Biomedicine

Getting the skinny on weight loss

The Institute of Medicine (IOM) has weighed in on America's battle with the bulge.

"We have an epidemic of obesity in this country among both adults and children," says Judith S. Stern of the University of California, Davis. Stern chaired an IOM committee that put together a report on weight-management programs. The IOM is a sister organization of the National Academy of Sciences.

Approximately one out of three U.S. adults is considered obese, the report notes. Yet as those who have dieted can attest, losing weight for good can prove a difficult task.

The IOM offers no magical solution to excess body fat; however, it does offer some advice. The report points out that losing small amounts of weight — just 10 to 15 percent of initial body mass — can provide significant health benefits.

IOM recommends choosing a weight-loss program that focuses on long-term weight management. "Consumers should demand evidence of success," it adds.

The report compares popular kinds of weight-reduction programs, including do-it-yourself as well as clinical regimens that offer the combined services of physicians and dietitians, exercise physiologists, and counselors.

For some obese people, drugs may help achieve a more healthful weight, the report suggests. Yet it notes that the Food and Drug Administration has approved no new anti-obesity drugs since 1972. The IOM committee questioned the strict standards used to evaluate such drugs. "We suggest these drugs be judged effective if they can produce small but medically significant weight losses," the report says.

For severely obese people, gastric surgery may prove a reasonable option, the report notes. This procedure, which makes the stomach smaller, can result in weight loss and a reduction in weight-associated health problems.

Hair — the long and the short of it

When Rapunzel let down her hair for the prince to climb up, she had no clue that a genetic defect probably lay at the root of her golden locks. But then, neither did anyone else until an experiment in developmental biology went awry.

Researchers studying a chemical messenger called fibroblast growth factor 5 had created mice that lacked the gene for this messenger to see how its loss would affect embryonic development. To their surprise, the newborn mice looked and acted normal, says Gail L. Martin, a developmental biologist at the University of California, San Francisco. But a few weeks later, she and her colleagues noticed that the mice with the missing growth factor looked a bit shaggy. "When [the factor] is missing, hair grows very, very long," Martin reported this month at the annual meeting of the Society for Cell Biology, held in San Francisco.

Normally, hair grows in cycles. First, a hair follicle develops. Deep inside it lies a bud of mesodermal tissue. That bud then divides and sprouts as a hair, but eventually it stops growing. The follicle becomes quiescent, and the hair falls out. The cycle then begins again.

In the experimental mice, the follicles appear normal and the hair grows at the usual rate. However, these follicles — unlike normal ones — don't make the growth factor, which, contrary to its name, appears to limit hair growth, Martin says. As a result, hair grows for a longer time during each cycle.

Her group's genetic analyses indicate that a known gene called angora is actually a variant of the gene for this growth factor. She expects people, too, may have the angora variant and seeks people with very long hair for testing.

According to Martin, fibroblast growth factor 5 is the first, but probably not the only, chemical signal discovered for the hair cycle. "There's obviously a backup signal, because the hair doesn't grow forever," she notes.

Climate

North Pole ice: Any thinning in sight?

When searching for signs of global greenhouse warming, many researchers look north because computer climate models predict temperatures will rise most dramatically over the Arctic Ocean. In theory, the warming will manifest itself by thinning the pervasive sea ice in that region. But a comprehensive study of sea ice measurements at and near the North Pole indicates that nature will not make it easy to pick out the fingerprint of greenhouse warming there.

The study focuses on data collected during 12 voyages of U.S. nuclear submarines spanning the years 1958 through 1992. Over this period, sea ice thickness varied markedly from voyage to voyage, showing no identifiable trend of thinning or thickening, according to physical geographer Alfred S. McLaren and his colleagues. A former submarine commander, McLaren now serves as publisher of SCIENCE NEWS. His team described its findings in *The Polar Oceans and their Role in Shaping the Global Environment*, published last month by the American Geophysical Union.

In the same volume, Peter Wadhams of the University of Cambridge in England asserts that Arctic sea ice in certain regions was thinner, by a statistically significant amount, in the 1980s than in the 1970s. He concludes, however, that such changes do not necessarily represent a thinning trend, because natural fluctuations from year to year could explain the differences.

"I think the question is still completely open because the data set is inadequate," Wadhams says.

William D. Hibler III comments that both Wadham's and McLaren's groups reach the same general conclusion. "For all practical purposes, they're both saying the same thing — that there probably isn't much of a trend there," says Hibler, an ocean researcher at Dartmouth College in Hanover, N.H.

Hibler's own work suggests that scientists should not rely on sea ice thickness as an indicator of climate change because sea ice responds more to winds than to air temperature. "It's questionable whether an increase or decrease in ice thickness has any relationship to climatic warming," he says.

Cloudy effects of ozone loss

Thinning of the ozone layer may have hidden the temperature rise expected from greenhouse warming, according to scientists who studied the subtle climate role played by stratospheric ozone.

In addition to shielding Earth from damaging ultraviolet light, ozone is a greenhouse gas that helps keep the surface warm by trapping radiation before it leaks into space.

So a drop in ozone concentrations works to cool the globe — an effect well known among scientists. Less obvious, however, is a link between ozone and clouds. Ralf Toumi of the Imperial College in London and his colleagues report that a thinning of the ozone layer should further cool climate by stimulating growth of sunlight-blocking cloud particles in the atmosphere.

In the Nov. 24 NATURE, Toumi explains that ozone loss in the stratosphere allows increased amounts of ultraviolet radiation to penetrate the troposphere. The radiation creates extra amounts of the hydroxyl radical by ripping apart tropospheric ozone molecules. The hydroxyl radicals, in turn, oxidize sulfur dioxide to form sulfuric acid, which serves as a nucleation site for cloud droplets. The bottom line: more ultraviolet light, more cloud droplets.

How much more, the researchers can't say. Their calculations suggest that the cloud connection could have minor cooling power, or it could dwarf the better-known direct effects of ozone loss on climate. If the ozone thinning does increase cloud cover dramatically, then it may have cooled climate enough to mask the warming from increasing levels of greenhouse gases, they suggest.