

The evaluation of knowledge

Aminoacids, Peptides, Proteins

1. The structure and physico-chemical properties of aminoacids
2. Aminoacids as zwitter-ions
3. Aminoacids commonly occurred in proteins - characteristics and biological meaning
4. Aminoacids not present in proteins - characteristics and biological meaning
5. The characteristics of selected aminoacids: glycine, alanine, cysteine, phenylalanine, tyrosine, tryptophan, glutamic acid, aspartic acid.
6. The criteria of aminoacid division
 - chemical structure (L and D configuration, α and β aminoacids, containing sulfur, OH group, aromatic ring, cyclic)
 - the participation in structure of protein molecule (protein, non protein)
 - the participation in metabolic pathways (glucogenic, ketogenic, gluco-ketogenic)
 - the possibility to synthesize in living organisms (exogenic and endogenic)
 - the participation of secondary structures of proteins (stabilising, destabilising, interrupting of α helix)
 - the influence of side chains of aminoacids on the formation of secondary protein structure (the division in accordance to Karlson into 4 groups, the characteristics of groups)
7. Tests for the identification of aminoacids:
 - aromatic aminoacids: phenylalanine, tyrosine, tryptophan
 - sulfur aminoacids: cysteine and cystine
8. The reactions of aminoacids
 - for amino group (with nitric acid III, N-acylation, N-alkylation, methylation, reactions: with ninhydrin, in accordance to Sanger, in accordance to Edman, deamination and transamination)
 - for carboxyl group: (reduction, esterification, decarboxylation, formation of chloride)



9. Methods for quantitative determination of aminoacids

- formol titration by use of the method of

Sørensen

10. Peptide bond and its properties
11. Peptides - structure, division, names
12. Physico-chemical properties of peptides
13. Biologically active oligo and polypeptides - examples, biological meaning
14. The identification of $-NH_2$ and $-COOH$ groups at the end of peptide - stages for the examination of sequence of aminoacids in chain (the meaning of the process)
15. Laboratory synthesis of polypeptide chains - the conditions of reactions, the meaning of the process
16. Criteria for protein division:
 - origin
 - occurrence - in plasma, in muscles, in milk ribosomal, cellular
 - biological functions - enzymatic, storage, receptor,
 - structure (single and conjugated)
 - solubility and shape of molecule (globular and fibrous)
17. Plasma proteins - division, functions, physico-chemical properties and biological meaning
18. Structures of proteins - primary and secondary
19. Properties of alpha helix and beta sheet - as examples of secondary protein structure
20. Bonds in protein structures
21. Physico-chemical properties of proteins
 - solubility
 - salting in
 - salting out (mechanism of process and salting factors)
 - denaturation (mechanism of process and denaturing factors)
22. Isoelectric and isoionic points - properties of proteins in isoelectric point (pI)
23. The influence of metal salts on proteins
24. Methods for quantitative determination of proteins (methods of biuret, Bradford, Lowry)
25. Differences between peptides and proteins

