The Effect of Ketoacidosis on the Breath: A Cost-Efficient Way to Monitor Ketones

Robinson, Cody (School: Yuma High School)

Insulin levels in diabetics are monitored by checking blood glucose levels. When there is not enough insulin in the body, hyperglycemia occurs. In extreme cases, diabetic ketoacidosis (DKA), may occur resulting in the production of acetone, a ketone, and the by-product isopropanol, an alcohol. Both acetone and isopropanol are exhaled through the breath. When using a breathalyzer with a semiconductor oxide-based sensor, there is the possibility of detecting isopropanol, because the sensor is not specific to different kinds of alcohol. The purpose of this research was to determine if correlations could be made among blood alcohol levels (BAC) reported by a breathalyzer test and/or a ketone or blood glucose test. The alternative hypothesis states if there is a case of DKA, then correlations can be made between the blood alcohol levels reported by a breathalyzer test and the blood glucose/ketone test. If the hypothesis is maintained, the breathalyzer should register a reading above 0.00 when the blood glucose levels are found to be greater than 250 mg/dl. Five, juvenile, Type-1 diabetic test subjects were asked to do a minimum of three breathalyzer tests per day in conjunction with normal blood glucose testing for a thirty-day period. A ketone test was conducted if blood glucose was below 250 mg/dl, but blood alcohol content was above zero on the breathalyzer; or if blood glucose was above 250 mg/dl. Statistical analysis was conducted using a correlation test, t-test, and p-values (a=.05). No correlations were found with BAC because of inconclusive results.

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