Behavior

Hormones and premenstrual symptoms

Some women experience marked emotional and physical changes every month that appear to be linked to their reproductive cycles. Scientists studying what is known as premenstrual syndrome, or PMS, admit there is no standard way to define it, explain it or treat it, but most believe a hormonal imbalance is somehow involved (SN: 12/11/82, p. 380).

While that may be true, currently available hormone screening tests used with women judged to have PMS turn up no significant abnormalities, according to Steven J. Sondheimer and his co-workers at the University of Pennsylvania School of Medicine in Philadelphia. Routine use of the costly tests for women with premenstrual complaints is not appropriate, they conclude in the October PSYCHOSOMATICS.

The investigators measured several hormones, including prolactin, thyroxine, thyroid-stimulating hormone, testosterone and cortisol. Fairly large samples of women, ranging from 70 to 183 per test, participated in the screening, which took place during the week preceding menstruation for each subject. Symptoms regularly appearing or intensifying at that point in their reproductive cycles included depression, anxiety, hostility, headaches and nausea.

Almost all subjects had hormone levels in the normal range, say the researchers. The few who had elevated hormone levels did not have distinctive or more intense symptoms. Still, the researchers explain, hormone changes may, in as yet undetermined ways, make a woman perceive her body differently at different times during the cycle.

Ellen W. Freeman and her colleagues at the University of Pennsylvania School of Medicine report in the same issue of PSYCHOSOMATICS that one-third of 239 women with PMS or possible PMS improved considerably after six weeks of treatment that did not include hormone supplements. The approach emphasized education, support groups, dietary changes and the use of vitamin B_6. About half of 107 unimproved patients receiving progesterone therapy reported improvement after six months, add the investigators, but hormone and placebo treatments still need to be compared.

Sit back, relax and panic

Many self-help books and courses aimed at people who suffer panic attacks promote meditation and relaxation procedures as the royal road to serenity. But relaxation therapy can, ironically, pave the way to panic attacks among some unwary individuals.

"We get countless patients in our [phobia and anxiety disorders] clinic who have been to the courses, listened to the tapes and then had panic attacks," psychologist David H. Barlow told a recent National Institute of Mental Health science press seminar in Washington, D.C.

What seems to happen, he says, is that some people susceptible to panic attacks become sensitive to the slightest bodily sensations. They constantly scan their physical and emotional reactions and may respond to slight changes with panic. The loss of control they associate with relaxing, as well as breathing changes that occur early in the relaxation process, create anxiety that rapidly blossoms into panic.

Barlow and his colleagues at the State University of New York at Albany were recently able, by chance, to observe physiological changes during spontaneous panic attacks in two female patients who were being monitored while practicing relaxation techniques. Most striking, says Barlow, were heart rate changes. Panic attacks struck in the middle of relaxation therapy, and heart rates reached a level of tachycardia — excessively rapid heartbeats — within one minute for one patient and two minutes for the other. Repeated practice with supervision, notes Barlow, diminishes the occurrence of panic attacks during periods of relaxation or meditation.

Earth Sciences

Stefi Weisburd reports from Orlando, Fla., at the meeting of the Geological Society of America

Search for impact clues: Amino acids . . .

Most of the scientists hunting for traces of an asteroid impact — which has been nominated as the cause of the dinosaurs' demise and other extinctions 65 million years ago (SN: 6/2/79, p. 356) — have focused primarily on the concentrations of chemical elements, such as iridium, at the Cretaceous-Tertiary (K-T) boundary. Now Jeffrey L. Bada and Nancy C. Lee at the University of California at San Diego have begun searching for biological traces of a possible K-T impact: extraterrestrial amino acids that are known to occur in carbonaceous meteorites and possibly in comets but are extremely rare on earth.

So far, the researchers have tested for alpha-amino isobutyric acid (AIBA) and have indeed discovered evidence for it in a K-T deep-sea sample. Unfortunately, this sample appears to have been contaminated by terrestrial organic matter, so it is premature to say that it clearly contains AIBA, observes Bada. Nonetheless, the reseachers are very encouraged by their preliminary results on this and other samples now being processed.

A finding of AIBA in more pristine samples would lend credence to the impact hypothesis, since scientists don't expect to find amino acids associated with volcanic eruptions — the main theory competing with the impact idea. Moreover, meteorites contain a whole suite of amino acids, so amino acid-bearing K-T samples would help scientists characterize the kind of object that crashed into the earth.

If no extraterrestrial amino acids are detected, a number of possibilities remain. A body other than a carbonaceous meteorite or comet might have struck the planet, or there might not have been an impact at all. And if a carbonaceous body did hit, perhaps its amino acids degraded over time or simply did not survive the high temperature and pressure of the impact. This last idea, if borne out, would be especially sobering to those who believe that life on earth began when extraterrestrial molecules were delivered to the planet via meteorites or comets.

. . . and shocked mineral grains

If there were a "smoking gun" for the impact theory, proposed to explain the mass extinctions at the Cretaceous-Tertiary (K-T) boundary, it would be an impact crater. But no such crater has been found. One possible reason for this is that the proposed meteorite or comet landed in the oceans, as has been suggested by many scientists. But Glen A. Izett and Charles L. Pillmore at the U.S. Geological Survey (USGS) in Denver now believe they have evidence of a land-based impact.

Izett and Pillmore found shocked quartz and feldspar gains in the Raton (N.M.) Basin. These grains have been fractured along their crystal axes in the same way that quartz grains found near craters and nuclear explosion sites have been fractured when the shock waves from such events ripped through the crust. Izett and Pillmore's find confirms discoveries by Bruce Bohor, also at USGS, of shocked quartz at the K-T boundary in Denmark, Spain, Montana and New Zealand (SN: 3/31/84, p. 197).

But their find also adds the shocked feldspar grains as well as some compound quartz grains, or fragments of quartz particles that have been fused together, to the impact proponents' arsenal. Moreover, the composition of the feldspar and the occurrence of the shocked compound quartz (rarely found in oceanic crust) strongly suggest that the meteorite or comet smashed into a continent and not the ocean, argues Izett.

Based on a model of how ash is distributed from a volcano, the researchers also use the size of the grains to speculate that North America was the continent hit. Says Izett: "What impresses us is that these shocked metamorphic minerals in the western United States, from Canada all the way to Mexico, are fairly large — 0.5 millimeter in diameter — which suggests that the impact may have been fairly close, within a few thousand kilometers of Raton Basin and of Montana and Canada."