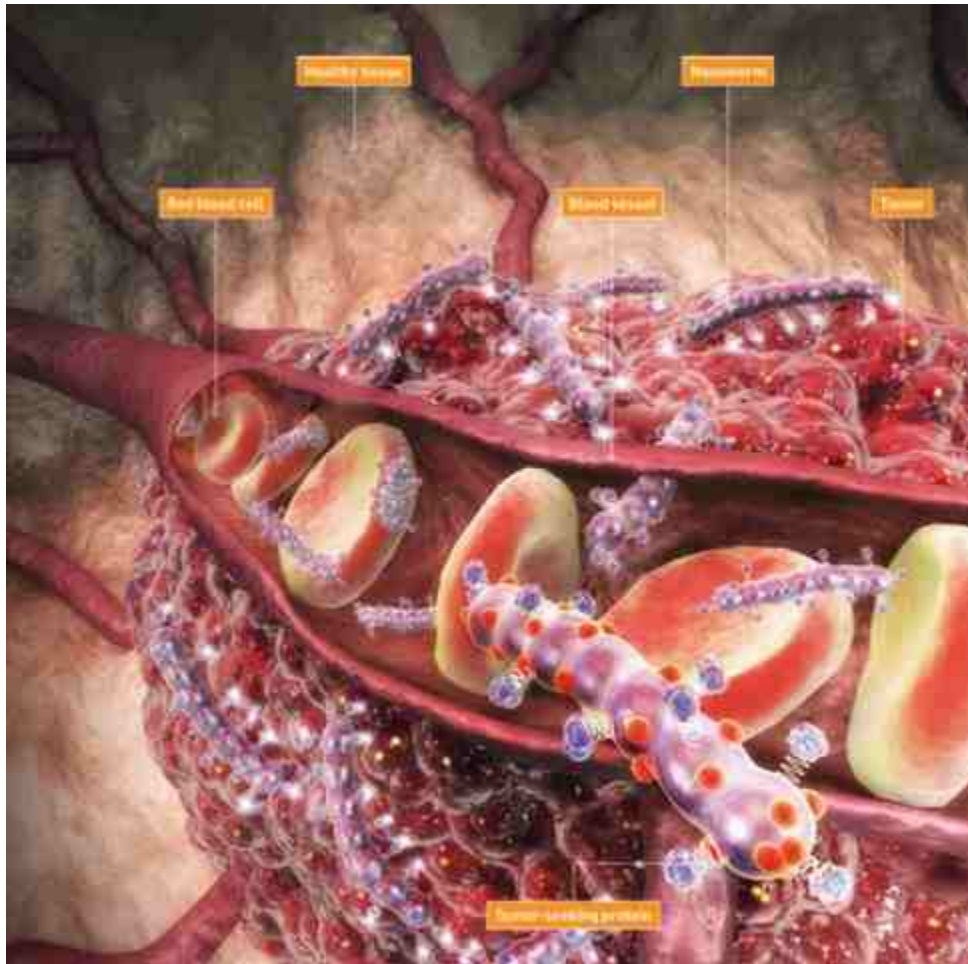


Popular Science

Wriggling Away From Cancer

Tiny strings of drug-laden iron particles could kill tumors

By Arnie Cooper Posted 10.10.2008 at 12:15 pm



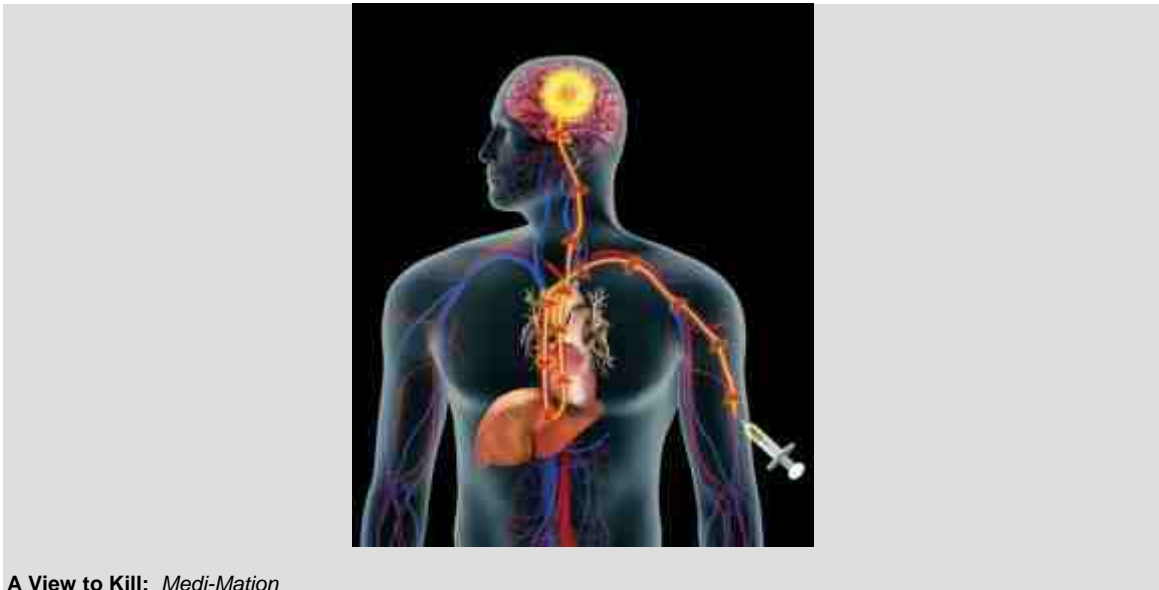
Wriggling Away From Cancer: Medi-Mation

“Cancer treatments have hit a wall,” says chemist Michael J. Sailor of the University of California at San Diego. Today’s chemotherapy drugs leave the body too quickly, and both chemo and radiation kill healthy cells indiscriminately, he explains. So he has developed “nanoworms,” strings of iron-oxide particles that could swim through your blood to kill nascent cancerous tumors—and nothing else.

This past spring, Sailor published his preliminary results from rodent studies showing that the worms can congregate in tumors, a critical first step to delivering medication directly to cancerous cells. One key to the

worms' success is their shape. The liver or other immune cells swallow up single nanoparticles in minutes, well before they can accumulate in a tumor. But previous studies have shown that longer molecules, like the worms and viruses, can evade these defense mechanisms for up to 24 hours. This gives the worms, which can be loaded with chemotherapy drugs and coated with molecules that bind only to cancerous cells, enough time to circulate throughout the body and hunt tumors. Once the worms latch onto a tumor, they would release their payload. Meanwhile, the body would naturally excrete any unbound iron oxide.

The first use in humans, Sailor says, could be for tumor detection. It turns out that worm-covered tumors show up more vividly on MRI scans, making it possible to catch tumors at an earlier stage. Sailor plans to recruit patients and begin clinical trials by 2010. Below, a look at how drug-filled worms could wipe cancer from your body.



STEP 1: Doctors inject train-like nanoworms into a vein, and the worms circulate through the body.

STEP 2: Coated with tumor-specific proteins, the worms home in on the cancer. Their elongated shape allows the proteins to latch onto the tumor at multiple points.

STEP 3: Doctors perform an MRI on the patient. The iron-oxide worms react strongly to the magnetic scanner, producing brighter images of young tumors than traditional scanning techniques do.

STEP 4: The medication can be released using enzymes, heat or a time-release mechanism.