# User guide

# Compartmental Analysis (PET)
# — LIFEx —

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# Chapter 1
# Introduction

## 1.1 Models

Compartmental analysis in LIFEx application come from of lhsol 2.0.2 program 2002-2012 by Turku PET Centre

Fitting of full or reduced compartmental model to plasma and tissue time-activity curves (TACs) to estimate the model parameters:

Where Model is one of these:

- lhsolK1: K1 (for assuming k2=k3=k4=k5=k6=0)
- lhsolvk1: K1 Vp(%) (for assuming k2=k3=k4=k5=k6=0)
- lhsolk2: K1 k2 K1/k2 (for assuming k3=k4=k5=k6=0)

- lhsolvk2: K1 k2 Vp(%) K1/k2 (for assuming k3=k4=k5=k6=0)
- lhsolk3: K1 k2 k3 K1/k2 Ki (for assuming k4=k5=k6=0)
- lhsolvk3: K1 k2 k3 Vp(%) K1/k2 Ki (for assuming k4=k5=k6=0)
- lhsolk4: K1 k2 k3 k4 K1/k2 k3/k4 Vd (for assuming k5=k6=0)
- lhsolvk4: K1 k2 k3 k4 Vp(%) K1/k2 k3/k4 Vd (for assuming k5=k6=0)

Compartmental models are transformed into general linear least squares functions (1, 2, 3), which are solved using Lawson-Hanson non-negative least squares (NNLS) algorithm (4). Linear parameters are always >=0, but compartmental model parameters may get negative estimates. Note that rate constants and macroparameters are represented per volume (measured by PET) including vascular volume.

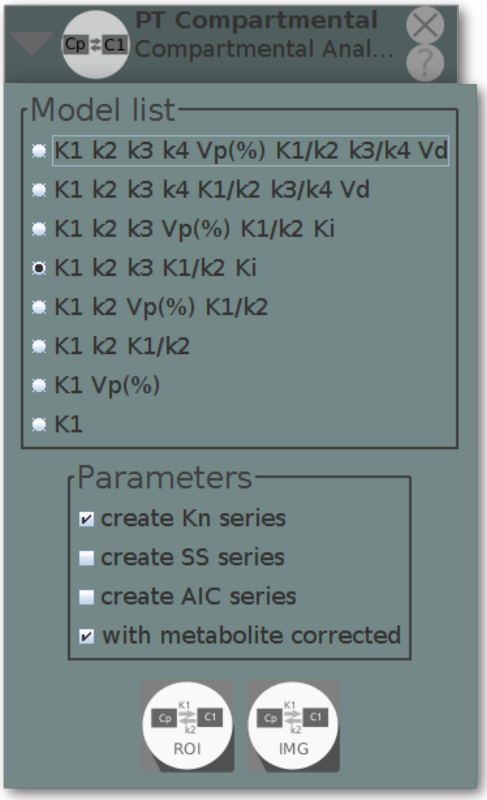


Figure 1.1: main screenshot of PT Compatmental protocol

References:

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3. Oikonen V. Multilinear solution for 4-compartment model: I. Tissue compartments in series. http://www.turkupetcentre.net/reports/tpcmod0023.pdf

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