

In this lesson today, we are going to discuss the structure, function, and role of proteins in our body. So first of all, proteins are organic compounds. And if you'll remember back, organic compounds are compounds that contain the element carbon. So common organic protein-- or I'm sorry, common organic compounds include proteins, lipids, nucleic acids, and carbohydrates. So proteins are one type of organic compound.

Proteins are made up of something called amino acids. And amino acids are the building blocks of proteins. And proteins have various, various different types. There's many different types of proteins. So they have many different roles. Some examples of ways that proteins are used in our body are as enzymes. They're used for structure, for transport, for movement, for regulation of cell activity. They're used in our hormones. So they're used as receptors to bind hormones to target cells. And they're used in defense in our lymphatic system. So proteins have many, many different roles in our body. They're a very important molecule in our body.

So let's take a look at amino acids. And we said amino acids are the building blocks of proteins. So amino acids combine together, form proteins. So we are going to take a look at this diagram right here, which is going to be the structure of an amino acid. So in the center, we have a carbon molecule that's going to be covalently bonded to a hydrogen as well as to a carboxyl group It is also bonded to an R group, and I'll explain a little bit more about that in just a moment, and to an amino group. So these are all the different components that make up an amino acid.

Now the R group that I mentioned is going to be distinct to each of the different 20 amino acids that there are. So there are 20 total types of amino acids. And then each of those 20 amino acids, the rest of the structure will be the same, but the R group will be different. So one amino acid is going to have a different R group than a different type of amino acid. Each amino acid has its own R group. And like I said, there are 20 total amino acids.

So amino acids will make up proteins. And the order of amino acids and the number of amino acids is going to compose different types of proteins. So there are many, many different types of proteins, depending on the structure of amino acids. So I'm going to zoom into this little diagram that we have the corner here. And we're going to discuss this a little bit more in depth. OK. So we're going to discuss the structure of a protein. And the structure of a protein has basically four different levels.

The primary structure of a protein includes a linear chain of amino acids. So here I've listed just four amino acids. And remember, there are 20 different types of amino acids total. So we have a chain here of four amino acids. When we have amino acids together in a chain, we call that a polypeptide chain. So the prefix poly means many. So we have many of these amino acids linked together in a chain. And they're held together by something called a peptide bond. So these are all different types of amino acids held together by peptide bonds. And when we have

many amino acids held together by peptide bonds, we refer to as a polypeptide chain. So this is our primary structure of a protein, a polypeptide chain.

Our secondary structure protein looks something like this. Basically, what we have is that polypeptide chain that's then twisted or folded. So we have our primary structure. When that twists and folds, it produces our secondary structure of a protein. The tertiary structure right here of a protein is made when that secondary structure will start to twist and fold even more, producing a 3D shape. And this 3D shape is going to determine how the protein is going to function.

From there, we have our quaternary structure. And that is formed when we have two or more chains that are held together. So we have the tertiary structure of one polypeptide chain. So the polypeptide chain has been twisted and folded, and twisted folded more. And that's going to combine with other chains. And those are all going to be bonded together. So we have our primary, secondary, tertiary, and quaternary structure of a protein.

So again, just to wrap up-- proteins are organic compounds found in our body that are built by amino acids. And they have various, various different roles in our body. And again, amino acids, we have the structure of an amino acid here, and then we have also discussed the structure of a protein-- the four different levels of protein structure. So this has been an overview on proteins.