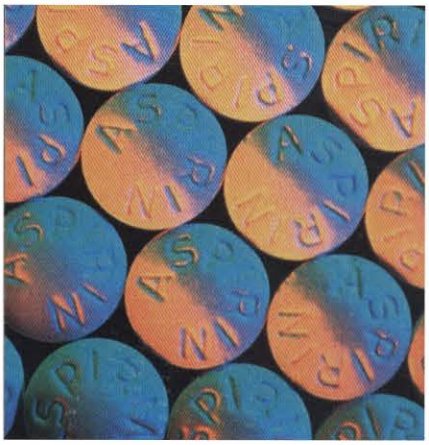
SynGenix

Magic bullet for pain-killers

PAIN medicine is usually imprecise. To neutralise pain in one particular area, a drug has to travel in the bloodstream throughout the body, weakening its specific effect and often leading to unpleasant side-effects. Thus, many doses that are sufficient to provide pain relief also pose some risk to the patient. The ideal analgesic would provide localised pain relief in small doses with minimal side-effects. Aaron Filler, a neurosurgeon at the University of California, Los Angeles, believes he has found one. The secret lies not in the pain-killer itself, but in the method for delivering it direct to the nerves causing the pain.

The technique makes use of "axonal transport", a phenomenon first discovered in the late 1940s. A single neuron can be as long as three feet; axonal transport allows communication to take place within the neuron by moving molecules from one end of a nerve cell to the other. To date, neurologists have used axonal transport chiefly to map neural pathways—tagging a molecule and seeing where it ended up.

Dr Filler's innovation—patented by SynGenix (of which he is a co-founder) in Cambridge, Britain—is a molecule called an "axonal transport facilitator" (ATF) which allows pain-killing molecules to enter cells within a specific nerve. Hundreds of drug molecules are attached to a long-chain polymer which, in turn, is attached to the ATF. As this "train" moves from cell to cell, the drug molecules are absorbed by the nerve cells. Because the pain medicine is so specifically targeted, it can be delivered in doses of a thousandth to a ten-thousandth of those currently employed. With such tiny infusions, the risk of systemic side-effects decreases greatly. Moreover, the concentrated application seems to be longer-lasting. Tests in animals showed that one dose of axonally delivered pain medicine could last up to four days.



The potential uses of ATFs are not limited to pain relief. Dr Filler speculates that they could eventually be used to treat problems such as muscle spasms which do not respond well to pain medicines now in use. ATFs might also be used to deliver treatments for diseases of the central nervous system, such as multiple sclerosis and Lou Gehrig's disease. A nasal spray with an ATF could deliver medicine to certain areas of the brain via the olfactory tract. Dr Filler hopes to begin clinical trials within two years. He first plans to test an anti-seizure medication which is used to treat pain that opiates cannot treat but is prone to causing nausea and drowsiness. If he is right, patients could soon be alert and comfortable enough actually to enjoy the relief of pain. ▮

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