BIOMEDICINE

Prostaglandin inhibitors fight pain . . .

Aspirin's action has been updated by a new generation of drugs. These drugs act by more effectively inhibiting the body's production of prostaglandins, hormone-like substances implicated in numerous aches and pains. Among the newcomers is a pain-killer just approved by the Food and Drug Administration for prescription use. McNeil Pharmaceutical, manufacturer of Tylenol, says its new product is more effective than aspirin and acetaminophen and is safer than narcotics. Aspirin and acetaminophens act by reducing prostaglandin production at the injury site. Bob Gussin of McNeil says that scientists have evidence that the new drug, Zomax (or zomepirac sodium), acts both at the injury site and in the central nervous system.

Tests on more than 4,000 people have shown that Zomax relieves lower back pain, headache, chronic joint and muscle pain, orthopedic pain from sprains and fractures and pain following surgery. McNeil says Zomax does not cause sedation or euphoria, does not become less effective with continued use and is non-addictive. Charles P. O'Brien of the University of Pennsylvania reported no withdrawal symptoms among 166 patients when Zomax use was discontinued after 12 months.

The side effects of Zomax are similar to those of aspirin. It can cause nausea and other gastrointestinal problems and urinary tract infections. A few patients developed peptic ulceration and gastrointestinal bleeding. The package insert for Zomax states that two 2-year studies in rats showed an increase in the incidence of adrenal tumors; two studies on mice found no excess tumors. Because of this tumorigenicity finding, Zomax is not recommended for use in children. Gussin says that McNeil only agreed to include that statement in the insert in order to expedite FDA approval of the drug. He says the pharmaceutical company plans to return to the agency to argue that rats are a poor model for human metabolism of Zomax and that the type of adrenal abnormalities observed in rats are not predictive of human cancers. Gussin says he believes Zomax is as safe as aspirin, and in a number of years it may become available over the counter.

and menstrual cramps

You've come a long way, baby, as far as the relief of menstrual pain goes. The reason? Another prostaglandin inhibitor. Menstrual cramps are known to be caused by an excess production of endometrial prostaglandin of the E and F series.

Penny Wise Budoff of the State University of New York at Stony Brook reported in the June 22, 1979 JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION that she had found that one prostaglandin inhibitor—the prescription analgesic Ponstel (mefenamic acid) — was significantly more effective than a placebo in relieving menstrual pain in 46 women. This year, at the meeting in Chicago of the International Symposium on Dysmenorrhea, W.Y. Chan of Cornell University Medical College in New York City reported that another prostaglandin inhibitor—the prescription arthritis drug Motrin (ibuprofen)—was more effective than a placebo in relieving menstrual cramps in eight women.

And now another prostaglandin inhibitor—Anaprox (naproxen sodium)—has just been approved by the U.S. Food and Drug Administration for treating menstrual cramps. Anaprox, unlike Ponstel and Motrin, was tested exclusively for the ability to relieve menstrual cramps. Clinical trials involved 212 patients followed over a total of 496 painful menstruations. Complete or substantial pain relief was achieved by 63 percent of patients treated with Anaprox, but only by 18 percent of patients treated with a placebo. Anaprox was also found to be superior to aspirin in both menstrual pain relief and in the inhibition of prostaglandin production.

SPACE SCIENCES

Tracing Io's potassium cloud

The golden cloud of sodium atoms enveloping Jupiter's bizarre satellite Io has been increasingly well mapped in recent years. Much harder to study is another Ionian veil, this one of potassium, whose atoms, says Lawrence Trafton of the University of Texas at Austin, are only about one-thirtieth as abundant as the sodium. Nevertheless, at the recent meeting in Tucson of the American Astronomical Society's Division for Planetary Sciences, Trafton was able to report on nearly 200 Io potassium spectra, gathered over four and a half years and at last offering a preliminary view of the fainter cloud's structure and dynamics.

Despite the difference in brightness, there is a "profound similarity" between the sodium and potassium clouds, Trafton says. For a constant distance from Io, the potassium emissions are systematically brighter on the Jupiter-facing side when Io is not near conjunction, and these "east-west" asymmetries seem consistent with the cloud's being generated (like the sodium) from Io's leading, inner quadrant. Again like the sodium, the (similarly long-lived) potassium cloud shows an alternating north-south asymmetry correlated with Io's latitudinal position in the magnetic field of Jupiter.

Warped rings for Neptune?

Although three of the solar system's four big outer planets are also the three planets known to have rings, some researchers believe that rings are unlikely around the fourth and most distant giant, Neptune. Neptune seems to have no "regular" satellite system (moons rotating in circular orbits in the same direction as the planet and roughly in its equatorial plane) such as would support the possible presence of smaller-scale particles — potential ring material. Of its two known moons, Triton is in a highly inclined, retrograde path, while Nereid follows the most elongated orbit of any known planetary satellite. Yet the ring systems of Jupiter, Saturn and Uranus are radically different from one another, and the possibility of Neptunian rings cannot be totally dismissed.

If Neptune does have rings, says Anthony R. Dobrovolskis of Cornell University, they may be strange indeed. Influenced by the gravitational attraction of massive Triton, he reports in ICARUS (41:222), their outer edges could turn out to be warped like that of a snap-brim hat, or perhaps the whole ring system could be out of Neptune's equatorial plane altogether.

Triton's orbit is inclined about 20° to Neptune's equator, at a distance equivalent to about 14 times the radius of the planet (14 R_N). Out to about 5 R_N, Dobrovolskis calculates, the oblateness of Neptune would hold any ring particles to within 1° of the equatorial plane. At greater distances, however, Triton would increasingly make itself felt, until, at about 10 R_N, the material would be circling the planet within 1° of the plane of the satellite's orbit. The effect of Triton's retrograde or backwards motion around Neptune would be simply to increase its influence.

One hope for detecting any Neptunian rings lies in observing the planet as it passes in front of a star, when additional blockages might signal the rings' presence. The rings of Uranus were discovered by such occultations, and Neptune will occult the star SAO 185377 on Nov. 24. Unfortunately, Neptune will be quite close to the sun at the time (as viewed from earth), making observations difficult. But, says Douglas Mink of MIT, there will be at least eight more occultations over the next four years, three of which will involve bright stars and suitable viewing geometry.

The results could be of particular interest to scientists shepherding the Voyager 2 spacecraft, which may be sent to fly close by Neptune in 1989.

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