

UTILIZING SINGLE-USE TECHNOLOGY FOR DIABETES MONITORING VIA BREATH ACETONE

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Diabetes can be a life-long disease which requires regular blood-glucose monitoring. Current technology, albeit good, does have its draw-backs; in particular that it is an invasive technique which causes discomfort to the individual. Therefore, low compliance is observed which can ultimately lead to other health issues. Approaches are underway to develop a portable, hand-held, noninvasive monitoring device to detect the biomarker, acetone, found in the breath of diabetics. By creating single-use sensor slides from polymers films of poly(4-vinylbenzeneboronic acid) and poly(allylamine hydrochloride), acetone can react with these via a Petasis reaction. Analyzing the difference in output voltage from exposed to unexposed slides at varying acetone concentrations, using a light emitting diode with a UV-photosensor and an integrated transimpedance amplifier, provides a linear relationship up to 2500 ppb, which is above the high point for breath acetone concentrations. We have engineered a hand-held breathalyzer device to detect acetone in the breath of diabetic individuals and have clinically correlated the results with blood glucose. The single-use sensor slides will ultimately provide patients with diabetes with a means of determining blood-glucose levels in a completely non-invasive manner.

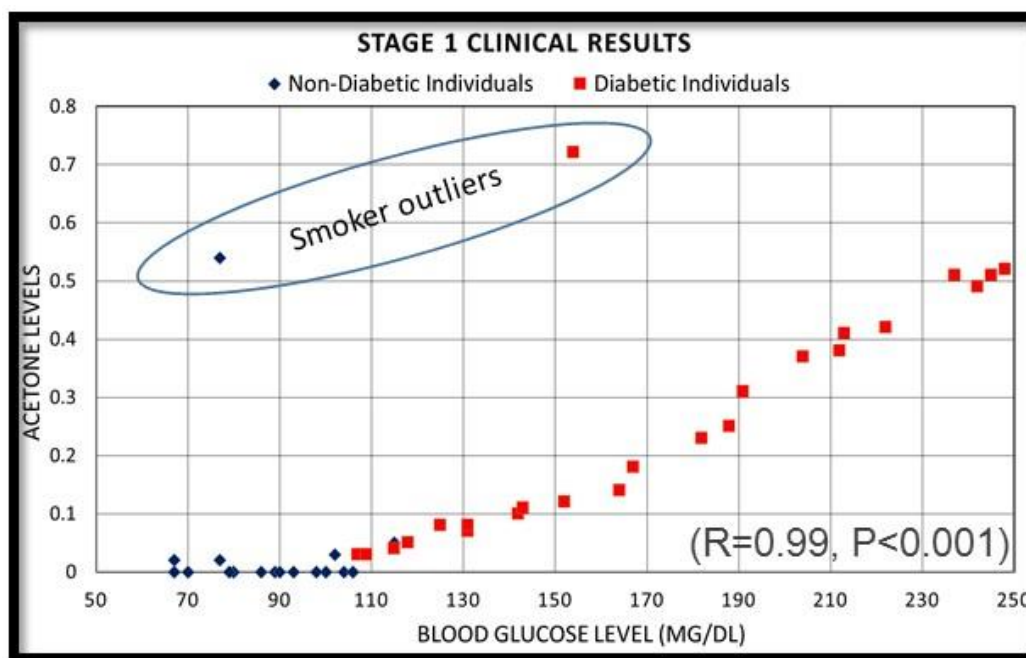


Figure 1 – Utilizing single-use sensor slides to correlate breath acetone to blood glucose