

Equations:

Data:

$$1) T_{1/2} = \frac{\ln(2)}{\beta}$$

$$2) K_{21} = \frac{(A\beta + B\alpha)}{(A + B)}$$

$$3) K_{el} = \frac{\alpha\beta}{K_{21}}$$

$$4) K_{12} = \alpha + \beta - K_{el} - K_{21}$$

$$5) Cl_p = \frac{DOSE}{AUC}$$

$$6) Vol = \frac{DOSE_{initial}}{A + B}$$

Models:

$$1) X_c = Ae^{-\alpha t} + Be^{-\beta t} + E \text{ where } E = 0$$

$$2) Y = Ae^{-Bx}$$

Description:

In this example a patient has been given an intravenous injection of a post-operative painkiller. The kinetics of pain killers are important as pain relief is closely related to plasma concentration. An initial fit is obtained from the measured data. This fitted information is then used to calculate the amount of drug present in the central compartment. This in turn is calculated by multiplying the Cp values by the volume of the central compartment equation (6) calculated from the parameters of the fit and the known initial dose. These new values are then plotted against time in graph (2). Graph (3) is used to visualize the terminal part of the plot created in graph (1). All equations have been created using the Formula Editor available in XLfit. The AUC calculation is extracted from the statistics wizard for graph (1).

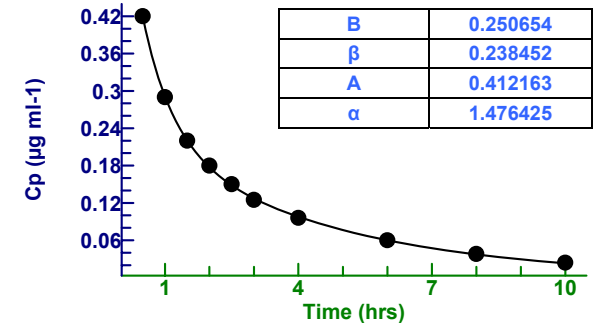
Time (hrs)	Cp	Drug in central compartment
0.5	0.42	31.682969
1	0.29	21.87633574
1.5	0.22	16.59584091
2	0.18	13.57841529
2.5	0.15	11.31534607
3	0.125	9.42945506
4	0.096	7.241821486
6	0.06	4.526138429
8	0.038	2.866554338
10	0.024	1.810455371

Results:

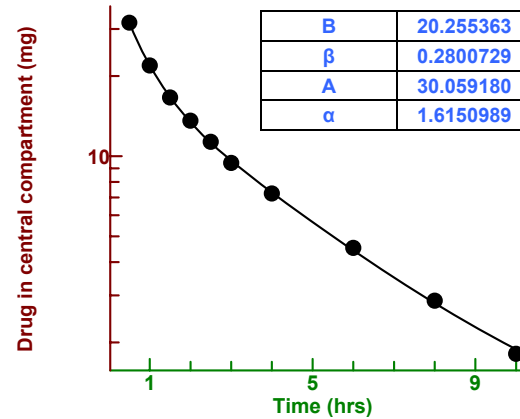
Calculated using fitted parameters for Graph (1)

Equation	Result Name	Result Value
1	T _{1/2}	2.906248
2	K ₂₁	0.706609
3	K _{el}	0.498233
4	K ₁₂	0.510034
-	AUC	1.330335
5	Cl _p	37.58452
6	Volume (Central Compartment)	75.43564

Graph (1)



Graph (2)



Graph (3)

