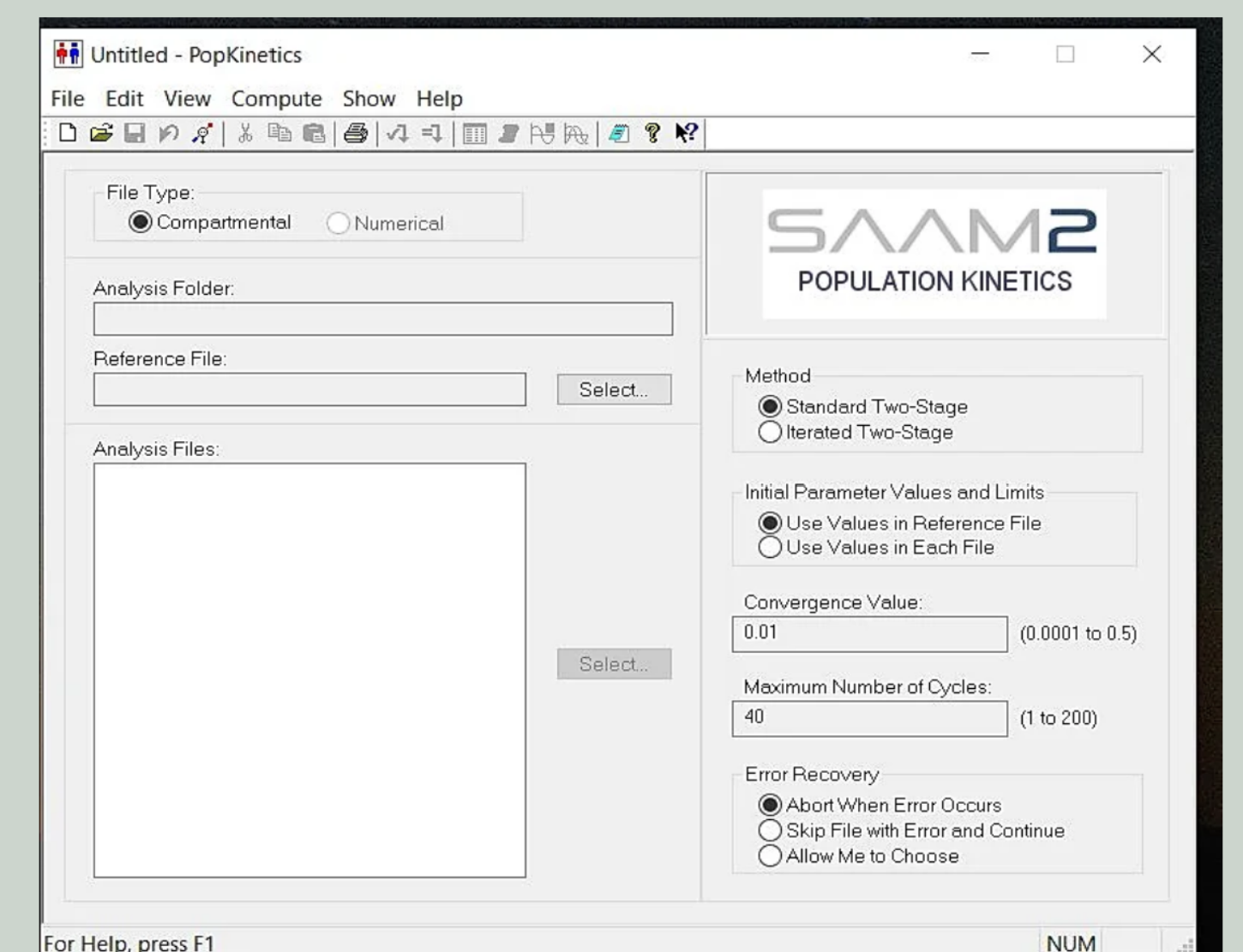


## Two-stage population methods

popKinetics v2.3-  
Population  
Pharmacokinetic  
SAAM II add-on

Windows Only  
(requires SAAM II)

Quick population PK analysis -  
Standard 2 Stages and Iterative 2  
Stages population PK analysis



## CONCLUSION

SAAM II provides a versatile tool for modeling complex and challenging kinetics, e.g., translating from laboratory experiments to in vivo scenarios, or estimating key parameters from PK and PD measurements. Its philosophy is to enable model building through the typical “circles and arrows” sketches used to represent compartmental systems, initially meant for users unfamiliar with scripting or command-line coding. SAAM II facilitates efficient mechanistic prototyping and rapid simulation and is a useful platform for mechanistic prototyping of ODE-based models, due to its ease to design, replicate, and test hypotheses very quickly.



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