

### Coenzyme Questions 1<sup>st</sup> Lecture

1. Draw the mechanism of the cytidine deaminase
2. What is the dominating mechanism that underlies cleavage of the glycosidic bond in the pyrimidine catabolic pathway?
3. Draw the oxidized, reduced and semi-reduced forms of the flavine cofactor.
4. Why is the reduced form a strong electron donor?
5. What is the structure of pentostatine? What is the mode of action?

### Coenzyme Questions 2<sup>nd</sup> Lecture

6. Please explain the captodative stabilization of a radical.
7. Please draw the mechanism of how a reduced vitamin B<sub>2</sub> reacts with oxygen. Why is this reaction important?
8. Please draw the structure of the active part of NAD<sup>+</sup> and NADH<sub>2</sub>. Please indicate which of the transferable H atoms is the proR and proS hydrogen.
9. Please sort the cofactors NAD<sup>+</sup>, FAD and F<sub>0</sub> according to their reduction potentials.
10. If you have an NADH molecule, which of the above mentioned cofactors (maybe both) can be reduced by NADH?

### Coenzyme Questions 3<sup>rd</sup> Lecture

11. Draw the structure of the heterocycle of adenine and indicate which nitrogens contain basic lone pairs and which nitrogens do not.
12. Explain in which orbital the unpaired electrons have to sit in order to create a basic lone pair in the heterocycle.
13. Draw the structure of the desazaflavine (F<sub>0</sub>). Is this coenzyme able to promote single electron transfer reactions?
14. Draw the structure of the molybdenon cofactor and draw the chemical reactions that lead to the formation of xanthine from hypoxanthine.
15. Draw the structure of Allopurinol and describe why this compound is on the WHO list for indispensable medicine.

#### Coenzyme Questions 4<sup>th</sup> Lecture

16. Please draw the mechanism of how pyridoxalphosphate decarboxylates  $\alpha$ -amino acids, racemizes  $\alpha$ -amino acids and converts  $\alpha$ -amino acids into  $\alpha$ -keto acids.
17. How does ATP react with bicarbonate?

#### Coenzyme Questions 5<sup>th</sup> Lecture

18. For which step in the pyrimidine biosynthesis do we need coenzyme Q<sub>10</sub>?
19. How does ribose react with ATP to give the precursor for pyrimidine biosynthesis?
20. What is so special about the cyclization of carbamoylaspartate to dihydroorotate?

#### Coenzyme Questions 6<sup>th</sup> Lecture

21. Give the structure of the coenzyme and the mechanism for the methylation of deoxycytosine to 5-methyldeoxycytosine.
22. Give the structure of the coenzyme and the mechanism for the methylation of deoxyuridine to thymidine.

#### Coenzyme Questions 7<sup>th</sup> Lecture

23. Please draw the folate cofactor in the "methyl", "methylene" and "formyl"-state.
24. What reactions does the methylene and formyl-form undergo? Give examples of where the folate-forms are needed.
25. How is a C1 transferred at the oxidation level of a carbocyclic acid. Give an example.