O NTNU

Faculty of Medicine
Department of Laboratory Medicine, Children's and Women's Health

WRITTEN EXAMINATION:
MOL3005 Immunology

Tuesday June 8th 2010, 9.00 am - 1.00 pm

ECTS credits: 7.5
Number of pages (including front-page): 3

Examination support: Dictionary (Medical dictionaries or similar dictionaries on biology are not permitted).

Contact person during the exam: Marit Walbye Anthonsen 91897559 / 72573351

Exam results: 29th of June, 2010
Examination results are announced on http://studweb.ntnu.no/

Examination question 1 (25 points).

a) Mention cells of the innate immune system and briefly describe their immunological functions.

b) Define the term phagocytosis and describe how this process contributes to immune responses. Which cells are able to phagocytose?

c) How do cells of the innate immune system contribute to activation of adaptive immune responses?

Examinantion question 2 (35 points).

a) Immunoglobulins (antibodies) have a common basic structure (monomer). Describe this structure.

b) B-cells are able to produce millions of different antibodies (antibody diversity). Why is this necessary? Describe the mechanism of V(D)J recombination (include a figure, remember to explain your drawing). At which level in the B-cell development does V(D)J recombination occur?

c) Explain the mechanisms through which a naïve B-cell is activated.

d) About 90% of B-cells die during development in the bone marrow and in secondary lymphoid organs. Explain briefly - why do B-cells die and why is this selection important?

Examination question 3 (20 points).

   a) Describe how a naïve T cell is activated. What is meant by co-stimulation?

   b) Describe the different main categories of professional antigen presenting cells. Which of these cell types can activate naïve T cells? Why?

   c) What is a superantigen?

Examination question 4 (20 points).

a) How can the immune system distinguish between tumor cells and normal
   cells?

b) Briefly describe what characterizes the three different phases of "cancer
immunoediting".