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## Nanotechnology and Insulin: A Perfect Marriage

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Insulin is considered as the final therapeutic agent against IDDM (Type 1 Diabetes) and NIIDM (Type 2 Diabetes) but its delivery is currently possible only through subcutaneous injection. This painful delivery mode has been the major cause of resistance coming from the patients to follow the strict dosing regimen. Oral and pulmonary delivery using nanoparticles and microparticles, therefore, has been considered as the "Golden Way" to overcome the problem of daily injection. Oramed Pharmaceutical, Israel has come out with an oral preparation named ORMD 0801 currently in phase 3 clinical trials while NIDDK and NICHD, USA are also engaged in phase 3 trial of their oral insulin candidate. Oral delivery through insulin encapsulation in polymeric nanoparticle is the most experimented method currently looked at. Chitosan, Chitosan/Alginate and PEG have been the most used polymers. Exubera (Inhaled powder insulin; Pfizer) was the first non-injectable marketed insulin preparation launched in 2006. Another pulmonary insulin formulation Afrezza [Technosphere Insulin (TI); Mannkind Corporation] has been approved recently by US-FDA in 2014. Thus, oral and pulmonary delivery of recombinant human insulin is definitely possible and would remove the use of painful parenteral route.