medical sciences

CARDIOLOGY

Heart-rate mechanism suspected

A mechanism that regulates the heart rate in animals and human beings, independent of the nervous system, is being investigated by researchers at the University or Illinois College of Medicine in Chicago. Dr. Willard S. Harris, who heads the group, says the mechanism is being checked in a fresh-water fish—the carp—because it is the only vertebrate known to lack sympathetic, or involuntary, nerves to its heart.

Dr. Harris and his Chicago associates find that the heart has a pacemaker contained in its wall that determines the rate of heart beat by the amount of stretch on the wall. Although the exact manner in which the mechanism works is still being sought, the mechanism appears to regulate the amount of blood the heart moves. Dr. Harris used a pump to drive oxygen and a salt-water solution continuously through a heart removed from the carp, and found the rate of beat changes by either increasing or decreasing fluid pressure.

NEUROCHEMISTRY

Calcium link found

Faulty calcium metabolism has long been associated with some forms of psychological disturbances, but the key mechanism has never been completely understood. Studies have shown that low calcium levels have been found in patients with poor intellect, memory or with mental retardation and in the severely mentally disturbed. In several cases, increasing the calcium levels leads to normal improved brain function.

Another step in this direction has been found by two Baltimore neurobiologists who uncovered a link between calcium and the establishment of the classic Pavlovian conditioned response. Drs. Robert Grenell and Eduardo Romero, both of the Neurobiology Laboratory at the University of Maryland Medical School, elicited responses at will by manipulating the cellular chemical in a living animal brain.

In cats, the physicians say, the conditioned response appears when the calcium level in the brain cell is higher than the level in the blood outside the cell. But when the reverse situation exists, the response disappears.

The researchers believe that calcium controls the bonding of acetylcholine, the neurohormone that elicits the conditioned response when released in a nerve cell. They believe that the calcium ions flow across the cell by osmosis to inhibit the bonding. If so, this may have direct bearing on processing information, memory and learning.

ASTHMA

Link with parasites

Bronchial asthma may be linked with three types of intestinal parasites, according to Dr. David C. H. Tullis of Niagara Peninsula Sanatorium in St. Catharines, Ontario.

Writing in the Feb. 12 NEW ENGLAND JOURNAL OF MEDICINE, the physician reports that of 201 bronchial asthmatics studied between 1965 and 1968, 198 had at least one type of the parasites in their intestines. Of these patients, he claims that 93 percent had a form of roundworm found in the United States and Canada, six percent had roundworms common to Asia and one percent had hookworm—another form of roundworm.

Of 29 who returned to the hospital because of their asthma, all again had parasites in their intestines.

Dr. Tullis contends that the results don't imply that all persons with bronchial asthma have parasites, but that parasites may be one of the many causes of bronchial asthma.

Allergy, he explains, is usually precipitated by an abnormal immunity in the blood, and parasites may upset the immune system. The link may be that antibodies may even develop to fight the worms, and that asthmatics develop an allergy to the antibodies.

VISION

Conditions on the moon

Astronauts will need sharp, clear, effective vision to explore the moon. But, says Dr. Ingeborg Schmidt, professor of the division of optometry at Indiana University in Bloomington, the moon has a unique optical environment that creates certain problems in vision.

According to Dr. Schmidt, the moon is illuminated by a number of sources, including direct sunlight, indirect sunlight, earthlight and moonlight.

The earth's atmosphere is gradually thinned by water vapor and haze that make contours less conspicuous and contrasts between color and brightness less distinct, says Dr. Schmidt. On the other hand, the moon lacks atmosphere to soften the clear contours of distant objects.

In addition, sunlight striking the moon is not changed in intensity or spectral composition. Thus, this lack of atmosphere may cause astronauts to misjudge distances. The actual forms of the moon's well-outlined contours against the immediate optical impression of the astronauts will need to be explored further.

Dr. Schmidt suggests that such capabilities as high-glare resistance, rapid recovery from glare and high contrast sensitivity at any level of illumination are needed.

ORTHOPEDICS

Foot pain and emotion

Neuromuscular and psychological conditions have been linked for some time. Dr. René Cailliet of the University of Southern California in Los Angeles says foot pain and emotional distress are common manifestations of one another.

The researcher observes that people stand and walk the way they feel. If they feel well, they move the body forward when walking, with a spring in the step. On the other hand, if a person is undergoing an emotional crisis, he tends to slouch and walk flat-footed with no spring. Pain, he contends, then occurs because of the stress and strain placed on certain parts of the foot.

Damage to these parts, such as fallen arches, flatfeet or bruised heels, could occur if the stress continues over a protracted period of time. Dr. Cailliet, who is clinical professor of physical medicine at USC's School of Medicine, says that the reverse can also be true. That is, if an individual's feet are constantly hurting from sheer physical causes, he can become depressed and walk sloppily again, creating a vicious cycle.