

The Hebrew University of Jerusalem

Syllabus

Drug Delivery to the CNS - 64322

Last update 15-09-2021

<u>HU Credits:</u> 2

Degree/Cycle: 2nd degree (Master)

Responsible Department: School of Pharmacy

<u>Academic year:</u> 0

<u>Semester:</u> 1st Semester

<u>Teaching Languages:</u> Hebrew

<u>Campus:</u> Ein Karem

<u>Course/Module Coordinator:</u> Dr. Tawfeeq Shekh-Ahmad

Coordinator Email: tawfeeq.shekh-ahmad@mail.huji.ac.il

Coordinator Office Hours:

Teaching Staff:

Dr. Tawfeeq Shekh-Ahmad

Course/Module description:

The course will cover a number of physiological and pathological aspects that have implications for drug delivery to CNS. The roles of transport systems at the BBB and the potential implications of these systems for CNS drug delivery will be taught. In addition, in vitro, in vivo, and pharmacokinetic models applied to the study of drug transport across the BBB will be discussed.

Critical factors in developing CNS drugs as well as strategies for CNS delivery of small molecules and biologics will be explored. The pathology of some common brain diseases and the implications for drug delivery for a given disease will be discussed. Novel drug delivery systems for CNS treatment will be covered.

Course/Module aims:

The aim of the course is to give understanding to the molecular properties of the blood-brain barrier, and to impart general knowledge on physiological concepts relevant to CNS drug delivery and how physicochemical properties of a small molecule relates to its likelihood to become a CNS drug. The course also aims to give a solid understanding on how brain pathologies may alter brain drug disposition in the brain.

Learning outcomes - On successful completion of this module, students should be able to:

In this course we will explore basic concepts and strategies in CNS drug delivery and provide an overview of the different approaches in the field. The course will also give a solid understanding of delivery and pharmacokinetic processes which reach beyond CNS delivery.

At the end of the course the students are expected to be able to:

• deduct if a drug compound is suited for CNS delivery according to its physicochemical properties.

• interpret data from in-vitro test models for CNS barrier permeability and efflux.

• demonstrate knowledge on how CNS pathologies may alter drug disposition in the brain.

• read, understand and extract general conceptual knowledge from original research articles.

<u>Attendance requirements(%):</u>

80

Teaching arrangement and method of instruction: lecture and seminar

Course/Module Content:

• The physicochemical parameters necessary for brain permeation

• Description of the tissue barrier properties and the roles of transport systems for endogenous and xenobiotic compounds at the BBB

• Pharmacokinetics basis and in vitro and in vivo models to study drugs transport across the BBB

• Drug discovery methods for studying CNS drug delivery

• Barrier changes in disease conditions and how these changes affect CNS drug delivery

• Strategies for CNS delivery delivering of small molecules and biological drugs into the brain

• Successful and failures in development of CNS drugs

Required Reading:

Additional Reading Material:

<u>Course/Module evaluation:</u> End of year written/oral examination 0 % Presentation 60 % Participation in Tutorials 0 % Project work 40 % Assignments 0 % Reports 0 % Research project 0 % Quizzes 0 % Other 0 %

Additional information: