Biomedicine

Chemotherapy combo boosts survival

Adding chemotherapy to radiation treatment for cervical cancer means that 30 to 50 percent more women survive 3 to 5 years after diagnosis, according to the results of five new trials. Until now, most cervical cancer that has not spread beyond the pelvis has been treated with surgery or radiation therapy. Including chemotherapy in this regimen may lengthen the lives of thousands of women each year, the National Cancer Institute says in a rare clinical announcement mailed to physicians.

In three of the studies, each with several hundred participants, women were divided into equal groups receiving either radiation alone or radiation plus chemotherapy. The studies confirmed that women given combined treatment lived longer than did women given radiation alone. In the longest-running trial, 73 percent of the women who had been given both chemotherapy and radiation were alive after 5 years, compared with 58 percent of the women given radiation only.

In the other two studies, all the women received radiation plus chemotherapy. Half the women in each test received the anticancer drug cisplatin, while the other half received the drug hydroxyurea. Women who received cisplatin fared better.

"[Adding chemotherapy] is the first fundamental advance in the treatment of cervical cancer in more than 40 years and should become the new standard of care," says Mitchell Morris of the University of Texas M.D. Anderson Cancer Center in Houston, who led one of the studies. He suggests that the anticancer drugs not only damage cancer cells directly but also sensitize them to radiation.

Three of the studies will appear in the April 15 NEW ENGLAND JOURNAL OF MEDICINE; the other two will be published in different journals later this year. An estimated 3,200 cases of invasive cervical cancer are diagnosed in the United States each year. —*D.C.*

Transplant drug increases cancer risk

After life-saving organ transplants, people must take drugs to suppress their immune system and prevent rejection of the transplanted organ. Unfortunately, a suppressed immune system also allows cancer cells to grow more freely, and researchers have assumed that this explains why transplant recipients face an increased risk of cancer.

Now, a study suggests that cyclosporine, a common immune-suppressing drug, may directly trigger the growth of cancer cells. In test tubes, normally slow-growing lung cancer cells that were exposed to cyclosporine developed hallmarks typical of more aggressive cancer cells. They grew without being anchored to a surface and increasingly piled on top of one another, Minoru Hojo of Teikyo University School of Medicine in Kawasaki, Japan, reports in the Feb. 11 NATURE.

Hojo also reported evidence of cyclosporine's cancer-causing effects among mice bred to lack immune systems. Among 21 such mice injected with kidney cancer cells, the cancer spread to an average of 241 locations in the lungs of each mouse. Another 18 mice injected with the same type of cancer cells and cyclosporine each developed an average of 338 cancers in their lungs. Because the mice don't have an immune system that cyclosporine can suppress, the results appear to be due to the drug itself, Hojo says.

This study doesn't indicate that giving transplant patients cyclosporine will cause normal cells to become cancerous, but the data do suggest that the drug might exacerbate tumor growth in patients with existing malignancies, says Gary J. Nabel of the University of Michigan in Ann Arbor. Although the new findings help explain why organ transplants are associated with an increased risk of developing cancer, this already well-known risk must be balanced against the need to treat life-threatening diseases, Nabel said. —*D.C.*

Chemistry

From Orlando, Fla., at the annual Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy

Bloodless test for glucose runs skin-deep

Many people with diabetes have to puncture their skin with a needle several times a day to check the glucose concentration of their blood. That's an uncomfortable, inconvenient procedure.

Now, researchers at the State University of New York at Buffalo have found that it may be possible to monitor glucose without drawing blood. They simply collect and measure the glucose that diffuses naturally through the skin.

"In the past, people have not explored these [methods] because we did not have the technology to detect the small quantities that go through the skin," says chemist Luis A. Colón. He and his colleagues are currently developing an extremely sensitive measure.

The scientists collected glucose samples from volunteers by attaching a small cup of water to the skin for 5 minutes. Next, they added an enzyme that changes glucose into hydrogen peroxide. Then, they allowed the hydrogen peroxide to react with homovanillic acid to form a fluorescent compound. The intensity of the fluorescence indicates the glucose concentration in the solution.

The amounts of glucose in the water samples don't correlate directly with those detected in the volunteers' blood, but the samples do seem to reflect changes in glucose concentration, says Colón. After the volunteers swallowed glucose tablets, the concentration increased in both their blood and skin.

The scientists also collected samples by using a method that places an electric voltage across the skin to enhance the flow of fluids (SN: 11/20/93, p. 327). However, this causes irritation, so the team has focused on the passive collection method.

Eventually, Colón and his group would like to develop a small sensor that could be attached to the skin to provide a continuous glucose readout. They are also testing other bodily fluids, such as tears and saliva, that can be collected painlessly and might contain valuable biochemical information. —*C.W.*

Paper or plastic? New test has the answer

Plastic bottles often get thrown into the recycling bin with their paper labels intact. Although that paper represents only a small percentage of the total waste, it contaminates the plastic and makes it harder to recycle into useable products.

Now, researchers in Germany have shown that a standard analytical technique can determine the paper content of plastic waste. Near-infrared spectroscopy (NIR) measures the short-wavelength infrared light absorbed by a material, a characteristic of its chemical composition. A fast, inexpensive method to assess the paper content of powdered plastic waste would have a large economic impact on the recycling industry.

Unsorted plastic waste usually contains 1 to 8 percent paper, says Dieter Fischer of the Institute of Polymer Research in Dresden. Recycled plastic containing more than 5 percent paper can't be reprocessed because the mix burns when heated.

Currently, recycling plants test small plastics samples by dissolving them in sulfuric acid and chemically measuring the paper content. However, such methods don't accurately represent the composition of large batches of plastics, which may contain a wide variety of materials, says Fischer.

To see if NIR could serve as a less cumbersome alternative, Fischer and his coworkers prepared test samples by grinding up a mix of common plastics and paper into a white powder. They added some carbon black to match the gray color of actual unsorted plastic waste and then examined them with NIR. The researchers found that the technique could distinguish between samples with paper contents of up to 11 percent.

They still need to refine their technique by comparing it with other methods that measure paper content, says Fischer. "The near-infrared spectroscopy works, but now we need a reference method so that we can show that our NIR results are good." —*C.W.*