



## Schedule TUMOR BIOLOGY 15 hp

- Course time: **November 2, 2020 – January 19, 2020**
- Course code: 5MO102/3MB034
- Lecture hall: The lectures and discussions are either in **lecture room Thymine + Uracil (T+U)** (room 6K-148) at the Department of Molecular Biology, in the **Astrid Fagreus lecture hall (A F)** (room 6A-103) or by **Zoom** meeting. Please note that additional lectures may change to Zoom with short notice due to covid-19 restrictions or other reasons.
- Laboratories: Laboratory experiments are in the **Green Lab + Green Annex**. The time schedule for the laboratory experiments is approximate, because of many variables (planning, skills, speed, etc.)
- Requirements: 1) Content of textbook "The Biology of Cancer" 2<sup>nd</sup> edition by Robert A. Weinberg (2013) Publisher: Garland Science. ISBN 9780815342205 (softcover) and lectures.  
2) Laboratory experiments emanating in reports in the form of a synopsis (Laboratory experiment 1) and a scientific paper (Laboratory experiment 2)
- Examination: **Written Test**, 13.00-17.00 December 2, 2020 in Östra Paviljongen.  
**Laboratory experiment reports**
- Course leaders: Thomas Grundström (TG) [thomas.grundstrom@umu.se](mailto:thomas.grundstrom@umu.se) tel. 785 2531, 072-7055603  
Jenny Persson (JP) [jenny.persson@umu.se](mailto:jenny.persson@umu.se) tel. 785 0814, 070-6391199
- Administrator: Ingela Nilsson [ingela.nilsson@umu.se](mailto:ingela.nilsson@umu.se) tel. 785 2869  
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- Lecturers: Sofie Degerman (SD) [sofie.degerman@umu.se](mailto:sofie.degerman@umu.se)  
Thomas Grundström (TG) [thomas.grundstrom@umu.se](mailto:thomas.grundstrom@umu.se)  
Jenny Persson (JP) [jenny.persson@umu.se](mailto:jenny.persson@umu.se)  
Daniel Öhlund (DÖ) [daniel.ohlund@umu.se](mailto:daniel.ohlund@umu.se)
- Duty to attend: All laboratory experiments, discussion of Tumor Biology problems and the written test. In case of illness, report to **Martuza Sarwar** concerning **laboratory experiments** or the course leader concerning **discussions of Tumor Biology problems** as soon as possible, preferably by e-mail.

## WEEK 45

<b>Mo 2/11</b>	9.00 – 9.45 <b>T+U</b> 12.00– 14.45 <b>Zoom</b>	<b>Registration, course information and study technique (JP)</b> <b>L1-Genetics.</b> Chap. 1 (TG).
<b>Tu 3/11</b>	9.00 – 12.00 <b>A F</b>	<b>L2-Nature of Cancer/Histopathology</b> Chap. 2 (JP)
<b>We 4/11</b>	9.00 – 12.00 <b>Zoom</b>	<b>L3-Tumor Viruses</b> Chap. 3 (TG)
<b>Th 5/11</b>	9.00 – 12.00 <b>A F</b>	<b>Discussion of Tumor Biology problems</b> (MS)
<b>Fr 6/11</b>	9.00 – 12.00 <b>Zoom</b>	<b>L4- Cellular Oncogenes</b> Chap. 4 (DÖ)

## WEEK 46

<b>Mo 9/11</b>	9.00 – 12.00 <b>Zoom</b>	<b>L5- Growth Factors, Receptors.</b> Chap. 5 (TG)
<b>Tu 10/11</b>	9.00 – 12.00 <b>Zoom</b>	<b>L6- Cytoplasmic signaling.</b> Chap. 6 (TG)
<b>We 11/11</b>	9.00 – 10.30 <b>T+U</b> 12.00 – 15.00 <b>Zoom</b>	<b>Introduction to Laboratory section of Tumor Biology and to Laboration 1</b> (MS/TW) A separate more detailed laboratory section schedule will be given <b>L7- Tumor Suppressor Genes.</b> Chap.7 (TG)
<b>Th 12/11</b>	9.00 – 12.00 <b>Zoom</b> 13.00 – 16.00	<b>L8- p53 and apoptosis.</b> Chap. 9 (DÖ) <b>Laboration 1</b> (MS/TW)
<b>Fr 13/11</b>	9.00 – 12.00 13.00 – 14.00 <b>T+U</b>	<b>Laboration 1</b> (MS/TW) Discussion about lab. 1-how to present the data. (JP/MS/TW)

## WEEK 47

<b>Mo 16/11</b>	8.00 – 15.00	<b>Laboration 1</b> (MS/TW) [Adding dyes and microscopy]
<b>Tu 17/11</b>	9.00 – 12.00 <b>Zoom</b> 13.00 – 16.30 <b>Zoom</b>	<b>L9- pRb and the Cell Cycle.</b> Chap. 8 (JP) <b>Discussion of Tumor Biology problems</b> (MS)
<b>We 18/11</b>	9.00 – 12.00 <b>Zoom</b>	<b>L11-Multistep Tumorigenesis.</b> Chap. 11 (TG)
<b>Th 19/11</b>	9.00 – 12.00 <b>Zoom</b>	<b>L10-Cell immortalization.</b> Chap. 10 (SD)
<b>Fr 20/11</b>	9.00 – 12.00 <b>Zoom</b> 17.30	<b>L12-Genomic Integrity.</b> Chap. 12 (TG) <b>Lab report 1 deadline.</b> Send by email, format .pdf. State group number in the subject field

## WEEK 48

<b>Mo 23/11</b>	09.00 – 12.00	<b>T+U</b>	<b>L13-Stroma-Angiogenesis.</b> Chap. 13 (JP)
<b>Tu 24/11</b>	09.00 – 12.00	<b>A F</b>	<b>L14-Invasion and Metastasis.</b> Chap. 14 (JP)
<b>We 25/11</b>	09.00 – 12.30	<b>Zoom</b>	<b>L15- Tumor Immunology and rational Treatment.</b> Chap. 15 and 16 (TG)
<b>Th 26/11</b>	09.00 – 13.00	<b>Zoom</b>	<b>L16- Continuation of Tumor Immunology and rational Treatment.</b> Chap. 15 and 16, <b>Discussion of Tumour Biology problems</b> , Time for questions on the theory part of the course. (TG)
<b>Fr 27/11</b>			<b>Study for Written Test.</b>

### WEEK 49

<b>Mo 30/11</b>			<b>Study for Written Test.</b>
<b>Tu 1/12</b>			<b>Study for Written Test.</b>
<b>We 2/12</b>	13.00 – 17.00		<b>WRITTEN TEST/EXAM in Östra Paviljongen.</b>
<b>Th 3/12</b>	08.30 – 09.30 09.30 – 12.30	<b>T+U</b>	<b>Introduction to Laboration 2 (MS/TW).</b> <b>Laboration 2: Seeding cells for Transfection (MS/TW)</b>
<b>Fr 4/12</b>	08.30 – 12.00		<b>Laboration 2: Transfection (MS/TW)</b>

### WEEK 50

<b>Mo 7/12</b>	09.00 – 15.30		<b>Laboration 2: Protein Lysate collection (MS/TW)</b>
<b>Tu 8/12</b>	08.30 – 16.00		<b>Laboration 2: Seeding and treatment of cells for Proliferation Assay and Cell Cycle Analysis (MS/TW)</b>
<b>We 9/12</b>	09.00 – 12.30 13.30 – 15.30		<b>Laboration 2</b> Whole cell Lysate Preparation and Training of Concentration Measurement & Proliferation Data analysis <b>Laboration 2</b> Whole cell Lysate Preparation and Training of Concentration Measurement & Proliferation Data analysis
<b>Th 10/12</b>	09.00 – 14.00		<b>Laboration 2: Fix cells for Cell Cycle analysis and add MTS for Proliferation analysis (MS/TW)</b>
<b>Fr 11/12</b>	09.00 – 15.30		<b>Laboration 2: Stain cells for Cell Cycle analysis with Flow cytometer (MS/TW), Training on the Example Cell Cycle Data (MS/TW).</b>

### WEEK 51

<b>Mo 14/12</b>	09.00 – 17.00	<b>Laboration 2</b> Western Blotting (MS/TW)
<b>Tu 15/12</b>	09.00 – 17.00	<b>Laboration 2:</b> Western Blotting Continued (MS/TW), Training on the Image J software for Western Blotting
<b>We 16/12</b>	09.00 – 13.30	<b>Laboration 2:</b> Western Blotting, Discussion about lab. 2- how to present the data (MS/TW)
<b>Th 17/12</b>	09.00 – 12.00	<b>Laboration 2</b> Discussion/training of data analysis for Lab 2 (MS/TW)
<b>Fr 18/12</b>	09.00 – 13.30	<b>Laboration 2</b> (If needed) (MS/TW) <b>Writing of reports.</b>
<b><u>WEEK 52</u></b>		
		<b>Writing of reports.</b>
<b><u>WEEK 53</u></b>		
		<b>Writing of reports.</b>
<b><u>WEEK 1</u></b>		
		<b>Writing of reports.</b>
<b><u>WEEK 2</u></b>		
<b>Mo 11/1</b>	9.00-17.00 Zoom	<b>Lab seminars. Presentation of reports on laboration 2 and discussion of the reports and the presentations. Course evaluation.</b>
<b>Tu 12/1</b>		<b>Time to correct/improve reports</b>
<b>We 13/1</b>		<b>Time to correct/improve reports</b>
<b>Th 14/1</b>		<b>Time to correct/improve reports</b>
<b>Fr 15/1</b>	<b>17.00</b>	<b>Time to correct/improve reports</b> <b>Deadline.</b> Lab report 2 due (emailed). Send by email, format .pdf. State group number in the subject field.
<b>Sa 16/1</b>		<b>WRITTEN RE-EXAMINATION</b> Time and locality not yet decided.