News
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******Dallas heart researcher studies angina.

DALLAS--Many people with coronary artery disease develop a chest pain called angina after they eat large meals or exercise. Medical scientists do not know exactly why this occurs or how to prevent it.

A researcher at The University of Texas Health Science Center at Dallas is currently investigating this problem. Dr. John C. Longhurst and his co-workers have found evidence in experimental animals that stomach stimulation and isometric exercise (such as lifting a heavy weight) both cause profound cardiovascular changes that may produce angina.

"A classic example of a situation that causes angina is after eating a meal," Dr. Longhurst says. "I am trying to determine why this occurs, and it looks like it may be at least partially due to cardiovascular reflexes originating in the stomach."

Dr. Longhurst is proposing that the stomach swelling and the presence of certain chemical substances that result from eating a meal may stimulate nerve endings in the stomach (or "gastric receptors") that can alter heart function. In studies supported by the American Heart Association, he began testing this theory by stimulating gastric receptors with a drug that is an extract of paprika--Capsaicin.

"When I stimulate the stomach with Capsaicin, it produces significant cardiovascular changes, including increases in blood pressure, heart rate and force of heart contraction," Longhurst says. "The stomach seems to respond by sending nerve impulses to the heart and blood vessels by way of the central nervous system."

He says he gets a similar type of heart response in stomach distention experiments, but that it may be due to stimulation of a different set of gastric receptors and reflex pathways. In future studies, he will use nerve recordings to define exactly what types of receptors he is stimulating and what nerve pathways are involved.

"I want to find out how the stomach influences the heart and to characterize the reflexes as completely as possible," Longhurst says. "Once this information is known, it should then be possible to suggest methods of treating patients so that angina will not occur during eating."

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first add angina studies

In another series of experiments, Dr. Longhurst and Dr. Jere Mitchell, director of the Moss Heart Center at the Dallas medical school, have shown that constriction of coronary arteries can occur during the stress of isometric exercise.

Isometric muscular contraction predominates in activities such as lifting a heavy suitcase or opening a stuck window. In this form of exercise, the muscles maintain a relatively constant length, as if contracting against an immovable object. The other main class of exercise--"dynamic" exercise--includes such activities as running and swimming, and is associated with changes in length of the contracting muscles.

In both types of exercise, the heart needs increased amounts of oxygen-supplying blood because it's working harder. But isometric exercise apparently stimulates a neural reflex that causes constriction of the coronary arteries and partially prevents the blood flow to the heart.

"In our experiments, we have demonstrated the presence of a reflex which reduces coronary flow during isometric exercise despite increased oxygen demand by the heart," Longhurst says. "Thus it appears that this form of exercise often causes an imbalance between coronary blood supply and work demands, a relationship that may be particularly delicate in patients with coronary artery disease."

Patients with coronary artery disease, which is hardening of the arteries of the heart, already have insufficient blood flowing to their hearts. Isometric exercise may further increase this blood insufficiency, possibly causing angina or even a heart attack. Therefore, Dr. Longhurst recommends that such patients avoid heavy isometric exercise.

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