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## Science and the sources of pain

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Chronic pain is no small problem for thousands of Americans. They take analgesics, sedatives or tranquilizers. They seek out chiropractors, acupuncturists or even miracle workers. Often they are not helped, at least over the long run, and become depressed. Some even commit suicide.

These hard facts were brought home last week at a pain seminar, held at the annual meeting of the American Society of Anesthesiologists in Washington. The reason that so many people aren't getting relief from pain is that clinicians still aren't sure what pain is and how to treat it.

Does pain consist of a stimulation of peripheral nerves, or of central nervous system nerves? Does it have its origin in the brain or in another organ of the body? Pain can be anything that the brain or body sees as noxious. Or pain can describe a single sensation.

Since pain is often diffuse, clinicians are rarely able to measure it scientifically. So they have to rely, to a large degree, on patients' descriptions of where they hurt. "An alert and cooperative patient can help us pick out his pain fibers," reports Hubert L. Rosomoff, a neurosurgeon with University of Miami School of Medicine. However, many patients, while cooperative, aren't particularly sensitive to pain sites, or their pains just don't lend themselves to accurate description. Prime examples are abdominal pains or organic pains caused by tumors. In such cases clinicians have to use other strategies for tracking down pains.

One physician is using a multipronged technique to zero in on pain sites. First a patient is given a placebo (an injection of salt solution near the purported pain site). If the placebo brings pain relief, he is fairly sure that the source of the pain is psychological. If the placebo doesn't bring relief, he concludes that the pain is physiological and tries blocking nerve fibers near the pain site. If the blocking helps, he is assured that the source of the pain is in the fibers. But if the blocking doesn't help, he will test an organ for pain. If the organ doesn't turn out to be the pain site, he will try the central nervous system. The physician asked not to be identified, to avoid any possibility of the publicity jeopardizing his research procedures.

Using this strategy, he has been successful at diagnosing pain sites that other physicians had misdiagnosed or had not been able to pinpoint. Of 100 patients for whom no cause of their pain could be found, 75 percent turned out to suffer from pain in the sympa-

thetic nerves. The sympathetic nerves control sweating, vasoconstriction and other autonomic nerve functions. They are not normally associated with pain since pain usually travels along nerves responsible for feeling (sensory nerves). The other 25 percent of the patients suffered from pain whose origin was organic, psychosomatic or of the central nervous system.

Even if clinicians manage to diagnose the site of pain, it doesn't necessarily mean that they're able to treat patients effectively. "We're still shooting very much in the dark with drugs that were used centuries ago," says Rudolph H. deJong, an anesthesiologist and pharmacologist with the University of Washington School of Medicine. Electrode stimulation of nerves in the spinal cord for low back pain, Rosomoff asserts, "is probably not worth a blessed thing in its present state of development." It's tricky making holes in the spinal cord to relieve pain, Kenneth L. Casey, a neurologist and neurophysiologist with the University of Michigan, points out, because nerve fibers may grow back in

the hole and cause pain once more. "The central nervous system," he laments, "is not a Swiss watch."

The most disconcerting aspect of pain treatment, the seminar speakers concur, is that a 70 percent success rate is reported for nearly all new pain treatments. But as more and more experience is gained with these treatments, the 70 percent success rate falls off for many of the treatments. The initial 70 percent success rate appears to be due to the enthusiasm of the clinician who believes he has found a great new cure and transmits his enthusiasm to his patients.

The pain picture isn't all glum, though. Recent studies have shown that specific pain fibers exist, and that their activity can be modified in the central nervous system by other nerve fibers or by impulses from the brain. So Casey is doing research to see whether drugs or electrical stimulation that act on the brain might control pain via the central nervous system. "We need to do more work on animals before trying these techniques on patients," he says. □

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## Hormones linked to birth defects

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Oral contraceptives have changed population patterns and birth rates almost single-handedly in most of the world's industrialized nations. The pill has many advantages over other forms of birth control, but it has come in for much criticism, too. Physicians and researchers have linked the pill to blood clots, migraine headaches, elevated blood pressure, liver tumors, diabetic effects and cervical cancer, among others. And the list is still growing.

New evidence now has been published linking the pill to birth defects. Epidemiologists from the New York State Department of Health at Albany report in the Oct. 3 *NEW ENGLAND JOURNAL OF MEDICINE* a possible link between exposure during pregnancy to hormones produced outside the body and limb malformations in offspring. Dwight T. Janerich, Joyce M. Piper and Donna M. Glebatis studied 108 cases of babies born with limb-reduction malformations (the absence of an entire or part of a limb) and 108 normal babies. The mothers were matched by age and race for more valid comparison. Among the mothers with malformed children, 14 percent had been exposed to exogenous hormones (produced outside the body) during pregnancy, while only 4 percent of the mothers of normal babies had been similarly exposed.

The exposure took one of three forms: the unintentional use of birth control pills after pregnancy had occurred; the administration of estrogens or progestogens as supportive therapy

for one of a number of reproductive system disorders, or the administration of hormones during a certain type of pregnancy test.

One puzzling fact emerging from the study is that in 11 of the 15 cases of malformations following hormone exposure, the mothers received the hormones orally (not by injection) and the affected babies are all males. This indicates, Janerich told *SCIENCE NEWS*, that hormones taken orally during pregnancy may have a sex-specific effect on the growing fetus, that is, cause deformations in male babies but not female. Hormones were injected into four women who later gave birth to malformed children of both sexes. Janerich does not know at this point how or why sex-specific effects could be occurring, but one possible answer suggested to him by a colleague is that oral hormones are derived chemically from testosterone, a male hormone, while injectable hormones are not. The converted male hormone may have a residual effect.

The team made these findings after studying New York state birth certificate information recorded between 1968 and 1973. The study was part of an ongoing congenital malformation surveillance program sponsored by the New York State Department of Health. The records show 145 limb reduction malformations occurred in New York during the five-year period, but the team was able to locate and interview only 108 mothers. Limb-reduction defects are fairly rare, occurring only