HELLENIC REPUBLIC

UNIVERSITY OF CRETE

Academic English

Section: Note taking task: Proteins

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Wk 5 Note taking task: Proteins

A. Before you listen complete the missing information.

- Antibodies
- Collagen
- Enzymes
- Keratin
- Insulin

A protein called **…….**for example makes up your hair.

A protein called **……..**makes up your ligaments and tendons and lips.

One of the main weapons of your immune system against foreign invaders, ……are made out of proteins.

Hormones such as **……**are made of proteins and then **…….**, the chemical workers of your cells, those are proteins

B. Take notes during the lecture. Use your notes to complete the missing information.

Proteins are one of the four basic kinds of**……**. Around 90% of the protein structures available in the Protein Data Bank have been determined by X-ray crystallography.

The **…….** that make up proteins are called amino acids, joined together to form long chains, i.e., a **……..**. This is a single linear polymer chain of amino acids bonded together by peptide bonds between the carboxyl and amino groups of adjacent amino acid residues. These long chains of amino acids wind up **……** together in very complex structures.

In general, the genetic code specifies 20 standard amino acids. All amino acids are used in nature have four basic parts to them. The central part is called the alpha carbon which has a hydrogen attached to it and then all the other side groups. This group over here is called the **……** and it's made up of a nitrogen with a couple of hydrogens. We also have the **……**, -COOH or -CO_2H, which gives the acidic quality to an amino acid.

As for the R group, it represents the different **……**that give each amino acid its**……..**. For example, R group of the amino acid alanine is a**……**, a carbon with three hydrogens attached to it while over here cysteine has the same amino, amino, carboxyl, carboxyl group but instead of the methyl group it's got a C, double H and then a sulphur over the hydrogen **……**

it. That gives it very different chemical and **…….**than the methyl group here.

The basic structure of proteins is **……** structure, secondary structure and tertiary structure and the **……** structure which is how multiple proteins work together.

The **……** of amino acids joined together make its primary structure. The primary structure is held together by covalent or peptide bonds, which are made during the process of protein biosynthesis or translation. The two ends of the polypeptide chain are referred to as the carboxyl terminus (C-terminus) and the amino terminus (N-terminus) based on the nature of the free group on each extremity.

Two main types of secondary structure, the alpha …….and the beta strand, were suggested in 1951 by Linus Pauling and coworkers. These secondary structures are defined by patterns of hydrogen bonds between the main-chain peptide groups. Because of their R groups, they all start interacting with each other so our long chain will start to form into these bendy parts here and twisty parts there, known as alpha helix and beta **……** respectively. The former is a long chain of amino acids joined to each other but due to hydrogen bonding between the R groups and other parts of the amino acid chain, it started to form up into this twisted structure.

A "beta pleated sheet" is one long **……..**but it gets bent up because of the structural properties of carbon to form this shape. The pleated part refers to the how it buckles up and down. Both of these qualities are determined primarily by the hydrogen bonding of the various R groups in the amino acid chain.

Tertiary structure refers to three-dimensional structure of a single protein molecule. The alpha-**……** and beta-sheets are folded into a compact globule. The folding is driven by the *non-specific* hydrophobic interactions, but the structure is stable only when the parts of a protein domain are locked into place by *specific* tertiary interactions, such as salt bridges, hydrogen bonds.

C. Underline the pieces of information NOT STATED during the lecture.

Wk 5 Note taking task: Proteins KEY

A. Before you listen complete the missing information.

- Keratin
- Collagen
- Antibodies
- Insulin
- Enzymes

A protein called **keratin** for example makes up your hair.

A protein called **collagen** makes up your ligaments and tendons and lips.

Antibodies, one of the main weapons of your immune system against foreign invaders, they're made out of proteins.

Hormones such as **insulin** are made of proteins and then **enzymes**, the chemical workers of your cells, those are proteins

B. Take notes during the lecture. Use your notes to complete the missing information.

Proteins are one of the four basic kinds of **organic molecules**. Around 90% of the protein structures available in the Protein Data Bank have been determined by X-ray crystallography.

The **monomers** that make up proteins are called amino acids, joined together to form long chains, i.e., a **polypeptide**. This is a single linear polymer chain of amino acids bonded together by peptide bonds between the carboxyl and amino groups of adjacent amino acid residues. These long chains of amino acids wind up **folding** together in very complex structures.

In general, the genetic code specifies 20 standard amino acids. All amino acids are used in nature have four basic parts to them. The central part is called the alpha carbon which has a hydrogen attached to it and then all the other side groups. This group over here is called the **amino group** and it's made up of a **nitrogen** with a couple of hydrogens. We also have the **carboxyl group** which gives the acidic quality to an amino acid because this C double bond OOH that's a carboxylic acid.

As for the R group, it represents the different **side groups** that give each amino acid its **individual qualities**. For example, R group of the amino acid alanine is a **methyl group**, a carbon with three hydrogens attached to it while over here cysteine has the same amino, amino, carboxyl, carboxyl group but instead of the methyl group it's got a C, double H and then a sulphur over the hydrogen **attached to** it. That gives it very different chemical and **structural properties** than the methyl group here.

The basic structure of proteins is **primary** structure, secondary structure and tertiary structure and the **quaternary** structure which is how multiple proteins work together.

The **sequence** of amino acids joined together make its primary structure. The primary structure is held together by covalent or peptide bonds, which are made during the process of protein biosynthesis or translation. The two ends of the polypeptide chain are referred to as the carboxyl terminus (C-terminus) and the amino terminus (N-terminus) based on the nature of the free group on each extremity.

Two main types of secondary structure, the alpha **helix** and the beta strand, were suggested in 1951 by Linus Pauling and coworkers. These secondary structures are defined by patterns of hydrogen bonds between the main-chain peptide groups. Because of their R groups, they all start interacting with each other so our long chain will start to form into these bendy parts here and twisty parts there, known as alpha **helix** and beta **pleated sheet** respectively. The former is a long chain of amino acids joined to each other but due to hydrogen bonding between the R groups and other parts of the amino acid chain, it started to form up into this twisted structure.

A "beta pleated sheet" is one long **chain** but it gets bent up because of the structural properties of carbon to form this shape. The pleated part refers to the, how it buckles up and down. So both of those qualities are determined by primarily the hydrogen bonding of the various R groups in the amino acid chain.

Tertiary structure refers to three-dimensional structure of a single protein molecule. The alpha-**helices** and beta-sheets are folded into a compact globule. The folding is driven by the *non-specific* hydrophobic interactions, but the structure is stable only when the parts of a protein domain are locked into place by *specific* tertiary interactions, such as salt bridges, hydrogen bonds.

C. Underline the pieces of information not stated during the lecture.
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From proteins wikipaedia

Notes

Reference Note

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