

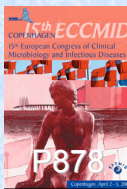


**Mailing address:**  
P.M. Tulkens  
UCL 73.70 av. Mounier 73  
1200 Brussels - Belgium  
tulkens@facm.ucl.ac.be

# Learning appropriate use of antibiotics (PK/PD and guidelines): a CD-rom course for healthcare professionals and students

E. Ampe, Y. Glupczynski, P.M. Tulkens, and F. Van Bambeke

Unité de Pharmacologie cellulaire et moléculaire, Université catholique de Louvain - Brussels - Belgium  
Laboratoire de microbiologie, cliniques universitaires UCL, Mont-Godinne



## ABSTRACT

**Objectives:** In a context of growing resistance and limited supply of new molecules, a rational use of antibiotics should be a high priority. Our objective is to train healthcare professionals and students in PK/PD and in a correct implementation of guidelines, since this could help to improve antibiotic use in both short and mid-terms.

**Methods:** We developed a PK/PD – guidelines course on CD-rom, targeted to both physicians and pharmacists but also usable by students. The course was prepared by a team of 2 pharmacists, 1 clinical microbiologist, and 1 pharmacologist. Sources of information were (i) textbooks, review papers and primary papers by internationally recognized experts (ii) materials presented at training workshops of the International Society for Antimicrobial Pharmacology (ISAP: www.isap.org) during the last 3 years, (iii) national and, if not available, international guidelines for the management of respiratory tract/urinary tract infections.

**Results:** The course is organized as a series of Power Point presentations covering in a progressive fashion the following topics : (1) bases in microbiology (in vitro properties of antibiotics); (2) pharmacokinetics (definition of the main parameters); (3) pharmacodynamics, with (A) the concepts, (B) the methods and pertinent models, and (C) the data, including the parameters to take into account to optimize the dosage of the main antibiotic classes; (4) resistance, including (A) the main mechanisms and (B) the use of pharmacodynamics to avoid the selection of resistance; (5) the appropriate use (including appropriate dosages) of antibiotics in (A) respiratory tract and (B) urinary tract infections.

**Conclusions:** This course promotes continuous education in the pharmacology and pharmacotherapy of antibiotics, in a format easily usable for courses and seminars to both students and professionals.

## INTRODUCTION

Optimizing the use of current antibiotics based on pharmacokinetics and pharmacodynamics and rational application of guidelines can contribute to the limitation of resistance development.

In this respect, education of students and healthcare professionals appears as a priority and can be facilitated by making available to them easy-to-consult informative supports.

## OBJECTIVES

- to develop an educational programme in which pharmacists and infectious disease specialists train healthcare professionals and students in PK/PD and in a correct implementation of guidelines.
- to distribute to people following this course a CD-rom as a support that can be consulted at any time.

## ACKNOWLEDGMENTS:

We thank W. Peetermans (KUL- UZ Gasthuisberg) for useful comments and Bayer Belgium for financial support

## CONTENT OF THE CD-rom



### Programme, please ...

- Basic introduction to key microbiological parameters
  - Pharmacokinetics (PK) : the basics
  - Pharmacodynamics (PD)
  - Resistance
    - mechanisms and epidemiology
    - PK/PD to fight resistance
  - Clinical guidelines or how to implement PK/PD ...
- References



What you always wished to know but never dared to ask because it seemed so basic ... and did not know how to begin with all that stuff ...

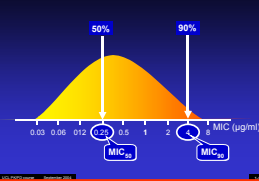
UCL PK/PD Course September 2004 0-9

### 25 MB of information ...

Name	Size
0-Introduction-EN.ppt	2,632 KB
1-Microbiology-Basics-EN.ppt	1,552 KB
2-Pharmacokinetics-EN.ppt	468 KB
3A-Pharmacodynamics-concepts-EN.ppt	444 KB
3B-Pharmacodynamics-methods-EN.ppt	3,919 KB
3C-Pharmacodynamics-actual-data-EN.ppt	3,196 KB
4A-Resistance-mechanisms-EN.ppt	2,164 KB
4B-Resistance-and-PK-PD-EN.ppt	1,959 KB
5A-Guidelines-pinciples-EN.ppt	1,586 KB
5B-Guidelines-respiratory-tract-EN.ppt	2,180 KB
5C-Guidelines-urinary-tract-EN.ppt	2,353 KB

## SECTION 1. DEFINITION OF MICROBIOLOGICAL PARAMETERS

MIC distributions : unimodal populations



## SECTION 2. DEFINITION OF PK PARAMETERS

What is PK for ?

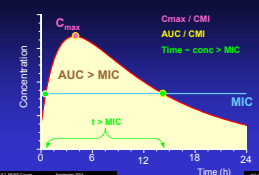
PK is the way to see if the drug can be made useful ...

- does it reach the target in sufficient amounts ?
- for long enough ?
- does it each non-desired targets ?



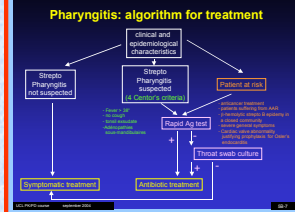
## SECTION 3. DEFINITION OF PD PARAMETERS

from pharmacokinetics to pharmacodynamics...



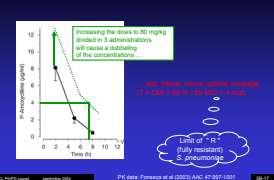
## SECTION 4. GUIDELINES

### GUIDELINES RESPIRATORY TRACT INFECTIONS Principles



### Application of PK/PD concepts

Why such high doses ?



### GUIDELINES URINARY TRACT INFECTIONS Principles

**Acute prostatitis : treatment**

**First choice:**

- Fluoroquinolones
  - Ciprofloxacin if suspicion of *P. aeruginosa*, 500 mg X 2 po

**Second choice :**

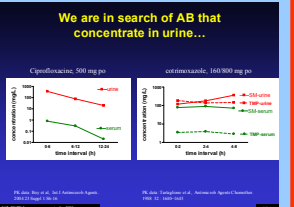
- Cotrimoxazol, 800/160 mg X 2 po

**Alternative:**

- Cephalosporins (cefuroxime)
- Amoxicillin + clavulanic acid

Minimal duration : 2 weeks, often 4 weeks (prevention of chronic infection)

### Applications of PK/PD concepts



## WHAT WE HOPE AND WHAT WE WILL DO:

- the CD-rom should be a continuous information source that
  - could be used for teaching pharmacology and pharmacotherapy of antibiotics to students and healthcare professionals.
  - may be easily consulted by healthcare professionals at any moment.
- We will regularly update it and plan to evaluate its impact on education of students and on the quality of antibiotic prescribing of junior physicians