# Diabetic Medical Device Advancement

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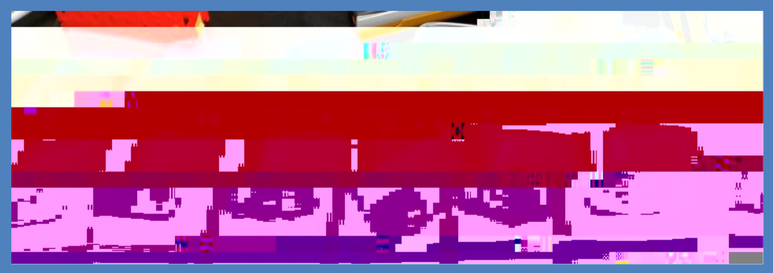
## Introduction

Companies across the world have created diabetic devices, none of which make the lives of type 1 diabetics tremendously easier. Their lives must be paused to address their illness with the constant pricking, monitoring, and administering of medication. Medical interruptions for a diabetic are unavoidable. There are extreme consequences for diabetics who forget to take their insulin and/or other medication. The purpose for the product is to combine the several different devices diabetics are stuck with into one. The product, gives the patient less reminders and worries.

## Experiments & Results



A spectrophotometer measures the amount of light that passes through a specimen. With a beam of light consisting of countless photons, those photons encounter molecules of the sample being studied. The molecule being tested can absorb the photon, reducing the number of photons passing through the sample. The spectrophotometer, reads the transmittance of light through a blank sample and the experimental sample. A low transmittance percentage represents a higher concentration.

When taking a look at the different polymers, the results recorded in table 1 were as expected.. Samples from each polymer were taken and placed in cubes to be tested in the spectrophotometer.

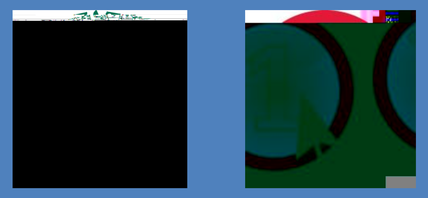
The amount of light absorbed is proportional to the concentration of the absorbing material or solute present.

| ***Moles/Liter*** | ***4.3*** | ***4.3*** | ***4.3*** | ***6.3*** | ***6.3*** | ***6.3*** |
|---|---|---|---|---|---|---|
| ***Initial Diameter*** | ***1.1 cm*** | ***1.1 cm*** | ***1.1 cm*** | ***1.1 cm*** | ***1.1 cm*** | ***1.1 cm*** |
| ***Initial Mass*** | ***1.0116 g*** | ***0.8178 g*** | ***0.9411 g*** | ***0.8655 g*** | ***0.9111 g*** | ***0.8517 g*** |
| ***Post Diameter*** | ***3.5 cm*** | ***3.2 cm*** | ***3.4 cm*** | ***3.2 cm*** | ***3.2 cm*** | ***3.2 cm*** |
| ***Post Mass*** | ***13.28 g*** | ***13.59 g*** | ***14.444 g*** | ***14.25 g*** | ***13.68 g*** | ***13.86 g*** |
| ***Transmittance*** | ***49.9*** | ***42*** | ***3.3 (outlier)*** | ***14.5*** | ***24*** | ***9.2*** |

Sure enough all the 6.3 polymers exhibited low transmittance. This proved it took in the sugar and Insulin Tech 2.0 could use a spectrophotometer to read how high or low a diabetics glucose levels are.

## Stem Concepts


The solution was a vein graft. Vein grafting consists of taking a vein from one area of the body like the leg and uses it to create an alternate channel for blood flow. The alternate channel of blood flow that is the best fit for the device would be a vein in the inner bicep. This would let a surgeon enter through the armpit, producing minimal visible scarring.





## Experimental Device

Using nanotechnology, the Insulin Tech 2.0 device monitors and checks blood glucose levels internally and sends messages to a wireless insulin pump that administers the proper amount of insulin accordingly- on its own.

## Conclusion

Once our device becomes feasible we are very confident that our device will help prevent and decrease problems that occur for diabetics who administer their own medication.

## Acknowledgements

We certainly want to thank Mr. Slaven, our for setting aside tremendous amounts of

always have the necessary push for us to think further and test the boundaries. Whenever he stood by our side offering his help, he gave us his full attention and nothing less. He seems to truly believe in our project just as much as we do. That support is greatly appreciated and cherished from the both of us.