Food & Nutrition

The ignored estrogen in soy

Over the past decade, the plant estrogens genistein and daidzein have become darlings of health food enthusiasts. Scores of studies have suggested that these compounds, members of a family known as isoflavones, may underlie many of soy's reputed health benefits. These include defense against cancer (SN: 10/11/97, p. 230), reductions in cholesterol (SN: 5/30/98, p. 348), protection against age-related bone loss (SN: 1/2/99, p. 15), and perhaps even mitigation of menopausal hot flashes.

The two isoflavones constitute 90 percent of the estrogen-mimicking, or estrogenic, material in soy. Seldom mentioned is glycitein, which makes up the remaining 10 percent.

Glycitein's presence at just trace levels in the whole soybean has discouraged most researchers from working with it, notes Patricia A. Murphy of Iowa State University in Ames. However, she notes, glycitein makes up fully 40 percent of the plant estrogens in soy germ.

In terms of estrogenicity, glycitein appears to top both daidzein and genistein, the Iowa scientists report in the April JOURNAL OF AGRICULTURAL AND FOOD CHEMISTRY. A companion paper in the May JOURNAL OF NUTRITION notes that the body takes up glycitein more readily than it does soy's other isoflavones. This alone could explain glycitein's greater estrogenicity, says Murphy. "We just absorb it better."

Noting glycitein's potency and the growing market for soy germ, Murphy believes that researchers should begin investigating any health effects of glycitein. Recent data on genistein have pointed out that whether a plant estrogen is beneficial or detrimental may depend on when it's ingested or other factors (SN: 4/24/99, p. 262). —*J.R.*

Soy's anticancer surprise

With many studies suggesting that soybeans possess anticancer activity, a team of midwestern scientists recently began probing the gooey wastes left over from the commercial extraction of oil and protein from soy. Their test-tube data now indicate that even this molasseslike muck contains agents with cancer-fighting potential.

Geneticist Michael Plewa of the University of Illinois at Urbana-Champaign and his colleagues incubated animal cells with dilute concentrations of the soy wastes and then exposed them to a known carcinogen. Cells treated with the soy wastes developed fewer of the precancerous changes called adducts than untreated cells did. Adducts occur when the carcinogen binds to DNA.

"We expected this anticancer activity would turn out to be due to soy isoflavones," such as genistein, observes chemist Mark A. Berhow of the Agriculture Department's Bioactive Agents Research Unit in Peoria, Ill. However, he observes, "it turned out to be more interesting than that."

Low doses of genistein, isolated from the waste, inhibited the formation of adducts, but higher doses fostered adducts. In contrast, genistin, a plant form of genistein contains an added sugar molecule, mildly inhibited adduct formation at all doses, Berhow notes.

The real surprise, he says, was the uniformly protective nature of saponins, cholesterol-like plant compounds being explored elsewhere for their potential to fight several diseases (SN: 12/9/95, p. 392). In contrast to genistein, the saponins inhibited adduct formation whether or not they had sugar molecules attached to them. Moreover, Berhow reports, the most active of these, soya sapogenin B, offered more cancer protection than any of the isoflavones.

His team plans to begin identifying foods rich in soy saponins. Based on preliminary data, Berhow says, isolated soy protein looks promising. —*J.R.*

Paleobiology

The tree that changed the world

Fossilized hunks of wood found recently in Morocco are repainting the picture of Earth's earliest woody tree, which transformed the planet more than 370 million years ago.

The extinct plant *Archaeopteris* lived during the late Devonian period, when amphibians were just beginning to crawl onto land. Previous studies of this spore-producing tree suggested that *Archaeopteris* grew only deciduous branches that dropped off after a year or two, a growth pattern that limited the tree's lifetime.

In 1998, a team of scientists traveled to the Sahara Desert and collected over 150 fossils of *Archaeopteris*, including a 5-meter-long section of trunk. These fossils showed that *Archaeopteris* had thick permanent branches as well as the short-lived kind, report Brigitte Meyer-Berthaud of the University of Montpellier II in France, Stephen E. Scheckler of the Virginia Polytechnic Institute and State University in Blacksburg, and Jobst Wendt of Tübingen University in Germany. They describe their finds in the April 22 NATURE.

This kind of branching structure indicates that *Archaeopteris* lived longer than previously thought, perhaps up to 50 years, says Scheckler. The thick permanent branches would also have increased the shade produced, thereby cooling off the streams where amphibians were rapidly evolving.

As *Archaeopteris* spread across the globe, it pulled carbon dioxide out of the atmosphere and turned down the planet's thermostat. At the same time, it pumped oxygen into the air, helping to set the stage for land vertebrates. "In the beginning of the Devonian, we would not have been able to breathe without apparatus, but by the end of the Devonian, we would have been able to breathe," says Scheckler. —*R.M.*

Large armored dinosaurs discovered

Paleontologists in Utah have discovered two new species of large ankylosaurs—elephant-size dinosaurs covered with so much protective bone that they looked like walking castles. The as-yet-unnamed animals come from a quarry near Price, Utah, where researchers are uncovering many new dinosaur species.

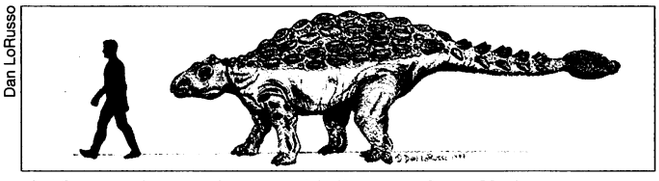
"This new site probably contains tens of thousands of bones," says paleontologist James I. Kirkland, who announced the discovery last month. Kirkland is a research associate of the College of Eastern Utah's Prehistoric Museum in Price, which led the excavations that uncovered the fossils.

Ankylosaurs were four-legged plant eaters with rows of bony plates covering their backs and skulls. One family, the ankylosaurids, had a large club at the end of their tails, used presumably for protection. Another family, the nodosaurids, lacked the tail club, but some species had large horny spikes projecting from their necks.

The Utah site yielded a new ankylosaurid and a new nodosaurid that lived more than 100 million years ago. The ankylosaurid resembles an Asian dinosaur of a similar time, suggesting that the two continents were connected then, says Kirkland. Scientists had previously thought that the continental bridge opened up several million years later.

However, Kenneth Carpenter of the Denver Museum of Natural History, who is also studying the new dinosaurs, contends that the resemblances appear to be superficial. —*R.M.*

Dan LoRusso



A 10-meter-long ankylosaurid dinosaur from Utah.