DEPARTMENT OF MEDICINE, HUDDINGE

H7F5309, Cancer and Cancer Stem Cells, 1.5 credits (hec)

Cancer och cancerstamceller, 1,5 högskolepoäng

Third-cycle level / Forskarnivå

Approval

This syllabus was approved by the The Committee for Doctoral Education on 2023-12-07, and was last revised on 2024-02-12. The revised course syllabus is valid from autumn semester 2024.

Responsible department

Department of Medicine, Huddinge, Faculty of Medicine

Prerequisite courses, or equivalent

Basic knowledge in Cancer Biology and Cell Biology.

Purpose & Intended learning outcomes

Purpose

The purpose of the course is to deepen the participant's knowledge in the concept of cancer stem cells and understand the necessity of targeting cancer stem cells directly in cancer treatment. The course will provide a historical perspective of the discovery of cancer stem cells. It will then focus on current research in the field and methods to detect cancer stem cells in solid tumors and hematological cancers. Finally, the therapeutical applicability of targeting cancer stem cells specifically will be discussed.

Intended learning outcomes

After completion of the course, the participants should be able to:

1) Explain the concept of cancer stem cells and the implications for the hallmarks of cancer, cancer development and cancer evolution

2) Analyze and compare the core assays to determine stemness of cancer cells, as well as technologies to identify these cancer stem cells

3) Discuss the challenges of cancer therapy in light of the cancer stem cell concept

4) Integrate the obtained knowledge into their own research project

Course content

The course covers key principles of cancer development and cancer therapies and provides an appreciation for the concept of cancer stem cells and its implications from a clinical and basic science perspective. This includes a general overview of molecular and cellular mechanisms underlying cancer development, drug resistance, disease relapse, cancer stem cells, therapeutic stem cell transplantation and clinical care for the treatment of solid tumors and leukemia, immunological cancer-related considerations, and perspectives for novel cancer therapies. The participant will be required to take an active part in this course by contributing with presentations and discussions related to cancer and cancer stem cells.

Forms of teaching and learning

Teaching and Learning Activities

The pedagogic frame of this course is based on lectures combined with topic-related research articles and learning activities such as small group discussions, 1-minute reflections, quizzes and similar exercises that shall foster student-centered learning. The course includes workshops where the students are requested to present articles, integrate the knowledge acquired from lectures and reading of the articles, and actively discuss their acquired knowledge in small groups. Each student will research, prepare, and present his or her examination task orally.

Language of instruction

The course is given in English

Grading scale

Pass (G) /Fail (U)

Compulsory components & forms of assessment

Compulsory components

The lectures and discussions are mandatory. Absence is compensated according to the instructions of and in agreement with the course director.

Forms of assessment

The individual performance of each student will be evaluated separately based on their presentation of a cancer stem cell-related topic and the feedback the students provide to their fellow students. The content and organization of the presentation and discussion will follow a format provided by the instructors.

Course literature

Course Literature

The course literature will consist of recent articles on selected topics within the field of cancer and cancer stem cells. These will be updated prior to the course based on speakers for the course and current publications. Examples of recommended articles:

1) Hanahan, D.; Weinberg, R.A. Hallmarks of cancer: the next generation. Cell 2011, 144, 646674, doi:10.1016/j.cell.2011.02.013.

2) Batlle, E.; Clevers, H. Cancer stem cells revisited. Nat Med 2017, 23, 1124-1134, doi:10.1038/nm.4409.

3) Bleijs, M.; van de Wetering, M.; Clevers, H.; Drost, J. Xenograft and organoid model systems in cancer research. EMBO J 2019, 38, e101654, doi:10.15252/embj.2019101654.

4) Yamashita, M.; Dellorusso, P.V.; Olson, O.C.; Passegue, E. Dysregulated haematopoietic stem cell behaviour in myeloid leukaemogenesis. Nature reviews. Cancer 2020, 20, 365-382, doi:10.1038/s41568-020-0260-3.

5) Walcher, L.; Kistenmacher, A.K.; Suo, H.; Kitte, R.; Dluczek, S.; Strauss, A.; Blaudszun, A.R.; Yevsa, T.; Fricke, S.; Kossatz-Boehlert, U. Cancer Stem Cells-Origins and Biomarkers: Perspectives for Targeted Personalized Therapies. Front Immunol 2020, 11, 1280, doi:10.3389/fimmu.2020.01280.

Additional articles for journal clubs and debate sessions will be given by the course organizers prior to the course.