

Faculty of Medicine
Department of Cancer Research and
Molecular Medicine

Exam MOL8006
Receptor Signalling and Trafficking

Tuesday 3 June, 2010 9.00am-13.00 pm

ECTS credits: 10
Number of pages (included front-page): 2

Examination support: English/ Norwegian or Norwegian/ English dictionary

Answers can be in Norwegian or English

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Exam results: 23 June, 2010
Examination results are announced on <http://studweb.ntnu.no/>

For each question is given a number of points to indicate how the question contributes to the total of **36 points**. Use these as a guide to estimate how much time it is worth spending on each question.

Question 1 (4 points)

What is a nuclear receptor? Describe its domain structure and compare its general mechanism of action with that of cell surface receptors.

Question 2 (4 points)

Outline the Wnt signalling pathway, and mention a cancer type associated with dysregulation of this pathway.

Question 3 (6 points)

How do Toll-like receptors mediate innate immunity?

Question 4 (5 points)

Describe how growth factor receptors are downregulated by endocytosis and lysosomal degradation.

Question 5 (6 points)

A (2 p.) Describe the two main types of neurotransmitter receptors.

B (4 p.) Which roles do the following molecules play in synaptic functions?

- a Dynamin
- b Voltage-gated Ca^{2+} channels
- c Acetylcholinesterase
- d SNARE proteins

Question 6 (5 points)

A (2 p.) Describe how activation of a receptor tyrosine kinase may cause activation of PI 3-kinase.

B (3 p.) Describe one mechanism by which PI 3-kinase controls cell growth.

Question 7 (6 points)

Describe the intrinsic (receptor-independent) apoptotic pathway.