

Unit 6 - Week 4

Course outline
How does an NPTEL online course work?
Week 0
Week 1
Week 2
Week 3
Week 4
<ul style="list-style-type: none"> Lecture 17 : Structural variation in immunoglobulin constant regions and isotype switching Lecture 18 : Structural variation in immunoglobulin constant regions and isotype switching (Contd.) Lecture 19 : Antigen recognition by T cell : major histocompatibility complex Lecture 20 : Antigen recognition by T cell : major histocompatibility complex (Contd.)
<input type="radio"/> Quiz : Assignment 4
<input type="radio"/> Week 4 Feedback Form
Week 5
Week 6
Week 7
Week 8
Week 9
Week 10
Week 11
Week 12
Download Videos
Assignment Detailed Solution
Text Transcripts
Live Interactive Session

Assignment 4

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2020-10-14, 23:59 IST.

- 1) Which of the following is not a feature of immunoglobulin gene rearrangement? 1 point
- V_K genes join J_K genes
 - D_H genes join both V_H and J_H genes
 - V_H genes are preceded by leader sequence
 - J_H genes join both V_H and D_H genes
- a.
 b.
 c.
 d.
- No, the answer is incorrect.
Score: 0
Accepted Answers: d.
- 2) All the statements regarding the arrangement of the gene segments for the $\alpha:\beta$ T-cell receptor are true except 1 point
- α gene consist of multiple variable (V), joining (J) and one constant gene
 - β gene consist of multiple variable (V), diversity (D), joining (J) and one constant gene
 - β gene consist of multiple variable (V), diversity (D), joining (J) and constant gene
 - each $V\alpha$ gene segment is preceded by an exon encoding the leader sequence (L)
 - The TCR locus is interrupted between the J and V gene segments by another T-cell receptor locus
- a.
 b.
 c.
 d.
 e.
- No, the answer is incorrect.
Score: 0
Accepted Answers: b.
- 3) Non-template encoded nucleotides are called _____. They are added by the enzyme _____ and are more common to _____ gene of the immunoglobulin. 1 point
- N-nucleotides, TdT, heavy chain
 - P-nucleotides, TdT, heavy chain
 - N-nucleotides, TdT, light chain
 - P-nucleotides, TdT, light chain
- a.
 b.
 c.
 d.
- No, the answer is incorrect.
Score: 0
Accepted Answers: a.
- 4) In the light chain variable exon, A V gene segment encodes the CDR1 and CDR2 loops. The CDR3 loop is formed by the 1 point
- V gene segment
 - J gene segment
 - sequences from the end of the V gene segment and the beginning of the J gene segment
 - sequences from the end of the J gene segment and the beginning of the V gene segment
- a.
 b.
 c.
 d.
- No, the answer is incorrect.
Score: 0
Accepted Answers: c.
- 5) "There is a separate gene for each different immunoglobulin chain and the antibody repertoire is largely inherited." This is called _____ theory. 1 point
- Somatic diversification
 - germline theory
 - Somatic hypermutation
 - clonal selection
- a.
 b.
 c.
 d.
- No, the answer is incorrect.
Score: 0
Accepted Answers: b.
- 6) The co-expression of IgD and _____ at the surface of mature B cells are derived from the same pre-mRNA transcript by alternative _____. 1 point
- IgA, splicing
 - IgM, splicing
 - IgG, polyadenylation
 - IgM, polyadenylation
- a.
 b.
 c.
 d.
- No, the answer is incorrect.
Score: 0
Accepted Answers: b.
- 7) When the two segments undergoing rearrangement (the V and J gene segments in this example) are arranged in the same transcriptional orientation in the chromosome, then 1 point
- juxtaposition of the RSSs results in the looping out of the intervening DNA which is released in the form of closed circle
 - juxtaposition of the RSSs results in the looping out of the intervening DNA which is retained in inverted orientation
 - juxtaposition of the RSSs results in the coiled configuration of the intervening DNA which is retained in inverted orientation
 - juxtaposition of the RSSs results in the coiled configuration of the intervening DNA which is released in the form of closed circle
- a.
 b.
 c.
 d.
- No, the answer is incorrect.
Score: 0
Accepted Answers: a.
- 8) Some T cells express $\gamma:\delta$ T-cell receptors rather than $\alpha:\beta$ T-cell receptors. The organization of the α locus and the δ locus helps to ensure that each T cell cannot express both types of T-cell receptors. The mechanism involved is that: 1 point
- The rearrangement of a T-cell receptor α gene deletes the δ locus on that allele.
 - The rearrangement of a T-cell receptor δ gene deletes the α locus on that allele.
 - The RAG recombinase enzymes are down-regulated immediately after the first T-cell receptor genes rearrange.
 - The $\alpha:\beta$ T-cell receptor signals the T cell to delete the δ locus.
 - The $\gamma:\delta$ T-cell receptor signals the T cell to delete the α locus.
- a.
 b.
 c.
 d.
 e.
- No, the answer is incorrect.
Score: 0
Accepted Answers: a.
- 9) One striking feature of TCR interactions with peptide:MHC complexes is that amino acid residues in the MHC protein are as important to the TCR binding strength as are amino acid residues in the pathogen-derived peptide. This feature is in contrast to antigen recognition by antibodies, which is a direct interaction that is independent of other host proteins. Based on the different functions of T cells versus antibodies in the adaptive immune response, the fact that TCRs recognize components of both the MHC and the bound peptide exists to: 1 point
- Prevent TCRs from binding only to surface exposed epitopes of native pathogens
 - Prevent immune evasion by a pathogen that has mutated the sequences required for antibody recognition
 - Put constraints on T cell recognition, due to the potentially damaging effector molecules made by activated T cells
 - Ensure that TCRs are focused on recognizing antigens associated with host cells, and not those that are free in solution
 - Ensure that the pathogen has already been destroyed by the host cell before the T cell will recognize it
- a.
 b.
 c.
 d.
 e.
- No, the answer is incorrect.
Score: 0
Accepted Answers: d.
- 10) B-cell receptor or secreted version of antibody is made by B cell by using 1 point
- Different heavy chain class but the same light chain transcripts.
 - Different light chain class but the same heavy chain transcripts.
 - Differential splicing of the same heavy-chain transcript.
 - Differential splicing of the same light-chain transcript.
- a.
 b.
 c.
 d.
- No, the answer is incorrect.
Score: 0
Accepted Answers: c.