More evidence for human sex pheromones

The secretion of chemical sex attractants by females occurs throughout the animal kingdom, from the lowly insect on up to the monkey. Lately, scientists have started investigating the possibility that women might also secrete pheromones.

A year ago, Richard P. Michael and his colleagues at Emory University School of Medicine reported the identification of some acids from the vaginal secretions of women that were identical to acids they had previously found in the vaginal secretions of female monkeys (SN: 1/4/75, p. 5). In the female monkey these acids function as a sex attractant for the male.

Now in the Dec. 26 SCIENCE scientists at the University of Pennsylvania report further evidence that women secrete chemical sex attractants. Their results indicate that human vaginal odors change slightly in both intensity and agreeableness during the menstrual cycle. Their results, however, do not reveal whether such odors are due to the same pheromones that Michael and his team isolated and whether they influence men's behavior. Nor do they support the possibility of using vaginal odors as a means of birth control, that is, to determine the general time of ovulation.

The investigators are Richard L. Doty, Mary Ford and George Preti of the university's Monell Chemical Senses Center and George R. Huggins of the university's obstetrics-gynecology department.

Doty and his colleagues first sampled vaginal secretions every other day, excluding weekends, from four women donors for a total of 23 menstrual cycles. Secretions were collected in the evening before retiring and were then sealed in glass jars and frozen until it was time for psychological testing.

A total of 37 men and 41 women served as observers, with 13 to 20 evaluating each cycle. Testing took place in a large air-conditioned room with relatively rapid air turnover. Bottles containing thawed vaginal secretions from an entire cycle of a given donor were presented to each observer randomly at 30-second intervals and were then rated according to the observers' reactions.

Doty and his co-workers evaluated the observers' ratings. They found that odors from different phases of the menstrual cycle differed in both intensity and agreeableness. The secretion odors were, on the average, slightly more agreeable in the preovulatory and ovulatory phases than during the postovulatory and menstrual phases. On the average, female observers found the vaginal secretion odors more intense and less agreeable than male observers did.

Since there was considerable variation in the intensity and agreeableness of vaginal odors from one woman to another, the Philadelphia investigators think it is unlikely that women can use vaginal odors reliably to determine the general time of ovulation. Are the chemicals in the secretions that give off the odors the pheromones isolated by Michael and his colleagues? Possibly. But as Doty and his colleagues point out, more than 30 chemical compounds have been identified in women's vaginal secretions, and any of these might be responsible for the odors. And as for the question of whether vaginal odors can influence men's behavior, Doty and his co-workers stress that male observers didn't find the odors particularly attractive in the test-tube environment. But they admit that men might react differently in normal situations.

One of the major obstacles in proving that men respond to women's vaginal odors, Michael points out in an article, "Hormones and Sexual Behavior in the Female," in the December HOSPITAL PRACTICE, is figuring out "how much of the afferent input to the olfactory pathways actually reaches awareness in such highly evolved species as monkey, ape and man. If these olfactory stimuli produce effects that in large part never reach consciousness, we have a situation that presents considerable difficulties for the experimentalist." □

Monitoring the earth's magnetosphere

The earth's magnetic field is far more than a mere scientific phenomenon. It is the framework for the planet's radiation belts, it helps protect the ozone layer, it affects communications. Its gradual changes may have affected evolution (by moderating incoming solar ultraviolet rays), and various theorists have suggested possible links with the weather. On Jan. 1, the International Magnetospheric Study, a three-year effort to coordinate research programs in more than 40 countries, began.

"Paradoxically," says Juan G. Roederer of the University of Denver, chairman of the IMS steering committee, "the organization of the IMS has come at a time when magnetospheric research is being criticized by some science administrators on both sides of the Atlantic who believe that the days of magnetospheric research are over, that all important discoveries belong to the past, and that any future magnetospheric program would only contribute to an increase of the reportedly indigestible amount of accumulated data."

Yet IMS is very much a space-age effort. It depends heavily on satellites—at least 49 of them—20 of which will be launched while IMS is in progress, including half a dozen specifically dedicated to the program, as well as sounding rockets, balloons and ground-based observations.

The IMS approach is very different, however, from that of the most recent multinational scientific super-project, GATE, the Atlantic Tropical Experiment of the Global Atmospheric Research Program (SN: 11/23/74, p. 332). In GATE, the participating nations sent their ships, planes and research teams together for a single, unified assault, controlled hour by hour for 14 weeks from a central "war room" in Dakar, Senegal, and followed by a carefully preplanned data analysis involving five countries with sharply delineated responsibilities. The IMS researchers will pursue their goals semi-independently, guided primarily by a common listing of research plans circulated through the National Oceanic and Atmospheric Administration's World Data Center "A" in Colorado and by satellite orbital predictions from the National Aeronautics and Space Administration's Goddard Space Flight Center in Maryland.

As the skeptics say, admits Edward R. Dyer Jr. of the Special Committee on Solar-Terrestrial Physics of the International Council of Scientific Unions, there is already a vast quantity of data on magnetospheric phenomena. But it is often difficult to fit such data into a common reference system for comparison. The goal of IMS, he says, is to encourage the gathering of data that will have some coherence, such as by enabling two countries at opposite ends of a given magnetic field line to launch sounding rockets at the same time, with the time chosen to coincide with satellite passages through relevant features of earth's magnetic field. Between 0700 hours GMT on March 2 and 0200 on March 4 of this year, for example, the IMP-J satellite will be in the neutral sheet separating the northern and southern hemispheres of the planet's magnetic tail, while IMP-H and Vela 6A will be crossing the magnetopause between the outer magnetosphere and the shock wave formed by the solar wind.

Seven basic areas have been defined for IMS research: the maintenance of regions of abrupt reversals of the magnetic field, maintenance of magnetospheric plasma convection, wave-particle interactions, propagation of waves through the field's irregularities, large-scale plasma instabilities, instabilities driven by electric currents and time-related changes in transport processes. More than 1,000 individual research programs have been filed with the IMS office, ranging from new projects specially funded for IMS to ongoing efforts included merely in the interests of coordination. The research covered by IMS, Roederer estimates in the January EOS, represents about $100 million—10 times the amount involved in the old International Geophysical Year. □