

ImmunoBiology, 18 August 2010

Naam:

Collegekaartnummer:

Question 1 (30 pnts):

Make sure that your answers are as short as possible.

- a) What is the function of the AIRE gene? What happens if this gene is defect?
- b) Describe which two processes (in the correct order) take place during T cell education in the thymus? Which cells are involved?
- c) What would happen with T cell repertoire if an individual has too many MHC genes? What if an individual has too few MHC genes?
- d) Why would T cells be so specific that they recognize only 1 in a 100000 antigens?
- e) We are exposed to foreign antigens in large quantities in the food that we eat. What is the mechanism for not mounting effective immune responses against these food antigens?

ImmunoBiology, 2 Juli 2010

Naam:

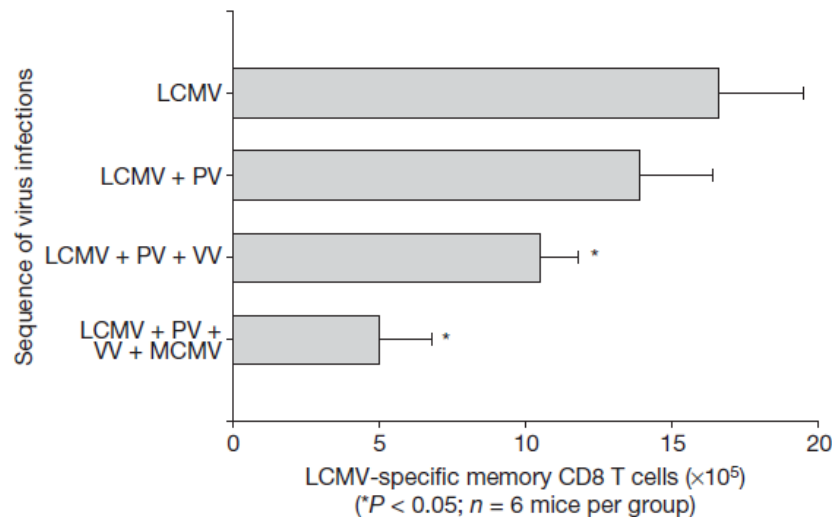
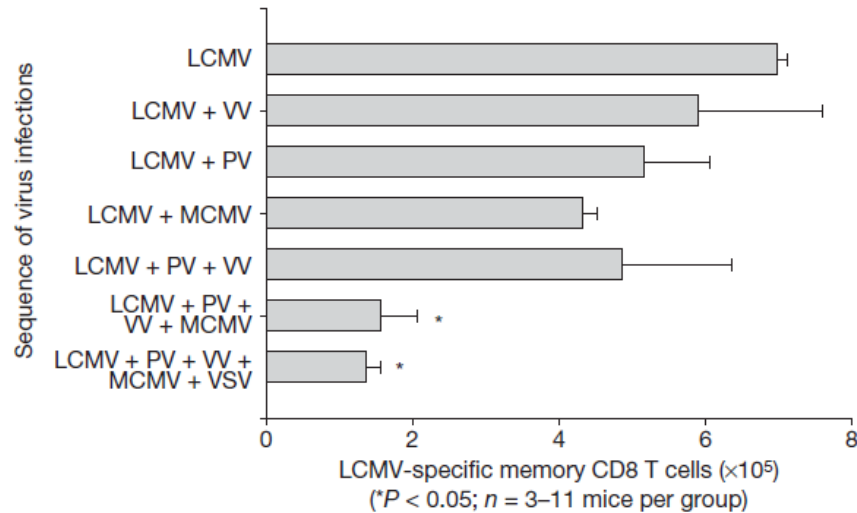
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Question 2 (25 pnts):

Write a short essay (at least half a page, max. of a page) on HIV-1 infection. Make sure that you cover the following list of concepts: HIV-1 Gag, long term non-progressors, immune escape, CD8 T cells, protective MHC molecules, hyperactivation (or immune activation), TRECs, telomers, turnover and exhaustion.

Question 3 (20pnts):

The below figure is taken from the short discussion article "Attrition of memory CD8 T cells" by Raymond M. Welsh & Liisa K. Selin, *Nature* **459**, E3-E4 (4 June 2009).



Total numbers of lymphocytic choriomeningitis virus (LCMV)-epitope-specific CD8 T cells per spleen in mice immune to LCMV and subsequently infected with Pichinde virus (PV), vaccinia virus (VV), murine cytomegalovirus (MCMV) or vesicular stomatitis virus (VSV). Data are reworked from refs 3 and 4. These are controlled experiments in which all measurements were taken at the same time after LCMV infection. **a**, Attrition of LCMV-specific memory cells as measured by limiting dilution assays after sequential virus infections. **b**, Attrition of LCMV-specific memory cells as measured by MHC-dimer or intracellular IFN- γ assays after sequential virus infections. Combined frequencies of T cells specific to LCMV-encoded epitopes NP396, GP33/34 and GP276 (GP, glycoprotein; NP, nucleoprotein).

- Attrition means here "loss". Explain in max. half a page:
- Which conclusions would you draw from these results?
 - What could be the mechanism causing this effect?

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Question 4 (25pnts):

Make sure that your answers are as short as possible.

a) How is the self reactivity of B cells checked? Is anti-self check done on B cells more or less important than that done on T cells? Why?

b) Explain the four levels of diversity created in antibody receptors.

c) For what therapeutic mode of action did you screen the Her1 (also called EGFR) specific VHH? What other therapeutic mode of action can be achieved with an IgG format against this target?