Public Relations Office, *extensions 414, 415*
CASE INSTITUTE OF TECHNOLOGY
UNIVERSITY CIRCLE
CLEVELAND 6, OHIO
SWeetbriar 5-1000

FOR RELEASE

Miniature FM transmitters, each smaller than a shirt button, are being implanted in experimental animals to broadcast the electrical activity of the muscles, the heart and respiratory system. The transmitters were developed in Case Institute of Technology's Engineering Design Center by Dr. Wen Hsiung Ko, Associate Professor of Electrical Engineering; Eugene Yon, Project Engineer; William L. Thompson, Engineering Design Fellow; and Herbert A. Will, Graduate Assistant in the Engineering Division.

Cooperating in the project are Charles Long II, M.D., Associate Director of Physical Medicine and Rehabilitation at Highland View Hospital; and Robert C. Grotz, M.D., Chief Resident in Physical Medicine and Rehabilitation at Highland View, which is a member of the Western Reserve University Associated Hospitals.

This is believed to be the first time that implant transmitters have been used to broadcast bio-electric signals from normal muscles

(more)

although radio receiving units have been used to stimulate heart action and other radio devices have been swallowed to broadcast data in studies of the digestive tract.

The advantage of implanting the FM transmitters beneath the skin is that this technique permits study of the normal electrical activity. Other techniques have required strapping down the experimental animal, or allowing it to move about while connected to wired external electrodes which interfere with the animal's normal movements.

Two techniques have been used. In a series of experiments on rabbits, the transmitters have been implanted in rear leg muscles along with miniature mercury batteries to provide power. Together, the battery and transmitter weigh about 1/13 of an ounce, and have given excellent experimental readings of normal muscular movement.

In the second technique which does not require a battery, the transmitter and a radio power detector have been implanted beneath the skin on the backs of rats and mice. Wires extend from the transmitter along both sides of the animal beneath the skin. These wires end in gold electrodes placed to pick up the electrical activity of the animal's heart.

The movement of the chest wall also creates an electric potential which can be simultaneously recorded along with the electro-cardiogram. This transmitter is powered by an externally-induced electric field surrounding the animal's cage.

(more)

Variations in the electrical pattern of the heartbeat, not previously recorded, resulting from sleep, activity and fright have been observed by the use of this technique. The investigators use the external source of power because the miniature mercury cells, which provide 1.4 volts, tend to become exhausted after 40 hours use.

The transmitting sets employ tunnel diodes and varacaps—specially developed for this purpose at Case and have an effective transmitting range for experimental purposes of about three to five feet. They are about 0.3 inches across and 0.08 inches thick.

At present, the tiny transmitters are being used only for recording body activity. The possibility of using these transmitters and similar implanted receivers to activate groups of body muscles in paralyzed humans will be studied as part of a major research effort at Case aimed at enabling disabled persons to regain the use of body functions.

This bio-medical engineering research is conducted by Case's Engineering Design Center under the general direction of Dr. James B. Reswick, the Center's Director, and Olgierd Lindan, M. D., of Highland View Hospital.

The project is supported by Case and the Vocational Rehabilitation Administration of the United States Department of Health, Education and Welfare.

-M-

21964