

**Exam MOL3015
Nanomedicine II - Therapy**

Friday May 21th 2012, 9.00 - 13.00

ECTS credits: 7.5

Number of pages (included front-page): 2

Aids: C – Dictionaries/word books allowed

Language: English or Norwegian

Contact person during the exam:

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Exam results: June 13th

Examination results are announced on <http://studweb.ntnu.no/>

Please do not exceed indicated lengths, illustrations do not count, letter size will be considered. Weight of questions is listed. Good luck.

1) Tissue engineering (20pts)

- a) Briefly describe how extracellular matrix (ECM) is organized and why it would be beneficial to recreate ECM in respect to tissue engineering? (10pts, 1page)
- b) Describe three different techniques available for generating porous networks for tissue scaffold? (10pts, 1page)

2) Drug delivery (35pts)

- a) For what reasons do we need drug delivery systems? (5pts, ½ page)
- b) What are the cellular mechanisms responsible for uptake of micro/nanoparticles by cells? (20pts, 2pages)
- c) What are the reasons for introducing polyethylene glycol (PEG) on the surface of drug delivery systems? (5pts, 1/2 page)
- d) Receptor-mediated cancer targeting has failed miserably in clinical settings. Why is cancer targeting so difficult? (5pts, 1/2pages)

3) Nanotoxicology (20pts)

- a) What are the three hallmark processes of cellular toxicity? (5pts, 1/2page)
- b) Phagocytic cells can eat substrates bigger than themselves. What are the biochemical/cell biological consequences of non-degradable particles in tissues? (15pts, 2pages)

The semester paper is 25pts=100total.

Thank you.