Biomedicine

Medical root for PMS found

Premenstrual syndrome (PMS), a condition whose existence was once scoffed at (SN: 12/11/82, p. 380), is inching its way toward medical acknowledgment. The exact cause — even the presence — of the menstrual cycle-linked spell of physical and psychological changes is still hotly contested. In the meantime, however, treatments are being attempted for the syndrome, which is estimated to afflict 10 to 30 percent of women. University of California at San Diego researchers report success with daily injections of a chemical that effectively shuts down the ovaries. But, they caution in the Nov. 22 NEW ENGLAND JOURNAL OF MEDICINE, "whether prolonged therapy would be safe and effective, or even necessary, remains to be determined."

Eight women alternated three months of daily placebo injection with three months of a chemical analog to gonadotropin-releasing hormone (GnRH), a substance that sets off a chain reaction resulting in stimulation of the ovaries.

The analog somehow inactivates the system, and in the trial, as expected, it abolished the women's menstrual cycles. The cycles returned when treatment was stopped. The researchers report "a marked attenuation of premenstrual symptoms" but note their concern about possible long-term effects, including osteoporosis. Judith Vaitukaitis of Boston University notes in an accompanying editorial, "At present, GnRH might better be reserved as a probe for understanding the pathophysiology of the premenstrual syndrome, rather than used as a treatment."

Says Ken Muse, one of the authors of the study, who is now at the University of Kentucky in Lexington, "This short-term study was not to find an effective form of treatment, though it points in that direction." Its importance, he says, is that the study is probably one of the first to say that PMS has a biological basis rooted in the reproductive system.

Bird-brained runners

Joggers, beware: There may be more to dodge out there than cars and dogs. In the Dec. 15 LANCET three Swiss researchers report having treated 12 joggers in a two-year period for scalp lacerations resulting from bird attacks. The victims, all men, suffered wounds as long as 14 centimeters. None got rabies.

Seven of the joggers say they were attacked by "birds of prey," while five identified their assailants as European buzzards *(Buteo buteo)*. Eleven attacks occurred during the buzzards' April-to-July breeding season. "The birds," the report states, "attacked by diving from behind and continuing to dive as long as the joggers were in motion."

The conclusion: "Joggers should be aware that nature has its own laws and may not allow intrusion without revenge."

Medicine capsules

•The Food and Drug Administration (FDA) last month approved a device that busts up kidney stones nonsurgically, with shock waves. The FDA claims that 80 to 90 percent of people requiring kidney stone removal (about 100,000 in the United States each year) are candidates for the lithotripter, which was developed in West Germany (SN: 4/17/82, p. 261).

•Minoxidil, a drug taken orally for high blood pressure, also causes hair growth, and is now being examined as a topically administered treatment for baldness. In a press conference late last year, Thomas Nigra of the Washington (D.C.) Hospital Center said that in his year-long study of the drug in 96 patients, 30 percent had a "cosmetically satisfactory response" — at least a doubling of the amount of hair in the treated area.

•Reports from Genentech in South San Francisco appearing in the Dec. 20 NATURE describe successful engineering of the genes for lymphotoxin and tumor necrosis factor, two proteins that kill tumor cells in cell cultures and animals.

Earth Sciences

Comets and geological rhythms of earth

The most fiery debate in earth sciences today rages around the question of whether comets periodically blast into the earth, wiping out many plant and animal species in the process. Now, using the same statistical technique that first revealed periodic extinctions every 26 million years in the fossil record (SN: 10/1/83, p. 212), two scientists have shown that the geological record is marbled by a similar tempo of cycles. Geologist Michael R. Rampino and astronomer Richard B. Stothers conclude that periodic cometary impacts might affect the evolution of oceans, continents and even the earth's magnetic field.

The idea that there are rhythms to the geological processes that shape the earth, as well as the notion that these processes may be triggered by comet showers, is not new. But this is the first time that all the geological data have been treated rigorously with statistics, says Rampino.

The scientists, who work at the National Aeronautics and Space Administration Goddard Institute for Space Studies in New York, analyzed data, compiled by other researchers, that include geomagnetic reversals, mountain range formation, changes in the direction and rate of seafloor spreading and unusually low global sea levels. The so-called time series analysis revealed two dominant, distinct, underlying periodicities of 33 ± 3 million years (Myr) and 260 ± 25 Myr over the last 600 Myr. Rampino stresses that these are mean values; actual events may be separated by longer or shorter time intervals.

The 33 Myr cycle is remarkably close to the 32 ± 1 Myr period obtained by the researchers in a recent reevaluation of the cratering record. (This differs from the previous estimate of 28 Myr because, unlike others, Rampino and Stothers included three impacts that happened in the last 5 Myr.) In earlier work, the scientists had suggested that the craters and mass extinctions were tied to the oscillation every 33 Myr of the solar system through the plane of the galaxy; comets are dislodged when the solar system encounters large interstellar dust clouds that tend to congregate near the galactic plane (SN: 4/21/84, p. 252). The researchers estimate that the chances of the periods of cratering, geological phenomena and solar system movement accidentally coinciding with one another are less than 1 in 10,000.

Rampino and Stothers, whose work appears in the Dec. 21 SCIENCE, think the 260 Myr period might be due to the solar system encountering gas clouds in the spiral arms of the Milky Way as the system orbits the center of the galaxy every 250 Myr or so. But there is no *a priori* reason to expect this, says Rampino, since the spiral arm patterns and movement are complex and poorly understood.

While they don't know the exact mechanisms or sequence of events, the researchers believe that the slow geological rhythms of earth are driven by the bombarding energy of a comet that, if large, can deliver about 1 million times the energy released by all the earthquakes that rumble the planet in one year. "When these things hit there may be an immediate effect like a dust cloud or a tsunami," says Rampino. "But there must also be an input of energy and momentum that goes into the mantle and core that somehow drives or changes the circulation" of inner earth material that dictates the earth's magnetic field, plate movement and the formation of magma plumes.

However, Gene Shoemaker of the U.S. Geological Survey in Flagstaff, Ariz., argues that the energy of a comet impact is very small and localized compared to the total amount of energy required to circulated mantle and core material. For this reason, he has trouble envisioning a geophysical mechanism that could strongly drive geological changes. Moreover, while he thinks the periodicities are interesting, he's not yet convinced that the statistics are compelling enough to link different geological data sets to one another. However, Shoemaker does agree with the new assessment of impact timing, which he feels better supports the galactic plane model.