

## MF9235 Molecular Cancer Medicine, 10 credits, fall

Weeks: 41-44 2021. Oct. 10.- Nov 4.

**Lectures and journal clubs:** All lectures and journal clubs is in Auditorium J3053 or classroom J3055 located adjacent to each other in the Radiation Biology Building, The Norwegian Radium Hospital Campus. Room booking contact: Eric Sundqvist. [eric@oslomet.no](mailto:eric@oslomet.no) , Administrative contact: Rut Fjeldberg [rfjelber@ous-hf.no](mailto:rfjelber@ous-hf.no)

**Course information:** All information, and links to lectures and journal clubs are found on Canvas.

**Course responsible:** Tor Erik Rusten, [t.e.rusten@medisin.uio.no](mailto:t.e.rusten@medisin.uio.no) , UiO course administration: Bjørnar Ones Storeng [b.o.storeng@medisin.uio.no](mailto:b.o.storeng@medisin.uio.no)

**Exam:** Passed student presentation (Week 43) and written home exam 4 weeks deadline. <https://www.uio.no/tjenester/it/digital-undervisning/underviser/pedagogiske-tips/eksamen/index.html>

**Course description:** MF9235 "Molecular Cancer Medicine" <https://www.uio.no/studier/emner/medisin/med/MF9235/>  
Curriculum: Lectures, research articles and chapter 1-7 + 13-15 in text book: The Biology of Cancer, 2<sup>nd</sup> edition, Robert A. Weinberg. Available at Akademika, Blindern, UiO.

### The lectures are of three levels:

**Basic concepts and background (text book):** These lectures are based on the text book "the Biology of Cancer" 2<sup>nd</sup> edition. Please use figures from the book when assigned chapters for teaching. They are provided with the book as a DVD. **Purpose:** To ensure background knowledge is in place for more advanced lectures.

**Current research and techniques:** These lectures are based on current frontline research from the researchers own field and research. Bring the students up to the frontline of research. Emphasize which techniques that are particularly important and used with the intent to make the students able to critically evaluate the research results and approaches. Base your lecture on the relevant chapter in the text book if existent, but feel free to use your own research and other papers/reviews as a base for the teaching material. **Purpose:** Bring the students to the forefront of the research in your field of expertise with emphasis on particular techniques used.

**Articles with group work/journal club:** Select a central research paper from your field and, optional a central review that makes the field and paper easier to understand. The students will study the paper the day before the "Journal club session" that you will lead. I will assist you in the session. We will provide critical questions that the students will discuss and answer in the first 45 minutes. The last 45 minutes, we will go through the answers with the students. The purpose of this session is to equip the students with skills to critically evaluate the frontline work in your field with respect to questions addressed, techniques, results and interpretations. **Purpose:** The students should be able to critically evaluate the work and *rudimentary* design their own project in your field.

**Site visits:** The purpose of the site visit is to meet the experts actively using techniques to: establish personal contacts, ask direct questions and increase understanding of what it takes to perform certain experiments and foster future collaboration.

Week 41

45 min lectures	Monday Oct 10	Tuesday Oct 11	Wednesday Oct 12	Thursday Oct 13	Friday Oct 14
	<p><b>The Nature of Cancer</b> Chapter 1+2+3+ articles</p> <p>Classroom: J3055</p>	<p><b>Cancer Genomics Research</b> +articles</p> <p>Classroom: J3055</p>	<p><b>Oncogenes and Tumor Suppressors</b> Chapter 4 + 7 + Research + articles</p> <p>Auditorium: J3053</p>	<p><b>Growth Factors, Receptors and Invasion.</b> Chapters 5+6+14 Research + articles</p> <p>Classroom: J3055</p>	<p><b>Membrane trafficking and tumorigenesis</b> Research +articles</p> <p>Auditorium: J3053</p>
09:00	<p>Welcome &amp; practical information.</p> <p>The Nature of Cancer</p> <p><b>TE Rusten</b></p>	<p>Journal club: Gene regulation &amp; epigenetics cancer</p> <p><b>Preparation</b></p> <p><b>Eskeland, and Rusten</b></p>	<p>Journal club: Cancer genomics</p> <p><b>Preparation</b></p> <p><b>Lorenz and Rusten</b></p>	<p>Journal club: Oncogenes and tumor suppressors</p> <p><b>Preparation</b></p> <p><b>Rusten</b></p>	<p>Journal club: Cell signaling and Cancer</p> <p><b>Preparation</b></p> <p><b>Wesche, Haugsten and Rusten</b></p>
10:00	<p>The heritability of Cancer. Tumor viruses. Cancer Syndromes I <b>TE Rusten</b></p>	<p>Journal club: Gene regulation &amp; epigenetics cancer.</p> <p><b>Eskeland, and Rusten</b></p>	<p>Journal club: Cancer genomics .</p> <p><b>Lorenz and Rusten</b></p>	<p>Journal club: Articles: Oncogenes and tumor suppressors</p> <p><b>Rusten</b></p>	<p>Journal club: Cell signaling and Cancer <b>Wesche, Løchen Haugsten and Rusten</b></p>
11:00	<p>The heritability of Cancer. Tumor viruses. Cancer Syndromes II <b>TE Rusten</b></p>	<p>Genomics in Cancer Research</p> <p>Research</p> <p><b>S. Lorenz</b></p>	<p>Oncogenes <b>TE Rusten</b></p> <p>Chapter 4</p>	<p>Growth Factor Receptors and Cancer <b>Ellen M. Haugsten</b></p> <p>Chapter 5 + 6</p>	<p>Membrane trafficking in Cancer I <b>Nina Marie Pedersen, L. Malerød</b></p>
12:00	Lunch	Lunch	Lunch	Lunch	Lunch
13:00	<p>Epigenetic regulation of gene expression.</p> <p><b>R. Eskeland</b></p>	<p>Genomics in Cancer Research</p> <p>Techniques</p> <p><b>S. Lorenz</b></p>	<p>Tumor Suppressors <b>TE Rusten</b></p> <p>Chapter 7</p>	<p>Cell signaling. <b>Ellen M. Haugsten</b></p> <p>Chapter 5 + 6</p>	<p>Membrane integrity in Cancer <b>Marina Vietri</b></p>
14:00	<p>Epigenetics and cancer</p> <p><b>R. Eskeland</b></p>	<p>Site visit in the sequencing facility</p>	<p>Journal club preparation</p>	<p>Cell signaling and Cancer <b>E. M. Haugsten</b></p>	<p>Journal club preparation</p>
15:00	<p>Journal club preparation</p>	<p>Journal club preparation</p>	<p>Journal club preparation</p>	<p>Invasion and metastasis <b>J. Wesche</b></p> <p>Chapter 14 + research articles</p>	<p>Journal club preparation</p>

Uke 42

45 min lectures	<b>Monday Oct 17</b>	<b>Tuesday Oct 18</b>	<b>Wednesday Oct 19</b>	<b>Thursday Oct 20</b>	<b>Friday Oct 21</b>
	<b>Autophagy and metabolism</b> Research + articles  Auditorium: J3053	<b>Models in Cancer Research</b> Research + articles  Auditorium: J3053	<b>Models and techniques in Cancer Research</b> Research + articles K06-120 6th floor, IKF		
09:00	Journal club: Membrane trafficking and cancer <b>Preparation Vietri, Rusten</b>	Journal club preparation	Journal club: Model organisms <b>Preparation Nathalia Chica, C. Dillard and Rusten</b>	Journal club preparation	Journal club preparation
10:00	Journal club: Membrane trafficking and cancer. <b>Vietri, Rusten</b>	Journal club preparation	Journal club: Model organisms  <b>Nathalia Chica, C. Dillard and Rusten</b>	Journal club preparation	Journal club preparation
11:00	Cancer metabolism. <b>Laura Rodriguez de la Ballina</b>	Journal club: Cancer metabolism <b>Moncho, de la Ballina and Rusten</b>	Mouse as a model system in cancer research  <b>Helga Bergholtz</b>	Journal club preparation	Journal club preparation
12:00	Lunch	Journal club: Cancer metabolism <b>Moncho, de la Ballina and Rusten</b>	Zebrafish as a model system in cancer research  <b>Arja Løken</b>	Journal club preparation	Journal club preparation
13:00	Autophagy and Cancer <b>Laura C. T. Moncho</b>	Fusion proteins, live imaging. <b>K.O. Schink</b>	Journal club preparation	Journal club preparation	Journal club preparation
14:00	Journal club preparation	Yeast as a model system in cancer research <b>Nathalia Chica</b>	Journal club preparation	Journal club preparation	Journal club preparation
15:00	Journal club preparation	Drosophila as a model system in cancer research <b>C. Dillard</b>	Journal club preparation	Journal club preparation	Journal club preparation

Uke 43

45 min lectures	Monday Oct 24	Tuesday Oct 25	Wednesday Oct 26	Thursday Oct 27	Friday Oct 28
	<b>Techniques in Cancer Research</b> Research + articles  Auditorium: J3053	<b>Techniques in Cancer Research</b> Research + articles  Auditorium: J3053	<b>Tumor – host interactions</b> Chapter 13 + Research + articles  Auditorium: J3053	<b>Techniques in Cancer Research</b> Research + articles  Auditorium: J3053	<b>Cancer and Immunity</b> Chapter 15 + Research + articles  Auditorium: J3053
09:00	Journal club: Model systems in Cancer. <b>Preparation</b>  <b>Bergholtz, Løchen and Rusten</b>	Bioinformatics and integration in Cancer Biology <b>S. Nakken</b>	Journal club: <b>Preparation</b>  <b>Andersen, Nakken and TE Rusten</b>	Journal club: Tumor-Host interactions <b>Preparation</b>  <b>Dillard, Khezri and Rusten</b>	Journal club: Screens in Cancer Biology <b>Preparation</b>  <b>Llorente and Rusten</b>
10:00	Journal club: Model systems in Cancer. <b>Bergholtz, Løchen and Rusten</b>	Bioinformatics and screen data interpretation.  <b>A. Andersen</b>	Journal club: <b>Andersen, Nakken and TE Rusten</b>	Journal club: Cancer Cachexia <b>Dillard, Khezri and Rusten</b>	Journal club: Screens in Cancer Biology J <b>Llorente and Rusten</b>
11:00	Genetic screens in cell and cancer biology <b>Amani al Outa</b>	<b>Amani al Outa, Herrera and Rusten</b>  Journal club: CRISPR screens in Cancer Research <b>Preparation</b>	Short range tumor-host interactions Tumor-Microenvironment <b>C. Dillard</b>	Human cells and organoids. <b>V. Lobert</b>	Journal club preparation
12:00	Lunch	Lunch	Lunch	Lunch	Lunch
13:00	Proteomics and phosphoproteomics  <b>Tuula Nyman</b>	<b>Amani al Outa, Herrera and Rusten</b>  Journal club: CRISPR screens in Cancer Research	Long distance tumor host interactions. Cancer Cachexia  <b>R. Khezri</b>	Clinical applications of extracellular vesicles in cancer.  <b>Alicia Llorente</b>	Cancer and Immunity <b>S. Wälchli</b>  Chapter 15
	Journal club preparation	Journal club preparation	Journal club preparation	Journal club preparation	Cancer Immune therapy. CAR-T technology. <b>S. Wälchli</b>

15:00	Pharmacological and CRISPR screens in cancer biology - Leukemia <b>Carmen Herrera</b>	Journal club preparation	Journal club preparation	Journal club preparation	New opportunities in cell based cancer immune therapy  <b>Johanna Olweus</b>
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Uke 43

45 min lectures	Monday Oct 31	Tuesday Nov 1	Wednesday Nov 2	Thursday Nov 3	Friday Nov 4
	<b>Rational treatment of Cancer</b> Chapter 16 + Research + articles  Auditorium: J3053	Research + articles  Auditorium: J3053	<b>Student presentations/exams</b>  Auditorium: J3053	<b>Student presentations/exams</b>  Auditorium: J3053	<b>Student presentations/exams</b>  Auditorium: J3053
09:00	Rational Cancer therapy  Molecular classification of breast cancer and implications for cancer therapy <b>T. Sørlie</b>	Journal club: Rational Cancer therapy <b>Preparation</b> <b>Sørlie, Arias, Fløisand and Rusten</b>	Preparation & Discussion	Preparation & Discussion	Preparation & Discussion
10:00	Journal club: Cancer and Immunity <b>Preparation</b> <b>Wälchli and Rusten</b>	Group work articles  Rational Cancer therapy <b>Sørlie, Arias, Fløisand and Rusten</b>	Preparation & Discussion	Preparation & Discussion	Preparation & Discussion
11:00	Group work articles  CART-T <b>Wälchli and Rusten</b>	The future of Cancer Research. <b>TE Rusten</b>	Student presentations	Student presentations	Student presentations
12:00	Lunch	Summary and feed back  <b>TE Rusten</b>	Lunch	Lunch	Lunch
13:00	Rational Cancer Therapy Leukemia. <b>Y. Fløisand</b>	Journal club preparation	Student presentations	Student presentations	Student presentations
14:00	Journal club preparation	Journal club preparation	Student presentations	Student presentations	Student presentations
15:00	Journal club preparation	Journal club preparation	Student presentations	Student presentations	Student presentations

Status:

Lecturer	Email	Article(s)	Phone	Status
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#### Journal club:

#### Deconstructing articles:

Suggested questions below. You are entirely free to design the questions otherwise:

1. What is the central question addressed in this article?
  - a) Briefly explain the background leading up to the studies.
  - b) What is the outstanding question(s)? How do they narrow down the questions to something addressable?
2. What is the strategy taken to answer the question at hand?
  - a) What model system?
  - b) Logic and sequence of experiments?
  - c) Techniques used?

Are the techniques used appropriate? Are there other techniques that could have been used or are better?
3. What are the conclusions drawn?
  - a) Are they well founded? Substantiate your opinion.
  - b) Can you identify any shortcomings?
4. Can you think of applications of the techniques or approaches used that will benefit your own work?