# Increasing the Efficiency of a Nasal Epinephrine Delivery System

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Epinephrine is a hormone naturally secreted by the body in response to stress. It is also used as the primary treatment for anaphylaxis, a severe and often fatal allergic reaction. Prompt injection with an epienphrine autoinjector is necessary. However, there are two main problems with this method of administration: the 15.2 mm needle is not long enough to reach the muscle of some patients, and many are reluctant to self inject. Nasal delivery is a viable route for epinephrine administration, but it results in a 15 fold increase of drug administered to achieve the desired response. In this experiment, various pretreatments were explored to increase the permeability of a cellulose membrane (recommended as a substitute for a human nasal membrane) to epinephrine. The epinephrine concentration was measured with a Spectronic 20D. Glycerin and petroleum jelly, when applied to the membrane 1 minute prior to epinephrine administration, almost tripled (256% and 258% increase, respectively) the amount of epinephrine which went through the membrane when the setup was allowed to run for 15 minutes as opposed to no pretreatment. Later, a t-test was done on the data showing that the results are statistically significant. In the future, this technology could be used to eliminate the need for self-injection or at least alleviate the need for repeated injections of epinephrine into the thigh. Using a pretreatment could also be useful in formulating IN sprays of other drugs with a similar structure to epinephrine, such as acetaminophen.

**Awards Won:**