SCIENCE NEWS of the week

Ocean Anti-Inflammatory Agents

More than two-thirds of the world is covered by water, so it should come as no surprise that some important discoveries drip. From a Caribbean soft coral, researchers have isolated a novel class of compounds that they say may hold the key to new types of anti-inflammatory drugs. Perhaps equally important, the researchers say, is that the compounds, called pseudopterosins, act in unique ways—raising hopes for a new probe into the processes of inflammation.

In experiments using mice, the pseudopterosins were more potent than indomethacin, a commonly prescribed treatment for arthritis and other inflammatory conditions, the researchers report in the September PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES (Vol. 83, No. 17). The pseudopterosins were 100 to 1,000 times more effective, depending on the assay, in blocking inflammation produced by a skin irritant. According to the researchers, that may be because the pseudopterosins act earlier in the inflammatory process.

The mechanisms of inflammation are maze-like; there are many points at which drugs can have a moderating effect. Most anti-inflammatory drugs target the arachidonic acid cascade, which produces two major mediators of inflammatory responses, prostaglandins and leukotrienes. Nonsteroidal drugs can dam only one side of the cascade—they block production of prostaglandins but leave the leukotrienes unaffected. Steroidal drugs block both routes, but their side effects can make them an undesirable, though sometimes irreplaceable, treatment.

Although the pseudopterosins are not steroids, they appear to act early in the arachidonic cascade, damming both inflammatory routes. But unlike the steroids, they also have potent analgesic properties.

The pseudopterosins seem to be relatively free of toxicity, says William Fenical of the University of California in San Diego. Fenical, one of the leaders of the study, has studied the chemical adaptations of soft corals for a number of years.

Courtesy, Fenical/UCSD

A sea whip of the same genus as Pseudopterogorgia elisabethae, *from which the pseudopterosins have been extracted.*

The pseudopterosins may provide a template for the development of an entirely new class of drugs for inflammatory conditions like psoriasis or arthritis, says Fenical. "They certainly do not act like any other drugs," he says. The University of California has applied for a patent on the class of compounds.

Exactly where in the arachidonic cascade the pseudopterosins have their effect, and how, remain mysteries. In a way, that's encouraging, says Fenical. "These compounds are pharmacologically quite unique—so unique that we don't know where to start in pinning down the mechanism of action," he says. "We've been studying them for years and still have no idea. Either we've overlooked something, or when we do find the mechanism, we're going to find out something fundamental about the mechanism of inflammation." —*L. Davis*

Even low lead levels in mom affect baby

Adverse health effects—one striking, another subtle—have been identified among infants whose mothers were exposed during pregnancy to lead in the environment at levels well below what is usually regarded as toxic to children. Preliminary results of an ongoing study involving more than 300 low-income, inner-city families in Cincinnati were reported Monday in Anaheim, Calif., at the American Chemical Society's national meeting. According to Kathleen M. Krafft and her colleagues from the University of Cincinnati Medical Center, the study indicates that exposure to even moderately low levels of lead *in utero* increases the chance not only that a child will be born with a low birthweight, but also that the child's early neurological development will be somewhat slowed.

Women were recruited into this study at their first prenatal health exam. Lead levels measured in their blood at that time are being used as the gauge of fetal exposure. The children's blood-lead levels are being measured at three-month intervals from 10 days after birth through age 6. Since it's assumed the home environment contributes most to a young child's lead exposure, the program also surveys each family's residence for the heavy metal's presence in paint, dust and soil. Finally, because others have linked lead exposure with learning and neurological problems (SN:2/6/82,p.88), Krafft, a neurobehavioral psychologist, is attempting to chart the cognitive and neurological development of the children through frequent behavioral tests.

Because so many of these children are quite young, Krafft says statistically significant correlations can be made only for effects in children under 1 year old. One of the strongest of those is the link between a mother's lead exposure and her child's birthweight. Even "relatively low" maternal blood-lead levels of 8 micrograms per deciliter—25 micrograms per deciliter is usually considered toxic to children (SN:2/16/85, p.203)—correlated with a birthweight 192 grams lower than that of infants whose mothers had no obvious lead exposure. Krafft says this effect is as striking as the link seen between maternal smoking and decreased birthweight (SN:1/19/80,p.37)—a factor that has been taken into account in designing these experiments.

Children whose mothers had the lowest lead levels scored slightly higher on neuromotor development tests given through age 6 months. But this correlation may not hold up beyond that age, Krafft warns, because in lead-laden households, children's exposures begin deviating from their mothers' at about this time—when they begin grasping, putting things in their mouths and crawling. —*J. Raloff*

Growing edge of a Caribbean wedge

Researchers on Leg 110 of this summer's Ocean Drilling Project became the first to drill into the detachment surface of a subduction zone—the surface of contact where one crustal plate burrows beneath another. The international expedition bored nine holes in six sites north of Barbados to better understand how the movement of fluid influences the very early stages of some mountain-building processes. They found that the folding and thrusting of the colliding plates have laced the area with fractures that allow water to seep through submarine rock to the ocean floor. The force of the two converging plates squeezes unusually warm water and sometimes methane out of the rock and up through these cracks, lubricating the plates as they slide past each other.