

NCMM Molecular Medicine Research Course

- Course no.: MF9120BTS Molecular Medicine (national PhD-level course)
- <u>Time</u>: November 9-20, 2020
- Place: Digital course via zoom (see daily plan)
- <u>Organized by</u>: Centre for Molecular Medicine Norway, Nordic EMBL Partnership, University of Oslo and Oslo University Hospital

Topics and Programme

- 1. Disease mechanisms and development (7 h)
 - a. Targeting signaling pathways in cancer (1h, Sigrid Skånland)
 - b. Inflammation (2h, Bente Halvorsen/Espen Melum)
 - c. Metabolic diseases, diabetes (1h, Pål Njølstad)
 - d. Epigenetics and chromatin structure (1h, Nikolina Sekulic)
 - e. DNA repair mechanisms (1h, Hilde Nilsen)
 - f. Disease mechanism and risk factors of venous thrombosis (1h, Lynn Butler)

2. Animal models of disease (3.5 h)

- a. Stem cells and organoids (1h, Judith Staerk)
- b. Disease mechanisms and animal models of cardiovascular disease (1.5h, Andreas Romaine /Arne Olav Melleby)
- c. The use of zebrafish to model and understand mechanisms underlying neurological disorder (1h, Camila Esguerra)

3. Biobanks, health registries and biomarker discovery (4 h)

- a. Use of population biobanks to understand human disease (1h, Kristian Hveem)
- b. Predictive medicine: Use of health registries and epidemiology (1h, Trude E. Robsahm)
- c. Cancer biomarkers (1h, Laxmi Silwal-Pandit)
- d. Biomarkers for early diagnosis and management of heart diseases (1h, Torbjørn Omland)

4. Imaging disease (4 h)

- a. Introduction to imaging modalities (1h, Lars Tore Gyland Mikalsen)
- b. Imaging cardiovascular diseases in animal models and patients (2h, Bill Louch/Magnus Arnonsen)
- c. Brain MR imaging in schizophrenia and bipolar disorder (1h, Ole Andreassen)

5. <u>Structure-based drug discovery</u> (4.5 h)

a. Basics of Chemical Biology and High throughput screening (0.5h, Johannes Landskron)



- b. Introduction to structural biology (1h, Hartmut Luecke)
- c. Introduction to cryoEM in drug design (1h, Eva Cunha)
- d. Drug development in the pharmaceutical industry (1h, Herbert Nar, BI)
- e. Molecular dynamics studies (1h, Matteo Dal Peraro, EPFL)

6. Tailored and personalized medicine (7 h)

- a. Precision medicine in everyday practice rare diseases (1h, Dag Undlien)
- b. Precision cancer medicine, implementation and the IMPRESS-Norway trial (1h, Kjetil Taskén)
- c. Drug sensitivity testing and personalized medicine (2h, Krister Wennerberg/ Bjørn Tore Gjertsen)
- d. Utilizing common genetic variation to predict disease predisposition (2h, Samuli Ripatti, Elisabeth Widen)
- e. Nano-medicine (1h, Irep Gözen)

7. Advanced cell-based therapies (4 h)

- a. Stem cells and their niche as a basis for future therapies (1h, Lorena Arranz)
- b. Cell based therapies in medicine Laboratory work flow and clinical practice in cancer treatment (1h, Else Marit Inderberg)
- c. T cell receptor engineering and T cell therapies in cancer (1h, Johanna Olweus)
- d. Stem cell treatment in diabetes (1h, Hanne Scholz)

8. <u>Computational biology</u> (6 h)

- a. Biostatistics and epidemiology (1h, Arnoldo Frigessi)
- b. Single cell genomics (1h, Oliver Stegle)
- c. Novel analytics in personalized medicine (2 h, Anthony Mathelier/Marieke Kuijjer)
- d. Deep learning in biomedicine (1h, Esa Pitkänen)
- e. Germline vs somatic mutations: commonalties, distinctions and interplay (1h, Sebastian Waszak)

9. SARS-CoV-2 detection, vaccination and drug targeting (2.5 h)

- a. SARS-CoV-2 a study of replication and immunity (1h, Christine Hanssen Rinaldo, UiT)
- b. Vaccine strategies (1h, Gunnveig Grødeland, KG Jebsen Center)
- c. Inhibitor development for M^{pro}, the main protease of SARS-CoV-2 (0.5h, Joel Heim)

10. Organizational

a. Introduction and organization (30 min, Elisa Bjørgo)



Week 1 Schedule; NCMM Molecular Medicine Research Course

Date	Room	Time	Торіс	Title	Lecturer
09.11.2020	Zoom	09.10	Organizational	Info & organization	Elisa Bjørgo
		09.25	BREAK		
09.11.2020	Zoom	09.30 - 10:15	Disease mechanisms	DNA repair mechanisms	Hilde Nilsen
		10.15 - 12.15	BREAK		
09.11.2020	Zoom	12.15 – 13.15	Disease mechanisms	Targeting signaling pathways in cancer	Sigrid Skånland
		13.15 - 14.00	BREAK		
09.11.2020	Zoom	14.00 - 15.00	Disease mechanisms	Metabolic diseases, diabetes	Pål Njølstad
10.11.2020	Zoom	09.00 - 09.45	Disease mechanisms	Epigenetics and chromatin structure	Nikolina Sekulic
		09.45 - 10.00	BREAK		
10.11.2020	Zoom	10.00 - 10.45	Tailored and personalized medicine	Precision cancer medicine, implementation and the IMPRESS-Norway trial	Kjetil Taskén
		10.45 - 11.15	BREAK		
10.11.2020	Zoom	11.15 - 12.00	Tailored and personalized medicine	Precision medicine in everyday practice - rare diseases	Dag Undlien
		12.00 - 13.45	BREAK		
10.11.2020	Zoom	13.45 – 14.30	Tailored and personalized medicine	Drug sensitivity testing and personalized medicine in leukemia	Krister Wennerberg
		14.30 - 14.45	BREAK		
10.11.2020	Zoom	14.45 – 15.30	Tailored and personalized medicine	Drug sensitivity testing and personalized medicine in leukemia	Bjørn Tore Gjertsen
11.11.2020	Zoom	09.15 - 10.00	Imaging disease	Introduction to imaging modalities	Lars Tore Gyland Mikalsen
		10.00 - 11.00	BREAK		
11.11.2020	Zoom	11.00 - 11.45	Imaging disease	Imaging cardiovascular diseases in animal models and patients	William Louch
		11.45 - 12.00	BREAK		
11.11.2020	Zoom	12.00 - 12.45	Imaging disease	Imaging cardiovascular diseases in animal models and patients	Magnus Aronsen
		12.45 - 14.00	BREAK		
11.11.2020	Zoom	14.00 - 14.45	Disease mechanisms	Inflammation - the fuel in atherosclerosis	Bente Halvorsen
		14.45 - 15.00	BREAK		
11.11.2020	Zoom	15.00 - 15.45	Disease mechanisms	Gut and liver inflammation	Espen Melum



12.11.2020	Zoom	09.00 - 10.00	Animal models of disease	Stem cells and organoids	Judith Staerk
		10.00 - 11.00	BREAK		
12.11.2020	Zoom	11.00 - 11.45	Animal models of disease	Disease mechanisms and animal models of cardiovascular disease	Andreas Romaine
		11.45 - 12.00	BREAK		
12.11.2020	Zoom	12.00 - 12.30	Animal models of disease	Disease mechanisms and animal models of cardiovascular disease	Arne Olav Melleby
		12.30 - 13.45	BREAK		
12.11.2020	Zoom	13.45 –14.30	Advanced cell-based therapies	Stem cells and their niche as a basis for future therapies	Lorena Arranz
		14.30 - 14.45	BREAK		
12.11.2020	Zoom	15.00 - 15.45	Tailored and personalized medicine	Nano-medicine	lrep Gözen
13.11.2020	Zoom	09.15 - 10.15	Disease mechanisms	Disease mechanism and risk factors of venous thrombosis	Lynn Butler
		10.15 - 11.00	BREAK		
13.11.2020	Zoom	11.00 - 11.45	Animal models in disease	The use of zebrafish to model and understand mechanisms underlying neurological disorder	Camila Esguerra
		11.45 - 13.00	BREAK		
13.11.2020	Zoom	13.00 - 13.45	Tailored and personalized medicine	Genomics in Disease Prevention and Management	Samuli Ripatti
		13.45 - 14.00	BREAK		
13.11.2020	Zoom	14.00 - 14.45	Tailored and personalized medicine	Genomics in Action: Preventing Ischemic Heart Disease	Elisabeth Widen

Week 2 Schedule; NCMM Molecular Medicine Research Course

Date	Room	Time	Торіс	Title	Lecturer
16.11.2020	zoom	09.15 - 10.15	Advanced cell-based	Cell based therapies –	Else Marit
			therapies	Laboratory work flow and clinical practice	Inderberg
		10.15 - 11.00	BREAK		
16.11.2020	zoom	11.00 - 11.45	Biobanks, health	Cancer biomarkers: from	Laxmi Silwal-Pandit
			registries and biomarker	discovery to clinical practice	
			discovery		
		11.45 - 12.00	BREAK		
16.11.2020	zoom	12.00 - 12.45	Advanced cell- based	Stem cell treatment in	Hanne Scholz
			therapies	diabetes	
		12.45 - 14.00	BREAK		
16.11.2020	zoom	14.00 - 15.00	Imaging disease	Brain MR imaging in	Ole Andreassen
				schizophrenia and bipolar	
				disorder	



17.11.2020 room 09.00 - 09.45 Computational Biology Covid-19 and mathematical models Amoldo Frgessi models 17.11.2020 room 10.00 - 10.45 Computational Biology Single cell genomics Oliver Stegle 17.11.2020 room 11.15 - 11.50 REKK Movel analytics in personalized medicine Anthony Mathelier personalized medicine 17.11.2020 room 12.15 - 13.00 Computational Biology Novel analytics in personalized medicine Anthony Mathelier personalized medicine 17.11.2020 room 12.15 - 13.00 Computational Biology Novel analytics in personalized medicine Marieke Kuijer 17.11.2020 room 14.45 - 15.00 BREAK BREAK Base State Mathematical Mathmatical Mathematical Mathmatical Mathematical Mathematical						
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			09.45 - 10.00	BREAK		



20.11.2020	zoom	10.00 - 10.30	SARS-CoV-2 detection, vaccination and drug	Inhibitor development for M ^{pro} , the main protease of	Joel Heim
			targeting	SARS-CoV-2	
		10.30 - 11.00	BREAK		
20.11.2020	zoom	11.00 - 11:45	SARS-CoV-2 detection, vaccination and drug targeting	Vaccine strategies	Gunnveig Grødeland
		11.45 - 12.15	BREAK		
20.11.2020	zoom	12.15 - 13.00	Advanced cell- based therapies	T cell-based immunotherapy in cancer	Johanna Olweus
20.11.2020	zoom	13.00	Organizational	Summary course	Elisa Bjørgo