Investigating New Methods of Noninvasive Glucose Monitoring

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This project in its present form is about approaching noninvasive ways in monitoring glucose in the human body using sweat. The idea of this experiment is to find an alternative to the current devices for self-monitoring of blood glucose (SMBG). This experiment began to show success by showing a different perspective when detecting glucose. The experiment began with a well plate being used as a voltaic cell to test if glucose affects the current and voltage output. Copper metal and zinc metal was used with is corresponding nitrates in half-cells connected by a salt bridge soaked in potassium nitrate. The copper half-cell transfers electrons to the zinc cell and it was hypothesized that inserting glucose to that half-cell would decrease current and voltage production. Half a milliliter of artificial sweat solution was in the copper half-cell as well as another half a milliliter of glucose solution. The control only had artificial sweat solution and distilled water. The copper half-cell that contained 0.3 grams of glucose per 100 milliliters produced the least amount of current and voltage. After discovering that glucose did have a correlation with the efficiency of a voltaic cell, the cathode metal was replaced to see if there was a better alternative to monitoring the glucose. The same procedures were repeated when using the silver metal instead of copper. This added another dimension to the experiment by expanding the research further and seeing if there could be better results. Statistics using two standard error of the mean show that there is significant data. This data shows possibility for making a device that could theoretically monitor glucose in the body using sweat.

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