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PATIENTS & PRACTICE

Quest for better insulin delivery

Puffer pulled but new methods promise easy, painless Tx

BY JUDAH ISSA

The roughly 8% of Canadian diabetics who were using the inhaled insulin Exubera got an unpleasant surprise on October 18 when its maker pulled the drug for financial reasons. The puffer worked as well as injections but was slow to catch on with MDs and patients.

But other alternatives to injected insulin, from pills to patches, are appearing on the market and in development for physicians and their patients to choose from. "We're like mechanics and we need to have toolboxes full of tools," says Dr J Robin Conway, director of the Diabetes Clinic in Smiths Falls, ON. "The more tools we have, the better results we can get."

"Diabetes is a progressive disease," he adds. "Over time everybody is going to have to be treated with insulin." Type I diabetics rely heavily on it, needing both a constant, basal amount in their system, and a quick fix or bolus to be taken with meals to deal with the mealtime sugar hike. In type II diabetes, it comes in handy when other methods, like diet, exercise or oral meds, aren't enough to control blood sugar. And the most readily available way to get that insulin is through injection. But, as Dr Conway notes, "Patients sometimes don't want to take the needle."

Here is the lowdown on the latest insulin alternatives available now — and coming soon to your toolbox.

ON THE MARKET

Pens The popular pen-sized devices are a light, easy-to-use alternative to syringes. "And they have very fine tips coated with Teflon, so they don't hurt," Dr Conway adds. The pens are filled with an insulin cartridge and a dose is dialled in by turning the bottom of the pen. The tip of the pen — the actual needle — goes just under the skin when the release mechanism is pressed. Both the cartridge and the needle are disposable.

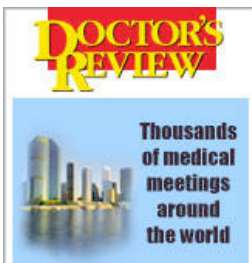
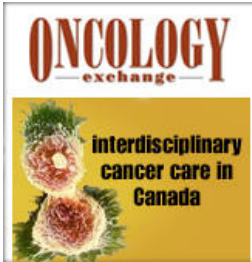
Pumps Several models of the pump are available and are about the size of a pager. They're made up of an insulin reservoir, a battery-operated pump and a computer chip that controls dosage. The pump is linked via a thin plastic tube to a cannula — a soft type of needle that gets inserted under the skin, usually on the abdomen. Tubes can be disconnected for showering, and the cannula, which remains stuck to the skin, is changed every two days.

The system offers a constant stream of basal insulin and can be adjusted to give a bolus jolt at mealtime. Abscess formation or skin infections have been known to happen with the pump, but using skin cleansers and changing the injection site regularly helps combat these problems.

Insulin jet These needle-free 'syringes' with disposable nozzles use pressure to shoot insulin through the skin. The syringe is filled with the required dose from an insulin vial and the insulin gets delivered with one easy push of the button.

IN THE PIPELINE

Inhalers "Technically, this is a bolus insulin only, but in experimental studies, people who used inhaled insulin had improved fasting glucose as well," says Dr Conway.



The decision to pull the plug on Exubera was an economic one — the device was more expensive than pens and syringes, and there were simply not enough takers. But other companies are hard at work on their own puffers, using either liquid or powder insulin. Generex's Oral-lyn, with its liquid insulin inhaler that gets sprayed into the mouth, is currently in late stage clinical trials, as is Novo Nordisk's AERx, which is expected to hit the market within a couple of years.

A couple of concerns with this method are the waste of insulin — since only a fraction of the inhaled insulin makes it to the bloodstream — and the unknown longterm effect on the lungs. The concept is good, but the devices need a little fine-tuning, says Dr Conway.

Pills "You can't eat insulin," says Dr Conway. "It gets broken down by the GI tract." So scientists are working on ways to circumvent that — with promising results. The latest buzz, out of Syracuse University, is that insulin, when attached to vitamin B12, can travel safely through the GI and make it to the bloodstream.

Their study, appearing in December's *ChemMedChem*, says the basal insulin delivered this way can last in the rats' system for up to eight hours. But human trials are still a long way off. "I don't think the pill would be coming to market for another decade," says Dr Conway.

Transdermal Scientists are working on patches using electrical currents, ultrasound waves or chemicals to deliver insulin through the skin, but they won't be out for a while yet.

Nasal spray Intranasal insulin has also been tried, but has so far shown poor absorption and caused nasal irritation.

But Dr Conway is optimistic. "We will have other technologies," he predicts. "New devices are being developed, which will improve convenience and lower costs."

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