UNIVERSITY OF OSLO

Faculty of Mathematics and Natural Sciences

New exam in MBV4250 Basic immunology and immunological techniques

Day of exam: Wednesday June 25 th
Exam hours: 16.00 – 19.00
This examination paper consists of 1 page.
Appendices:
Permitted materials:

Make sure that your copy of this examination paper is complete before answering.

You have isolated V genes derived from T cells with specificity against DQ2 and a gluten peptide (E9 and E37). Such T cells are activated in the gut of patients with celiac disease after challenge with gluten.

The patients also have antibodies with specificity against the enzyme transglutaminase (TG), a self protein. You would like to analyse the V gene repertoire of the antibody producing plasmacells involved, and therefore need to clone the V genes from cells isolated from two different patients and one unaffected individual.

Once you have total RNA from the cells, you do the V gene cloning.

1) How would you design the primers to clone the antibody V genes? Use you knowledge of antibody V and C genes as well as your knowledge of antibody expression during an immune response to argue for your strategy. How many different reactions would you plan to do? Describe each.
2) To select the TG specific binders from the pool of V genes cloned, you subclone your isolated selection of genes in a phage genome to make small libraries. Make a simple drawing of the phage coat and the antibody fragment displayed on the surface. How many libraries would you make? Describe a phage display assay for selection of specific TG binders.
3) You isolate binders. After the selection, you want to verify that they are specific for TG. How will you do that?

You pick isolated binders and isolate DNA for V gene sequencing. You analyse the sequences using IMTG V quest.

4) How much information would you expect to get from the search regarding the sequence of each clone and also from a comparison of the individual binders?
5) Describe the effector functions of antibodies in the secondary response.