



NTNU – Trondheim
Norwegian University of
Science and Technology

Department of Cancer Research and Molecular Medicine

Examination paper for Mol3015 Nanomedicine II - Therapy

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Examination date: 2017-05-27

Examination time (from-to): 0900-1300

Permitted examination support material: D, (Dictionaries allowed)

Other information:

Language: English (Norwegian or English answers)

Number of pages (front page excluded): 1

Number of pages enclosed: 2

Informasjon om trykking av eksamensoppgave

Originalen er:

1-sidig ☐ 2-sidig ☒

sort/hvit ☒ farger ☐

Checked by:

Date

Signature

Please respect the indicated limitations on length of answers. Illustrations do not count. Font size will be considered. The exam is 75%, the semester paper is 25%. Good luck

Question 1 Biomaterials and tissue engineering

- a) What do we mean by a biomaterial and what physicochemical properties of the biomaterial are important for the interaction with cells and tissues? (1page 10pts)
- b) Stem cells in the body grow in densely packed environments called stem cell niches. Describe the types/classes of biological/biochemical components that can be embedded in the scaffold and which are important for stem cell self-renewal and development. Also describe how these components are organized at the nanoscopic level. (2pages, 15pts)

Question 2 Drug delivery systems

- a) What are the advantages and disadvantages of Drug delivery systems? Make lists of keywords. (1/2 page, 5pts)
- b) What general mechanisms (internal and external) can be exploited to achieve controlled release of drugs from a DDS? (2pages, 15 pts)
- c) What other major requirements for the design of nanoparticle carriers should be considered? (2pages 15pts)

Question 3 Nanotoxicology

- a) How is nanotoxicology different from classical toxicology? (1/2 page, 5pts)
- b) What is the role of reactive oxygen species (ROS) in toxicity of nanomaterials? (1 page, 10pts)