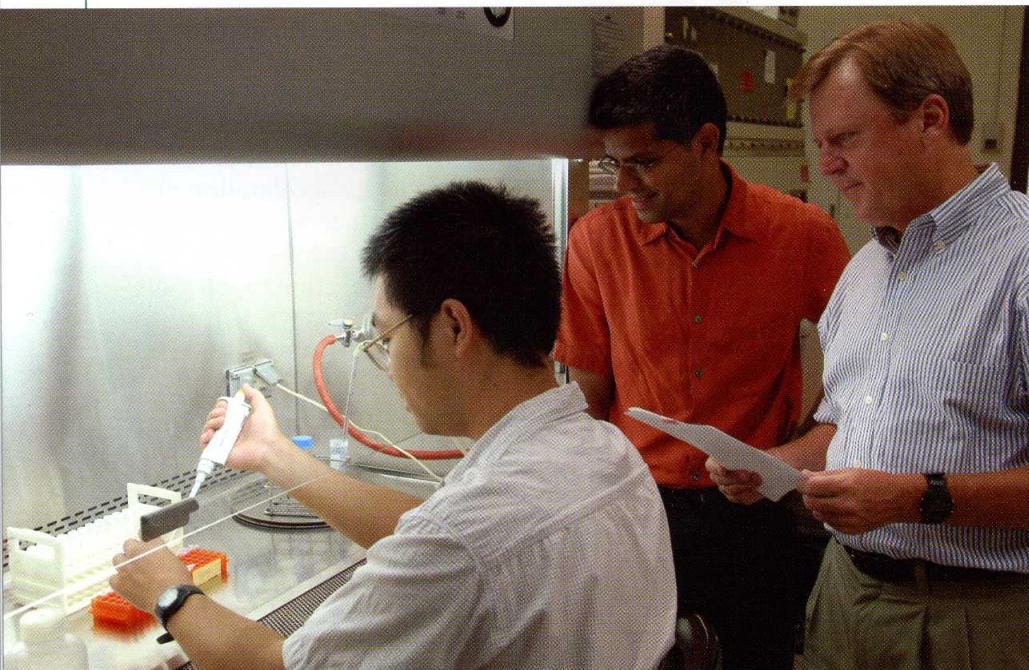


Science Features

NANOTECHNOLOGY

A PROMISING NEW FRONT IN THE WAR AGAINST CANCER



Researchers achieve promising breakthrough delivering cancer drug to targeted tumor cells

by David Reich
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Chemotherapy has been the primary tool in cancer treatment for some years. Usually, it involves massive amounts of cancer drugs delivered intravenously. Typically, although effective, a significant percentage of the drug fails to reach the intended tumor and is absorbed by other parts of the body with undesirable side effects.

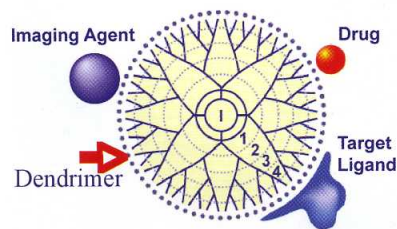
With the advent of nanotechnology, a promising new front has opened in the fight against cancer, and researchers are focusing on new “targeted” drug delivery systems capable of honing in and attacking tumor cells without affecting healthy tissue.

Chemical engineers, together with medical scientists, are working with tiny polymer constructs called dendrimers (~5-10 nanometers) that act as cancer-drug carrying ‘vehicles’ to target cancer cells, which can be highly resistant to drugs.

At Wayne State’s College of Engineering, a team led by Chemical Engineering Professor Rangaramanujam Kannan has shown how to effectively deliver a cancer drug to the doorstep of a tumor. More significantly, their unique dendrimer formulation can manipulate the resistance cancer cells to open themselves for drug delivery. Through collaborations with researchers at the Karmanos Cancer Institute, the investigation is set to move to the animal model stage. Kannan’s team has demonstrated their method to be as much as 20 times more effective against resistant cancer cells than current treatment methods. Their nanovehicles were the first reported polymer-based delivery vehicles that performed better than the drugs in cells. Considering the built-in advantages of these vehicles in vivo over free drugs the potential of their technology is significant.

A successful targeting method using nanotechnology not only introduces a powerful new tool in fighting cancer, but has other applications. One application is in cancer detection. Kannan’s team is working with other Karmanos researchers in developing imaging agents using dendrimers to create improved cancer detection and screening procedures.

“It costs hundreds of millions of dollars to develop a new drug that may be more effective; rather than discover a new drug, it’s much cheaper to deliver the same drug



Schematic of the dendrimer-based targeted, nanovehicle that is imageable in vivo

