

Biochemistry is not difficult !!!

If you talk to the students in the years ahead of you in college most of them will tell you that biochemistry is a difficult subject. It's not !

Biochemistry studies the chemical reactions that occur in cells. Life, at the molecular level (and therefore biochemistry and molecular biology), is about *forming chemical bonds*. The things that living organisms do, such as grow and make “machines” which allow them to move, generate electrical impulses and perform other functions, all have one thing in common at the molecular level. They all involved atoms and/or small molecules being joined together by chemical bonds. When a house is being built bricks are “joined” together with cement. When structural components of cells and cell “machines” are being built the molecules that make up these structures are “joined” together by chemical bonds.

So, much of biochemistry involves studying the processes of forming chemical bonds between the molecules that make up the cells. For example, amino acid molecules are joined together by chemical bonds to make proteins which are the most important structural components of cells. Nucleotide molecules are joined together by chemical bonds to form DNA which is the stuff that the genes are made of.

In order to form chemical bonds energy is required. In this book we will look at the biochemistry of where this energy comes from. Now, it does not take a genius to work out that if it takes energy to form a chemical bond then a potentially good *source* of this energy is to break a different chemical bond. This is exactly how cells get the energy they need to form the chemical bonds between amino acids to form proteins, between nucleotides to form DNA and so on. The chemical bonds in certain molecules are sacrificed and the energy released when these bonds are broken is used to form other chemical bonds.

So, why does biochemistry seem so difficult? Unfortunately, the processes of forming or breaking chemical bonds usually occurs in a series of steps rather than in one single step. Furthermore, many of these reaction pathways are interlinked with each other. This all makes it difficult to break the subject of biochemistry down into discreet, individual sections that are easy to study and learn. Even when you do break the metabolic pathways down into manageable sizes you never get a full understanding of what is going on until you can see how the different pathways interact with each other. It is a bit like a jigsaw. You can only deal with one piece at a time but each piece in isolation does not make much of a picture.

Unfortunately, there does not seem to be an easy answer to this problem. Please, just carry on studying all the different pathways and structures individually. Don't get discouraged when you find it difficult to see the overall picture. When you have studied all the pieces (and there are not that many of them really!) you will eventually find that you will be able to fit them together to form the great picture that is the closest thing we have to understanding the meaning of life.

Whenever you get really confused as you plough through those enormous biochemistry textbooks or lost as you try and keep up with your biochemistry lectures ask yourself “What chemical bond is being formed or broken”? and you will find it much easier to follow what is going on.

I wish you an interesting time in your journey to understand what is known about how life works and of course good fortune in the exams you must pass to allow you to go on and pursue whatever career path you have set out on.

Paul M. Byrne

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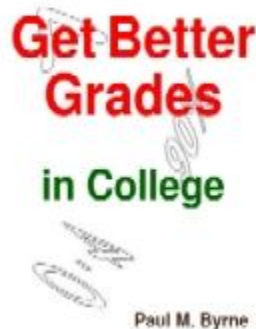
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