The Hebrew University of Jerusalem

Syllabus

Personalized Medicine in Cancer and Neurodegenerative Diseases - 98824

Last update 25-01-2023

<u>HU Credits:</u> 2

<u>Degree/Cycle:</u> 2nd degree (Master)

<u>Responsible Department:</u> Bio-Medical Sciences

<u>Academic year:</u> 0

<u>Semester:</u> 2nd Semester

<u>Teaching Languages:</u> Hebrew

<u>Campus:</u> Ein Karem

<u>Course/Module Coordinator:</u> Dr Iris Lavon and Dr Adi vaknin

<u>Coordinator Email:</u> Irisl@hadassah.org.il

<u>Coordinator Office Hours:</u> Mon 10-12

Teaching Staff:
Dr. Iris Lavon,
Dr. Shai Rosenberg,
Dr. dana ekstein,
Dr. David Arkadir,
Prof Adi Vaknin,
Prof Sara Eyal,
Dr. benjamin uliel

Course/Module description:
To understand the importance of personalized medicine. As a proof of concept will focus primarily on the diagnosis and treatment of cancer and neurodegenerative diseases

Course/Module aims:
To understand the importance of personalized medicine. As a proof of concept will focus primarily on the diagnosis and treatment of cancer and neurodegenerative diseases

Learning outcomes - On successful completion of this module, students should be able to:
To understent what personalized medicine is
To understand the various aspects of this approch and its complexity
To understand the chances and risks of this approach
to learn about the methods used today with a look to the future to implement the method

Attendance requirements(%):
100

Teaching arrangement and method of instruction:

Course/Module Content:
1 13.03.2023 Dr. Iris Levon and Prof. Adi Vakanin Introductory lecture:
We will discuss the rapid development of personalized medicine, what the future holds for us, as well as the problems that can arise with this approach.
2 20.03.23 Dr. Iris Levon Continuation of the introduction: What is being done today in the world in the field of personalized medicine
3 27.03.23 Dr. Shai Rosenberg Bioinformatics:

During the class, an introduction to deep sequencing from the bioinformatic point of view will be given, examples of bioinformatic analysis of deep sequencing applications that assist in the diagnosis and treatment of personalized medicine will be presented, and several methods for data integration in advanced analyzes will be reviewed. Finally, we will discuss the challenges that personalized medicine poses to bioinformatics.

2-15.04.23 Passover holiday

4 17.04.2022 Dr. Shai Rosenberg Bioinformatics: continuation of advanced/future approaches to personalized medicine:

Meaning of genomic changes (DNA) in non-coding regions and their interpretation, integration of various types of genomic changes (mutations, indels, CNV, breakpoint) and predicting their clinical significance. Example - phial algorithm. Using the transcriptome (RNA) to identify therapeutic targets. Example - use of network theory to identify a bottleneck of master regulators. Integration of DNA and RNA analysis to identify treatment targets for combining several drugs. Example - SIMS algorithm and SPRING research

24.04.23 the eve of Memorial Day

5 01.05.2023 Dr. Iris Levon Personalized medicine in brain tumors: what has happened in the last 10 years in the field of brain tumors. What are the accepted molecular tests in brain tumors. How has this changed the method of differentiation.

08.05.2023 Dr. Dana Eckstein Personalized medicine in epilepsy: a representative of developments in personalized medicine in epilepsy, starting with molecular etiological diagnostics, through a careful semiological diagnosis of epileptic seizures to pharmacogenetics, and we will discuss the ever-expanding clinical implications of these developments.

05.15.2023 Dr. Dana Eckstein Personalized Medicine Epilepsy: - continued

6. 22.05.2023 Prof. Sara Eyal Pharmacogenetics: the meetings will briefly review the processes that affect the movement of drugs in the body and their action. Later, the possible effects of genetic variation on these processes will be presented. In addition, participants will receive an article to read that will serve as a basis for class discussion.

7. 29.05.2023 Prof. Sara Eyal Pharmacogenetics: Continued...

06.05.2023 Prof. Adi Vakanin Diagnosis and personalized treatment of neuroimmunological diseases

Today we treat a number of inflammatory diseases that affect the brain and spinal cord. The accurate diagnosis and follow-up between the different types is critical to preventing disability. He has about 20 different treatments and today the decision is made personally for the individual patient according to: training profile, imaging, and stimulating potentials. We anticipate that in the near future more advanced methods of genetic profiling and extensive immunological panels will be used, which are currently only used in research.

10 12.06.2023

Prof. David Arkadir Personalized medicine in Parkinson's: we will present how from a disease that was considered a disease with a single etiology, the innovations in the genetic field revealed different etiologies. During the lectures we will review the

various etiologies and future treatment according to the gene involved in the individual patient.
12. 19.06.2023 Dr. Benny Oliel Personalized medicine in Alzheimer's and dementia: We will present the complexity of the pathophysiology of the disease, the many and synergistic risk factors as well as the different and diverse etiologies, including the genetic complexity of the disease.
We will review the new biomarkers used in the diagnosis of the disease, and discuss the possibilities that open up as a result of this for the future of treatment - tailoring treatment to patients according to the appropriate profile for each one.
13 26.06.2023
Prof. Adi Vakanin and Dr. Iris Levon explanation of final exam and summary

<u>*Required Reading:*</u>
will be advice during the lectures

<u>Additional Reading Material:</u>

<u>Course/Module evaluation:</u>
End of year written/oral examination 50 %
Presentation 0 %
Participation in Tutorials 10 %
Project work 0 %
Assignments 0 %
Reports 0 %
Research project 0 %
Quizzes 0 %
Other 40 %
final assignment

<u>*Additional information:*</u>