Development of Intelligent Pharmaceutical Packaging for Real-Time Monitoring of Patient Compliance

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Purpose

To develop a device that allows real-time reporting of medication administration to specified individuals involved in the patient's care.

Methods

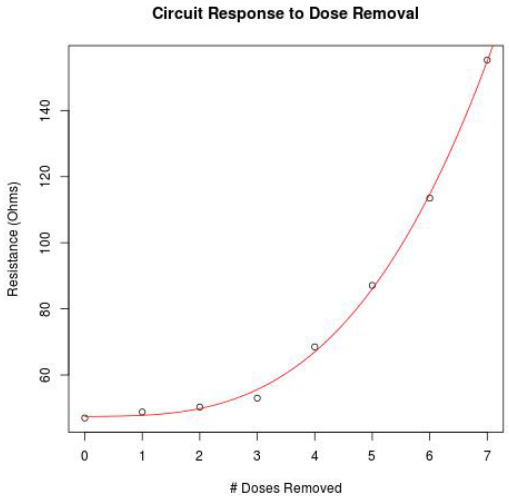
The circuit prototype was constructed by exploiting the intrinsic electrical properties of graphite. A model circuit was drawn onto standard matte printer paper using a standard graphite pencil in such a way as to represent the dimensions of a blister pack. Traced graphite tracks were manually disrupted by erasing them from the paper surface to simulate removal of a dose. Resistance values were measured across the circuit and plotted as a function of number of disrupted traces (Figure 1).

Results

Disruption of the graphite traces resulted in a measurable change in resistance across the circuit (Table 1). There is a clear relationship between the circuit's resistance and the number of doses removed which allows both the time of dose removal and the number of doses removed to be determined.

Conclusion

The circuit design is suitable for use with microcontrollers which would allow dose removal to be recorded or reported to a central computer or server. The circuit design allows each medication dose to be monitored as it is removed from a standard blister pack. Data could be stored locally with a time and date stamp for each dose of medicine taken, or it could be transmitted in real-time to a remote computer for storage. Additionally, data could be used to send updates or notifications to specific individuals
involved in the patient's health.



Removed Doses	Resistance (ohms)
0	47.0
1	48.8
2	50.3
3	53.0
4	68.5
5	87.1
6	113.5

Table 1: Circuit responsiveness demonstrating that resistance increases with sequential disruption of graphite traces.