

PHAR 7632
Biopharmaceutics - Pharmacokinetics

University of Oklahoma
College of Pharmacy
Instructor: David Bourne, Ph.D.

The left graph shows concentration (Cp) on the y-axis (0 to 20) versus time (hr) on the x-axis (0 to 24). It contains three curves: a solid line for Cp (fast infusion) that rises quickly and plateaus; a dashed line for Cp (slow infusion) that rises more gradually to the same plateau; and a dotted line for Cp (Total) which is the sum of the two. The right graph shows the rate of change of concentration (V = dCp/dt) on the y-axis (0 to 15) versus time (hr) on the x-axis (0 to 24). It shows a curve that starts at 15, crosses the x-axis at approximately 10 hours, and then approaches 0 from below. Labels indicate: V = dCp/dt = 0 at the peak, V = dCp/dt = positive for the rising part, and V = dCp/dt = negative for the falling part.

I. Introduction to Course

- Staff
- Grading
- Course Outline
- Textbook
- Other References, Journals
- Software

A. Staff

- Lecturer: David Bourne, Ph.D.
Office: CPB 303
email: david-bourne@ouhsc.edu
- Course WebSite
http://www.boomer.org/course/PK_BIO/
- Lectures: 11:10 a.m. - 12:00 p.m.
Tuesday and Thursday (CPB 103)

B. Grading

- Mid Semester Exam 30 %
- Homework 20 %
- Final Exam 50 %
- TOTAL 100 %
- Exam - preview, review, one week
- Calculators/Computers Rules/Guidelines
- Homework - on time, practice

C. Coursework

- Introduction
- Mathematical Material
- Pharmaceutical Analysis
- Pharmacokinetic Intro
- One Compartment I.V. Bolus, Plasma
- Analysis of Urine Data
- Intravenous Infusion

C. Coursework

- Introduction
- Mathematical Exponents and logarithms
- Pharmaceutical Graphing Data (linear and semi-log)
- Pharmacokinetic Use of Spreadsheet Software
- One Compartment I.V. Bolus, Plasma Calculus (differential and integration)
- Analysis of Urine Data Laplace transforms as an Integration method
- Intravenous Infusion

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Spectroscopic drug analysis
HPLC, GLC, RIA, EMIT, etc

C. Coursework

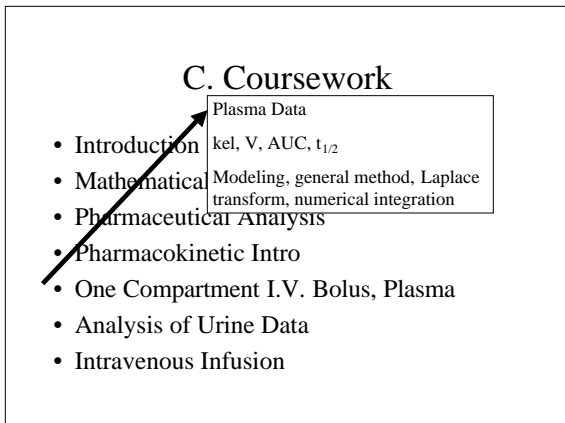
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Plasma Data
kel, V, AUC, $t_{1/2}$

Modeling, general method, Laplace transform, numerical integration



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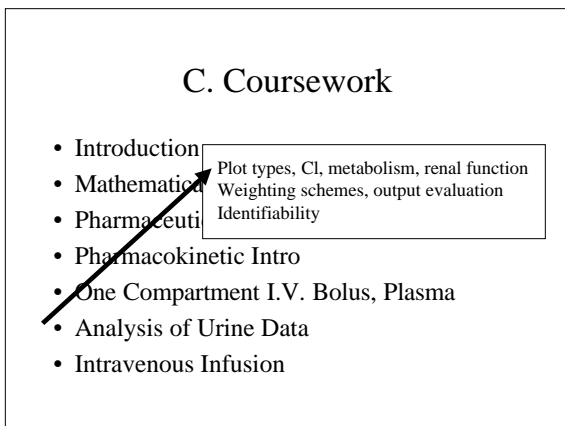
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Plot types, Cl, metabolism, renal function

Weighting schemes, output evaluation

Identifiability



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C. Coursework (contd.)

- Routes of Drug Administration
- Pharmacokinetic of Oral Administration
- Bioavailability Calculations, F
- Bioavailability Studies

C. Coursework (contd.)

- Routes of Drug Administration
- Pharmacokinetic of Oral Administration
- Bioavailability Calculations, F
- Bioavailability Studies

Method of residuals, W-N method
Fitting simultaneous data sets, Optimal sampling

C. Coursework (contd.)

- Routes of Drug Administration
- Pharmacokinetic of Oral Administration
- Bioavailability Calculations, F
- Bioavailability Studies

C. Coursework (contd.)

- Factors affecting Oral Absorption
 - Physiological
 - Physico-chemical
 - Formulation
- Multiple Dose I.V. Bolus
- Multiple Oral Dose
- Routes of Excretion

C. Coursework (contd.)

- Metabolism
- Drug Distribution
- Multicompartment PK Models, Selection
- Non-linear PK Models
- More complex PK Models
- PBPK Models, PD Models
- Clinical Application of PK

D. Textbook and Resources

- Bourne, **Mathematical Modeling of Pharmacokinetic Data**
- PHAR 4634 Course Syllabus
<http://gaps.cpb.ouhsc.edu/>
- Boomer Manual <http://www.boomer.org/>
- Other online resources, e-mail list, forum and chat areas (password)
– <http://www.boomer.org/pkin/>

E.-F. Other References

- Books, Journals
- Instructor
During class - ask questions
After class, Office (CPB 303)
eMail (david-bourne@uokhsc.edu)
WWW resources
http://www.boomer.org/course/PK_BIO/

G. Software

- Boomer <http://www.boomer.org/>
- Other software
<http://www.boomer.org/pkin/soft.html>
- SAAM II
- WinNONLIN Pro
- ADAPT II
- NONMEM
