Center for Drug Sciences
6 Traian Vuia, 020956,
Bucharest, Romania.

University of Medicine and Pharmacy
Carol Davila Bucharest,
Faculty of Pharmacy,
Biopharmaceutics Laboratory.

Biopharmaceutical Applications in Drug Development

Intensive seminar for PhD students organized within CEEPUS framework

Project code CIII-RS-1113-01-1718 - Central European Knowledge Alliance for Teaching, Learning & Research in Pharmaceutical Technology (CEKA PharmTech)

Coordinator: **Prof. Jelena Parojčić**

Date:

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Location:
Center for Drug Sciences, Laboratory of Biopharmaceutics, Faculty of Pharmacy, University of Medicine and Pharmacy Carol Davila Bucharest, 6 Traian Vuia, 020956, Bucharest, Romania.

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Short description: In 1971 Wagner defines Biopharmaceutics as "the study of the influence of formulation on the therapeutic activity of a drug product. It encompasses all possible effects of the dosage forms on biological response, and all possible physiologic factors which may affect the drug contained in the dosage form and the dosage form of the drug itself." Since 1971 Biopharmaceutics is growing with classification such as BCS and TCS concepts, use of dissolution as a surrogate of In Vivo with biowaivers and ultimately IVIVC which could predict, based on vitro parameters full in vivo behavior of the drug. The present course will present those various aspects and insist on the importance of a global understanding of in vivo and in vitro results to ultimately link to quality attribute of formulation to in vivo performance of the drug.

Topics to be addressed during the seminar

Prof.Jean-Michel Cardot,
University of Clermont-Auvergne, France

In vitro in vivo correlations, IVIVC

Practical advice for understanding how and when to use IVIVC
- -Gain a full understanding of when IVIVC can be established;
- -Explore how IVIVC could decrease the risk of in vivo studies;
- -Improve formulation development strategies as per ICH recommendation and speed market access;
- -Discover critical quality attributes of formulation;
- -Use IVIVC to establish dissolution limits.

Performance & Knowledge Objectives of this Course
- -Clarifying the usage of IVIVC;
- -Formulating faster and better NCE and generics;
- -Managing the practical hurdles of IVIVC with the right supporting data;
- -Understanding the impact Critical Quality Attribute on formulation;
- -Decreasing the risk of in vivo studies;

-Perform practical calculation to establish IVIVC and calculate the optimal formulation's target dissolution curve.

Introduction to the course

-Outlining the aims and objectives of the course.

Description of data needed to establish IVIVC

-Description of the IVIVC backgrounds;
-Basis of in vivo behavior of the drugs;
-Identification of limiting factors;
-Interaction between BCS (Biopharmaceutical Classification System) and IVIVC;
-Exploring in vitro dissolution methods;
-In vivo methods used for IVIVC: Absorption determination;
-Selection of most appropriate data to establish IVIVC.

Introduction to the IVIVC

-Definition of IVIVC;
-When IVIVC could be established;
-When IVIVC could not be established;
-How to establish IVIVC;
-Predictability;
-Limitation of IVIVC.

Case study

-Application for MR formulations;
-Application for class 2 drugs;
-Utilization in development;
-Setting dissolution limits;
-In silico bioequivalence based on in vitro data.

Overcoming the pitfalls

-Overview of common pitfalls when establishing IVIVC;
-Examples of ineffective IVIVC strategies;
-Understand what can be done to avoid these pitfalls.

Legal frame

-EU;
-USA.

Practical exercise

-Understanding limitation of BCS approach;
-How to point out the critical quality attribute;
-Calculation of absorption;
-Establishing IVIVC;
-Time scaling;
-Prediction of concentrations;
-Determination of dissolution limits;
-Optimization of formulation.

Prof. Sandra Cvijić,
University of Belgrade, Serbia

In silico modeling

In silico modeling: Transforming our ability to predict bioperformance of drug products

-Theoretical background;
-Physiologically-based models description;
-Modeling strategy.

In silico models exploration: Mechanistic interpretation of drug absorption pattern

-Checking the hypotheses;
-Assessment of the influence of physiological factors on drug absorption;
-Food effects;
-Alcohol-induced dose dumping.

In silico models exploration: Population simulations

-Virtual trials;
-Pharmacokinetic outcomes for different population groups.

In silico models exploration: IVIVR and biowaiver considerations

-In vitro-in vivo-in silico correlation;
-In vitro-in silico results to support biowaiver.

In silico models exploration: Guidance on formulation strategy

-Parameter sensitivity analysis;
-Tailoring formulation properties based on the in silico results.

In silico modeling of inhaled drugs deposition and absorption

-Pulmonary model description;
-Prediction of drug deposition and absorption;
-Combined CFD-PBPK approach: case example.

Practical exercise

-Selected examples;
-Free choice (model drugs selected by participants).

Pharmaceutical application from Thermo Scientific

Speaker to be confirmed.

Dalia Simona Miron, PhD, Flavian Ștefan Rădulescu, PhD
University of Medicine and Pharmacy Carol Davila Bucharest, Center for Drug Sciences

In vitro dissolution / drug release methodologies

Basics of in vitro methodologies

-History;
-Method development;
-Current applications for quality control and performance testing;
-Compendial chapter and regulatory documents;
-Particularities of in vitro dissolution testing for immediate and modified release dosage forms;
-Dissolution testing and biowaiver.

In vitro drug release testing of special dosage forms

-Soft gelatin capsules;
-Suppositories;
-Oral and injectable suspensions;
-Topical semisolid dosage forms.

Biopharmaceutics-based Classification Systems. Beyond BCS

Hands-on session

-Presentation of various in-vitro dissolution testing equipment and procedures;
-Open discussions.

Offered support

The participants will have access to the presentations and additional documents using the available on-line platform (https://elearn-bcs.herokuapp.com/) of the Center for Drug Sciences. A valid e-mail address will be required for creation of a dedicated account.

Please note that, between June 7-9th, 2018, the 6th edition of the Congress of the University of Medicine and Pharmacy Carol Davila will be organized at the Palace of the Parliament in Bucharest (http://www.congresumf.ro/registration/?lang=en). Registration is free and participants of the seminar can also attend this international meeting.