Biomedicine

The long and the fat of prostate cancer

Men with long, fat torsos tend to have an elevated risk of prostate cancer, according to a small, preliminary study comparing the physiques of healthy men with those of men who developed prostate cancer.

If this finding holds true in larger comparative studies, it may one day help physicians identify patients most likely to fall ill with prostate cancer and thus most in need of frequent screening examinations.

A team led by cancer prevention researcher Wendy Demark-Wahnefried of Duke University Medical Center in Durham, N.C., performed 13 different anatomic measurements on 28 men, half of whom had prostate cancer. She and her co-workers found that overall, the cancer patients had higher waist-to-thigh circumference ratios than did the healthy volunteers. They also had greater trunk-to-total-height ratios than their healthy counterparts, the researchers report in the Sept. 2 JOURNAL OF THE NATIONAL CANCER INSTITUTE.

Demark-Wahnefried and her colleagues hypothesize that these physical features arise during adolescence because of elevated concentrations of the hormone testosterone, which spurs growth in young men. Studies have shown that boys with high concentrations of testosterone during puberty have greater sitting heights than their peers with average concentrations. Such a hormone surge, the Duke group speculates, might initiate minute changes within prostate cells at puberty that prompt the cells to become cancerous later in life.

While the researchers note that their study "must be interpreted with caution" until larger studies are completed, they conclude that the presence of a comparatively long, fat torso might "represent an inexpensive, readily available, and simple means of better defining the one man in 11 who may develop cancer of the prostate."

Wives' low-fat diets help husbands, too

Jack Sprat may have eaten no fat, while his wife would eat no lean, but a new study suggests that most husbands' fat intake mirrors that of their wives.

Investigators led by Ann L. Shattuck, a dietitian at the Fred Hutchinson Cancer Research Center in Seattle, found that men whose wives adopt low-fat diets eat significantly less fat than those whose wives consume large amounts of fat. This suggests that public health efforts to reduce women's fat intake will also benefit their mates.

Shattuck and her colleagues surveyed the eating habits of the husbands of 368 women who had participated in a study to determine whether lowering dietary fat could reduce the incidence of breast cancer among women at moderate risk of the disease. Roughly half of the women had received intensive counseling to reduce their fat intake; the others had been instructed to continue their usual eating habits.

The researchers found that the husbands of women on low-fat diets derived 4 percent fewer of their total calories from fat than did the husbands of women who did not modify their eating habits. On average, men with mates on low-fat diets consumed only 33 percent of their total calories as fat, while those whose wives were not on modified diets derived 37 percent of their total calories from fat, Shattuck's group reports in the September AMERICAN JOURNAL OF PUBLIC HEALTH.

The two groups of husbands had similar levels of knowledge concerning healthful eating, Shattuck's team found, ruling out the possibility that those who reduced their fat intake learned from their wives' examples and consciously altered their own behavior. Instead, the researchers conclude, the husbands' reduced fat intake "was more likely due to their acceptance of lower-fat foods being served at home than to [their own] overt actions."

Chemistry

Elizabeth Pennisi reports from Washington, D.C., at an American Chemical Society national meeting

Priming plastics to keep their colors

Although plastics solve many problems for automakers seeking ever lighter and cheaper components for their cars, these materials can create new headaches because paint flakes off them more easily than it does off metal parts. And even though manufacturers follow a multi-step procedure to make paint last, they still get uneven results, says Rose A. Ryntz, a chemist with Akzo Coatings, Inc., in Troy, Mich. For example, one car company noticed that paint stuck less well to bumpers molded in summer than to those molded in winter.

Paint may have failed to adhere adequately to the bumpers because processing conditions make surfaces more or less receptive to coatings, says James O. Stoffer, a materials scientist at the University of Missouri-Rolla.

Stoffer and his colleagues looked at how much water beads up on these plastics as an indication of how well a paint will work. They discovered that the history of the plastic affects its surface properties. "The way you mold it and the way you cool it will change the way the paint sticks," says Stoffer.

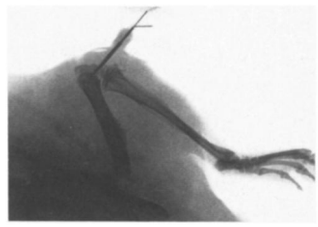
For example, when his group heats plastic while pressing it between glass plates, the plastic surface becomes more receptive to wetting. In contrast, heating plastic between Teflon plates causes water to bead more readily on the plastic. The glass or Teflon causes the polymer's molecules to reorient, with water-attracting or water-repelling chemical entities on top, respectively. "So you get better adhesion with water-based coatings with glass-treated plastic," he explains.

Ryntz says that her company has just filed a patent for a new primer for such plastics as thermoplastic olefin – a blend of polypropylene and rubber used in car bumpers, wheel covers, dashboards, and armrests, as well as in parts in many other consumer goods.

This undercoat will eliminate the need to treat plastic surfaces to make them more receptive to paint, says Ryntz. The primer contains a solvent that causes the plastic to swell, so the primer links up better with the surface, she explains. Test cars in Florida coated with this primer have so far kept their colors intact for two years, she reports.

Technique monitors drugs where they work

By using a very tiny probe that reaches into the knee joint, scientists can now track arthritis drugs in action.



Glaxo

X-ray of probe reaching into rat knee joint.

Pharmacologists typically study drugs by monitoring concentrations in blood or urine, but those levels do not necessarily represent what actually reaches an arthritic joint, says Robert L. St. Claire III, an analytical chemist at Glaxo Research Institute in Research Triangle Park, N.C. He and his colleagues are developing methods for analyzing chemicals in increasingly smaller spaces to understand better how the body processes medications.

For this procedure, the researchers inject a systemic drug into anesthetized rats with arthritis. They insert one probe into the knee joint and another into a muscle next to the joint. As the researchers slowly pump a fluid through each probe, the liquid flows up against a membrane over the probe tip and causes molecules to diffuse from the joint or muscle into the probe. The fluid then carries these molecules into a liquid chromatograph designed to measure minute quantities.

"The synovial cavity [of the rat] is the size of the head of a pin," says St. Claire. "So the ability to go into a site is quite spectacular."