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# Transdermal nanoemulsion chitosan-cellulose hybrid patch as an effective controlled insulin delivery system

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Nanoemulsion is one of the most interesting vehicles, which are mostly developed to enhance *in vitro* and *in vivo* absorption and bioavailability of drugs through skin. Transdermal patch uses a special membrane (Figure 1) to control the rate at which liquid drugs contained in the reservoir within the patch can pass through the skin and into the bloodstream. A variety of pharmaceuticals are now available in transdermal patch form<sup>1</sup>. Drugs administered through skin patches include scopolamine (for motion sickness), nicotine (for quitting smoking), estrogen (for menopause and to prevent osteoporosis aftermenopause), nitroglycerine (for angina)<sup>2</sup> e.t.c. In the past, molecule of insulin was considered large to pass through skin. However, our research group recently found that an amorphous form of insulin (semilente) possess functional structure adjustable giving nanosize particles absorbable through skin. The need for new insulin preparation arises from the desire to mimic more closely in people with diabetes the normal physiological plasma insulin profile, while also minimizing their discomfort<sup>2</sup>.

My mother recently died of protracted diabetes sickness. The agony of the daily needle injection on her lap that eventually created lap discomfort sore remains a very sad deep hollow in my mind till date. The unfortunate scenario prompted my looking at transdermal application of insulin drug as an alternative to oral and injection method of delivery.

My present submission for oral presentation reviews various nanoemulsion transdermal routes as a more effective drug delivery. Furthermore, it serves to present our research results on transdermal nanoemulsion patch (hosted by chitosan-cellulose hybrid) as a controlled insulin delivery system. In the research, semilente insulin was incorporated into the oil phase of nanoemulsion as nanosize globule which was adequately characterized with reasonable insulin entrapment efficiency.

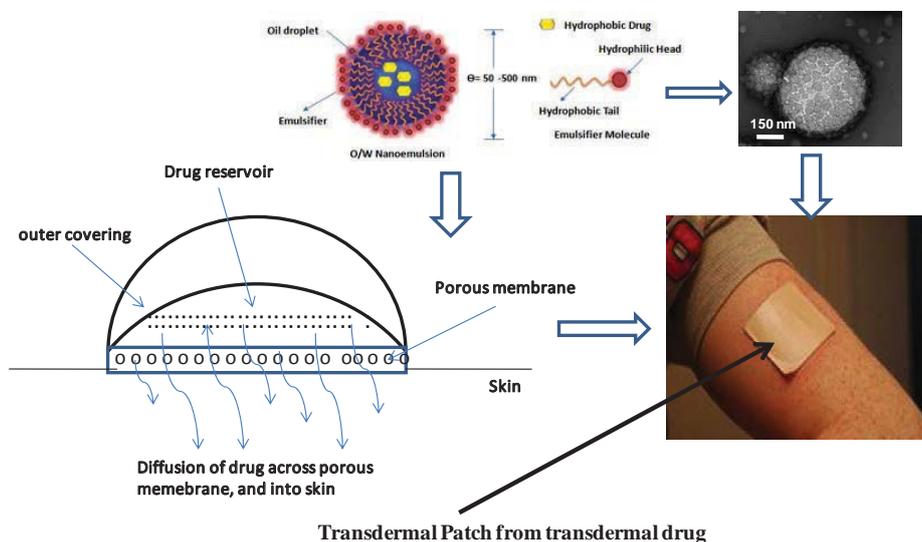


Figure 1: Nanoemulsion and transdermal patch illustration

## References

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3. Sara Sleight. Insulin preparations and analogues: structure and properties. Journal of Diabetes Nursing Vol 2 No 5 1998.