Biomedicine

Antidepressants help smokers to quit

A year-long study of pack-a-day smokers who wanted to stop has found that those who got an antidepressant drug had more success than those who went "cold turkey."

Researchers gave either bupropion (also called Zyban or Wellbutrin) or an inert substitute to 615 smokers. Every participant received brief counseling at the start. After 7 weeks, medications were stopped and researchers checked concentrations of carbon monoxide in participants' blood to see who had quit.

Forty-four percent of the group that got the highest of three doses of bupropion had quit, whereas only 19 percent of the control group had stopped. After a year, 23 percent of the smokers in the high-dose group and 12 percent of the controls were still smokeless, researchers report in the Oct. 23 NEW ENGLAND JOURNAL OF MEDICINE.

Smokers who quit without the help of bupropion gained roughly 6 pounds in the first 7 weeks. Those getting the highest dose of the drug gained only half that, says study coauthor Richard D. Hurt, an internist at the Mayo Clinic in Rochester, Minn. After 6 months, however, all those who had quit smoking—whether they had been given bupropion or not—had gained, on average, about 12 pounds.

Based on this and smaller studies, the Food and Drug Administration has cleared bupropion for smoking cessation. —*N.S.*

Salmonella plays the good-guy role

The *Salmonella* bacterium, long despised for causing food poisoning, may someday become a weapon against cancer. Tests in mice with melanoma, a deadly skin cancer, show that modified *Salmonella* can conduct seek-and-destroy missions against tumors.

Since mice injected with pure *Salmonella* die within a few days, scientists created three strains of the bacterium with flaws that rendered them harmless. The altered bacteria lack compounds central to three different biochemical pathways required for their survival and growth. Some of these attenuated *Salmonella* had a mutated DNA building block, some carried a disabled RNA component, and others had an altered amino acid.

The modifications made the bacteria safe for mice and useful for accosting cancer. Tumors have rapidly dividing cells and are rich in amino acids and nucleotides, the components of protein and genetic material. However, tumors grow so fast that parts of them routinely die from lack of an adequate blood supply. Because the bacteria naturally thrive in anaerobic areas such as dead tissue, the modified strains of *Salmonella* flourished in this environment. Meanwhile, the fast-growing parts of the tumor provided the amino acids and nucleotides that the *Salmonella* craved. As the tumor and the *Salmonella* competed for nutrients produced by the mice, the bacteria stunted tumor growth.

Even when injected into a site remote from the cancer, the modified bacteria thrived only in tumors and fared poorly in normal tissue. "These are mutants genetically tailored so they survive only in tumors," says study coauthor John M. Pawelek, a melanoma biologist at Yale University School of Medicine. The study appeared in the Oct. 15 CANCER RESEARCH.

In untreated animals, new tumors grew to 1 gram in 18 days; in those given *Salmonella*, tumors took 31 to 45 days to reach that weight, depending on which strain of modified *Salmonella* was used. Untreated mice died in about 25 days; those given modified *Salmonella* survived up to twice as long.

The researchers are now expanding the tests to pigs to study safety issues before beginning human trials, says study coauthor David Bermudes, a parasitologist at Vion Pharmaceuticals in New Haven, Conn. The researchers hope to gain approval from the Food and Drug Administration to test the technique on people by the end of 1998, he says. —*N.S.*

Earth Science

Caribbean blasts sparked global warmth

Just over 55 million years ago, Earth's temperature jumped into the red zone, triggering massive extinctions of deep-sea zooplankton and fostering the rise of many land mammals. A group of geoscientists lays the blame for this sudden global warming on volcanic eruptions in the Caribbean.

Studies of sediment cores pulled from the Caribbean seabed reveal several layers of volcanic ash, one of which coincides with the start of the warm period, report Timothy J. Bralower of the University of North Carolina at Chapel Hill and his colleagues. They describe their findings in the November GEOLOGY.

The eruptions may have caused the warming indirectly, the researchers suggest. Dust and gas from the blasts would initially have cooled the tropics, causing the saline seawater in this region to grow dense. As it sank and flooded the deep ocean, this water would have warmed the seafloor and melted solid deposits of methane hydrates. Once the methane bubbled up into the air, it would act as a greenhouse gas, warming the world (SN: 3/22/97, p. 181). —*R.M.*

Fossil embryos reveal early animals

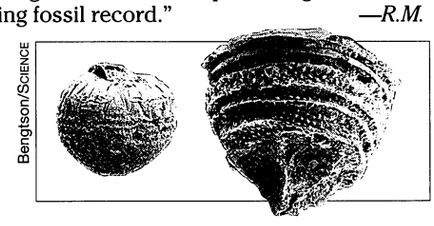
Paleontologists have discovered the oldest known examples of animal embryos, preserved within tiny fossilized eggs in China and Siberia. The recognition of these 540-million-year-old embryos illuminates a route scientists could take to determine when animals originated—a subject of much debate.

The new work builds on research by Chinese scientists, who 20 years ago described egglike fossils in rocks from the early Cambrian period. They named these half-millimeter-wide, globe-shaped fossils *Olivooides.* Now, analysis of the eggs with a scanning electron microscope reveals that they contain embryos from a known Cambrian animal, report Stefan Bengtson of the Swedish Museum of Natural History in Stockholm and Yue Zhao of the Institute of Geology in Beijing. The researchers described the findings in the Sept. 12 SCIENCE and last month at a meeting of the Geological Society of America in Salt Lake City.

Bengtson and Zhao discovered telltale spikes on parts of the embryos that match protrusions on much larger, cone-shaped fossils that apparently belonged to juvenile forms of jellyfish. By examining many fossils, the researchers tracked the animal's embryonic development through several stages of cell division as well as its growth after hatching.

In the past, paleontologists had presumed that egg and embryo fossils were scarce, especially from times near the dawn of animal life. "Maybe eggs are not at all uncommon. Maybe we've been just looking for them in the wrong way," says Bengtson. When he and Zhao used their new knowledge to examine early Cambrian rocks from Siberia, they discovered a set of embryos from an as-yet-unknown animal.

Genetic evidence suggests that animals may have originated 1,200 million years ago, but paleontologists have failed in their attempts to find adult animal fossils in rocks more than 600 million years old. The embryo discoveries suggest that researchers should try searching these ancient rocks for tiny eggs, which may have fossilized more readily than adult animal bodies, says Bengtson. "This is a promising avenue to search for the missing fossil record." —*R.M.*


Bengtson/SCIENCE

A fossilized embryo (left) belonging to the hatched spiral-shaped animal (right) from the Cambrian period.