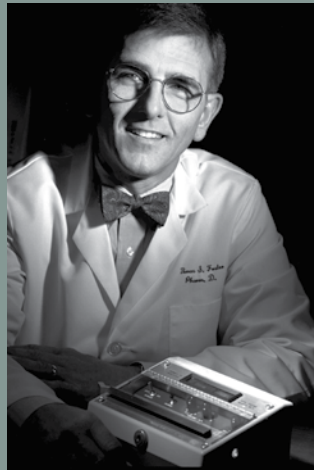


Drug Design & Delivery

Push-Button Pain Relief

If you find yourself in a hospital bed with a push-button apparatus to control your pain, you can thank UK's Thomas Foster. A longtime professor in the College of Pharmacy, Foster led a team in the early 1980s that did nothing less than revolutionize the way patients receive pain relief.



"Before this time," Foster explains, "there was a one-size-fits-all approach to pain management. But it was clear that the interpretation and intensity of pain is subjective and varies widely among people." His work throughout the next decade with Daniel Kenady (general surgery), Daniel Wermeling (pharmacy) and others led to the design of devices and procedures for a therapy now referred to as patient-controlled analgesia (PCA).

"We ultimately wanted something totally disposable, cheap, easy to use, and simple to operate," Foster says. "And we came up with the idea for a wristwatch PCA device." This device used a special infuser system to deliver intravenous dosages of pain medication when the patient pushed a button on top of the watch. It included a "lock-out" feature, which allows the patient to administer only one dose of medication every six minutes so that overdosing isn't possible.

This concept has evolved, Foster adds. "There are multiple companies worldwide marketing PCA devices and most hospitals have them available for patient use. There are also adaptations of PCAs such as for transdermal delivery—where a patient pushes on a patch and pain medicine is delivered across the skin. Our wristwatch has taken quite a few new forms over the years, but patient-controlled analgesia continues to be a standard of care worldwide."

An Easier Way to Fight Migraines

The list of possible symptoms of a migraine headache read like a checklist of human misery: intense throbbing on one or both sides of the head, nausea or vomiting, blurred vision, feeling "attacked" by light, noise or odors, feeling confused, cold or sweaty. And the list goes on. What the sufferer needs is quick relief, which is where the work of Anwar Hussain, a retired UK professor of pharmacy, comes in.

In the 1970s, the effective migraine pain management drug Stadol hit the market, but the drug could be administered only by injection. At UK, Hussain had been working on various drug delivery systems to improve efficacy and reduce side-effects of various drugs. This work led to his development of the Nasal Drug Delivery System, which uses the nasal membrane as the point of introduction to the blood system and is a much more user-friendly method to fight migraines than injection.

Hussain's work led to a patent and the product, Stadol Nasal Spray, was subsequently marketed by Bristol-Myers. To date, his research in the area of drug delivery systems has resulted in 51 patents. His work has generated more than \$14 million in revenue income for UK from patent royalties, and has brought national and international attention to the university's College of Pharmacy.

\$14 MILLION
revenue income from
Hussain's nasal sprays