

Chemistry of compulsive hair pulling

A preliminary study suggests women driven by an irresistible impulse to pull out their own hair can often resist the strange urge when given an antidepressant drug already shown to ease the symptoms of obsessive-compulsive disorder. The finding, reported in the Aug. 24 *NEW ENGLAND JOURNAL OF MEDICINE*, suggests excessive hair pulling—or trichotillomania—is related to the uncontrollable thoughts and repeated rituals that characterize obsessive-compulsive disorder.

Trichotillomania's prevalence is unclear. Sufferers recognize the bizarre nature of their impulses but still pull out hair from their scalps, arms, eyebrows and eyelashes. No standard treatment exists for the disorder, which mainly afflicts females.

Psychiatrist Susan E. Swedo of the National Institute of Mental Health and her colleagues compared two antidepressants, clomipramine and desipramine, in 13 women with severe trichotillomania. Subjects first took a placebo pill for two weeks. Next, each received one of the antidepressants for five weeks, then switched to the other for five weeks.

Evaluations by patients and their physicians, none of whom knew which drug was being taken, indicated only clomipramine was effective. Three clomipramine patients stopped pulling their hair, and nine had a reduction of at least 50 percent in the severity of their symptoms.

Clomipramine may work by increasing the availability of serotonin, a chemical messenger in the brain (SN: 5/21/88, p.324). The researchers also recommend behavior therapy for patients who partially respond to the drug.

Seeking the source of emotions

In studying the roots of emotion, researchers typically focus on facial expressions for clues to the different emotions babies experience. These expressions apparently reflect a "central emotional system" in the brain that formulates positive and negative emotions during the first year of life, says psychologist Nathan A. Fox of the University of Maryland in College Park.

Fox, who spoke at the recent annual meeting of the American Psychological Association in New Orleans, contends the "primary" emotions—joy, interest, fear, disgust, anger and sadness—emerge under the direction of an inner-brain structure called the amygdala.

Recent animal studies conducted by psychologist Joseph E. LeDoux of Cornell University Medical College in New York City indicate the amygdala determines the emotional importance of stimuli. In human infants, Fox maintains, the amygdala may evaluate sensory information and handle the decision to approach or withdraw from an object, person or situation. Complex emotions are probably forged as the amygdala gradually develops neuronal connections to the brain's frontal lobes, he adds.

One signal of a baby's tendency to approach or withdraw from an emotional stimulus is the pattern of electrical activity across the surface of the brain, Fox asserts. Over the past seven years, he and his co-workers have found that electrical activity in an infant's left brain hemisphere surges during positive emotions, while electrical activity in the right hemisphere greatly increases during negative emotions. They obtain measurements via electrodes embedded in a metal cap placed over an infant's head.

Right hemisphere activation is most striking when a baby cries, Fox notes, whereas activity intensifies in the left hemisphere during a smile.

Much remains unknown about the roles of the right and left hemispheres in emotional development (SN: 3/11/89, p.149). Nevertheless, changes in the electrical charges produced by the hemispheres appear to mirror infants' emotional experiences in different situations, Fox says.

Sperm sorter ensures sex-linked litters

Scientists have an improved method for sorting male-producing (Y chromosome) and female-producing (X chromosome) sperm cells in animals. Using the technique, they have produced rabbit litters with 80 to 90 percent one gender or the other. The technique shows promise for farmers raising beef cattle, swine and dairy cows, who have economic incentives to raise greater numbers of either males or females.

Dairy farmers want to limit the number of newborn males—for obvious reasons. But beef producers prefer males because they grow faster, and swine farmers seek a preponderance of litter-producing females.

Previous work by Lawrence A. Johnson of the USDA's Agricultural Research Service in Beltsville, Md., yielded a machine that could sort male and female chinchilla sperm, but only after the sperm's tails had been removed (SN: 5/18/85, p.310). Johnson started with chinchillas because male-producing sperm from these animals pack a whopping 7 percent more DNA in their microscopic heads than do female-producing sperm—a difference easily detected by the experimental device, which sorts cells on the basis of DNA quantity.

But male- and female-producing sperm in most livestock differ in DNA content by only about 3 percent. The newest sorter easily recognizes that subtle difference while leaving sperm cells their tails, and it does so at a rate of about 300,000 cells per hour. That's almost twice the rate of Johnson's previous models but still too slow to produce economically the millions of sperm required for each insemination in a typical farm animal. Nevertheless, the process may prove valuable for the growing number of animal breeders who use *in vitro* fertilization and embryo transfer techniques, which require far fewer sperm than natural insemination does.

The \$250,000 sorter measures the amount of laser light reflected from individual sperm soaked in a DNA-staining dye, then sorts them according to light intensity. Since rabbit sperm heads are flat, Johnson had to devise a way to keep them all oriented in the same plane while they flow through the sorter, minimizing random variations in reflected light due simply to differences in sperm-head orientation. The new sorter does this by creating a ribbon-like flow of fluid that sends the flat-headed sperm to their sex-segregated destinations like manta rays skimming the ocean bottom in single file.

Rabbits inseminated with sorted sperm have about double the pregnancy failure rate of rabbits inseminated with unsorted sperm—a reflection, perhaps, of DNA damage from the dye or laser, Johnson says. Ongoing experiments seek to find a cell-surface marker that might serve as a less damaging dye-binding site than the DNA itself.

Prolific pigs: Pleasant but not pretty

Three U.S. research centers recently welcomed a total of 140 Chinese boars and sows they hope to breed with domestic swine. The oriental sows average 36 piglets per year, comparing favorably to the U.S. average of 22.

They're also more docile, they don't snort as loudly, and the males don't emit the strong, unpleasant odor common to domestic varieties. "They're not a pretty animal by any means," says Robert D. Whiting of USDA's Animal and Plant Health Inspection Service in Hyattsville, Md. "But that's not what we got them for."

