The Electrifying Speed of Enzymes

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A main concept in physics is energy within a system and how it causes the velocities of the molecules to change. Within biology, this can greatly affect how systems function, as enzymes (biological catalysts) are able to catabolize and anabolize the necessary reactions to sustain life. It is common practice in biology to teach how heat energy affects the rate at which reactions occur. As the heat energy increases, effective molecular collisions increase, which leads to reactions occurring more often. This experiment focuses on electrical energy and voltage and if it has the same effect as heat will be on an enzyme-substrate complex. Furthermore, if it does have an effect, the experiment focuses on how the rate of reaction will change at various voltages. Using an indicator (guaiacol) to measure the rates of reactions enzymes (peroxidase catalyzing hydrogen peroxide), the colorimeter allows for the transmittance to be measured at various times. From this, the rate of reaction can be measured and interpreted at various voltages, which allows for the optimal voltage at which the enzyme functions to be calculated. The data collected be used in the future possibly for enzymatic homeostasis. With the ability to control voltages, specific metabolic pathways could be regulated, allowing for homeostasis to be externally regulated, which could be used in hospitals or in the medical sense to save lives. If the optimal conditions for specific reactions are found within humans, then specific voltages could be run through these areas to optimize reactions when other conditions limit their activities.

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