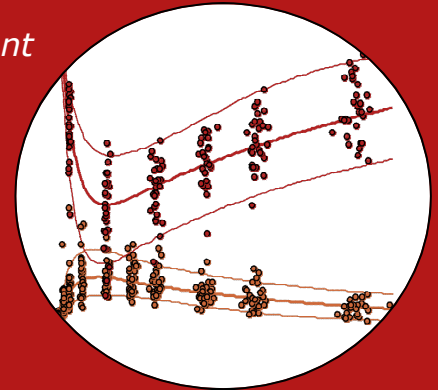


MASTER 2 *Mention: Science du Médicament et Produits de Santé.*

PHARMACOKINETIC / PHARMACODYNAMIC MODELLING



Keywords Pharmacokinetics (PK), Pharmacodynamics (PD), Modelling, Statistics, Programming, Data analysis, Drug Development, Precision dosing

BACKGROUND

From **drug development** to dose individualization in clinical settings, model-informed approaches have become essential to solve **dose optimization** issues.

The aim of this **Master Degree** is to teach the statistical, pharmacological and programming basics necessary to understand, build and take advantage of **PK/PD models**.

OPEN TO

- **Master 1 students** with a background in pharmacology, mathematics, statistics
- **Pharmacy students** (6th-year Industry branch)
- **Pharmacy residents** (i.e. *Interne en Biologie Médicale, Pharmacie Hospitalière, et Innovation Pharmaceutique et Recherche*) and Medical residents
- **Medicine**
- **Veterinary students** : Last year of specialization
- French or International candidate with equivalent background

PRACTICAL

Calendar: Starting in September 2022, Duration 1 year

European credits: 60 ECTS

Teaching language: English

Organization: Alternating training (*Formation en alternance*)

- Theoretical and interactive courses (Toulouse, France)
- Training in academic/industry data analysis unit (Eur. Union)

OPPORTUNITY

Possibility to apply for a **Ph.D.** in Pharmacometrics

Career: **Pharmacometrician** in

- Pharmaceutical Industry
- Contract Research Organization
- Regulatory agencies
- Academia



SEMESTER 1 – 30 ECTS

PROGRAM

Analyzing individual PK data (6 ECTS)

Linear PK concept ; Model-dependent analysis : main models, mathematical concepts ; NCA (non-compartmental analysis) ; « Two-stage approach » and clinical trials ; Patients with impaired renal or hepatic function, elderly, pediatrics, drug-drug interactions ; Analytical issues : assay validation ; PK and drug regulatory (human and veterinary drugs) : Bioequivalence ; Applied exercises : Personal tasks

Pre- & Post-Processing (3 ECTS)

Pre-processing ; Data management ; Building of dataset ; Post-processing / data science ; Applied exercises : models evaluations, goodness-of-fit (R) ; Data simulations

Population PK analysis (6 ECTS)

Concepts and methodologies in POP-PK ; Use of NONMEM, MONOLIX, R (tutorial classes) ; POP-PK applied to Therapeutic Drug Monitoring, medical imagery ; Applied exercises : Personal tasks ; Machine learning applied to PK

Physiologically-based PK (3 ECTS)

Principles of PB/PK ; Applications of PB/PK : interspecies extrapolations, *in vitro/in vivo* extrapolations ; Building a PB/PK model from physiological parameters and drug characteristics ; Simulations and interpretations

PK/PD modelling (6 ECTS)

Pharmacodynamics ; Building of PK/PD models ; PK/PD analysis of data : applied exercises ; PK/PD workshop

Application of PK/PD (3 ECTS)

Regulatory for human and veterinary drugs : bioequivalence ; Veterinary drugs ; PK/PD of antibiotics ; PK/PD in oncology

Project development (3 ECTS)

SEMESTER 2 – 30 ECTS

Full time internship

TEACHERS

Sarah Baklouti, Cécile Bon, Alain Bousquet-Mélou, Étienne Chatelut, Didier Concordet, Philippe Cremades, Cedric Dray, Aude Ferran, Peggy Gandia, Marlène Lacroix, Félicien Le Louedec, Fabienne Thomas, Alexis Viel, Mélanie White-Koning, Jean-Baptiste Woillard

CONTACT

Chairmen and contact: **Pr. A. Bousquet-Mélou** (alain.bousquet-melou@envt.fr) **Pr. E. Chatelut** (chatelut.etienne@iuct-oncopole.fr) <http://physiologie.envt.fr/m1-smpps/>
Candidature: eCandidat (<https://ecandidat2.univ-tlse3.fr/>) from April 25 to May 30 2022