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**Regents Review: Biochemistry**

**The Big Ideas:**

* In all organisms, organic compounds can be used to assemble other molecules such as proteins, DNA, starch, and fats. The chemical energy stored in bonds can be used as a source of energy for life processes.
* Many organic and inorganic substances dissolved in cells allow necessary chemical reactions to take place in order to maintain life. Large organic food molecules such as proteins and starches must initially be broken down (digested to amino acids and simple sugars respectively), in order to enter cells. Once nutrients enter a cell, the cell will use them as building blocks in the synthesis of compounds necessary for life.
* The work of the cell is carried out by the many different types of molecules it assembles, mostly proteins. Protein molecules are long, usually folded chains made from 20 different kinds of amino acids in a specific sequence. This sequence influences the shape of the protein. The shape of the protein, in turn, determines its function.
* Enzymes and other molecules, such as hormones, receptor molecules, and antibodies, have specific shapes that influence both how they function and how they interact with other molecules.

**Important Facts:**

1. The most common elements in living things are (in order) Carbon, Hydrogen, Oxygen and Nitrogen (CHON).
2. Organic Compounds have Carbon **AND** Hydrogen (ex: C6H12O6 is organic, H2O, CO2, and O2 are not). Organic molecules are also larger than inorganic molecules.
3. Carbohydrates are sugars and starches. All carbohydrates are made from simple sugars (like glucose) and they supply energy.
4. Lipids store energy in their chemical bonds and include fats, oils and waxes. They are made from fatty acids and glycerol.
5. Proteins are made from amino acids. Proteins also make hormones and many body and cell structures, so as far as your body is concerned, proteins are by far the most important of these three organic molecules.
6. It is the SHAPE of proteins and how they fit together that determines what proteins can do.
7. Four specific jobs of proteins:
* make enzymes
* make receptor molecules on the cell membrane. These are used to receive chemical messages (like hormones).
* make antibodies
* make hormones