

Taking the fight against cancer to heart

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Hormones produced by the heart eliminated human pancreatic cancer in more than three-quarters of the mice treated with the hormones and eliminated human breast cancer in two-thirds of the mice, according to researcher David Vesely, a doctor at the James A. Haley Veterans Hospital in Tampa and a professor at the University of South Florida (USF).

The treatment has not yet been tried in humans, but a private biotechnology company is raising money in the hope of beginning human trials. Vesely is the hospital's chief of endocrinology, diabetes and metabolism and is also professor of medicine, molecular pharmacology and physiology at USF.

He will present his research at a symposium April 9 at the Experimental Biology 2008 conference in San Diego. The American Federation for Medical Research sponsors the session, which takes place during the annual meeting of The American Physiological Society.

The discovery of cardiac hormones

For more than 350 years, scientists and physicians thought the heart was a pump, delivering blood and oxygen to the body. But that view changed dramatically in 1981 when Adolfo deBold discovered that the heart produces atrial natriuretic factor (ANF), so-named because it is produced in the atrium of the heart and stimulates the production of urine and the excretion of sodium.

Vesely later discovered three more hormones that are produced from the same gene as ANF. He called them:

- Long acting natriuretic peptide, which also stimulates urine production and sodium excretion.
- Vessel dilator which opens the blood vessels and lowers blood pressure
- Kaliuretic peptide which increases potassium excretion

The hormones, called peptide hormones because they are composed of amino acids, help regulate blood volume and blood pressure. Most hormones, including such well-known hormones as insulin, are peptide hormones.

Started with congestive heart failure research

Vesely began his research on cardiac hormones by looking at the role they can play in diagnosing and treating congestive heart failure. Following his wife's death from breast cancer in 2002 -- and as it became clear that the hormones controlled cell growth -- he decided to place the hormones into cancer cell cultures.

Using colon, ovarian, breast, prostate and pancreatic cancer cells, among others, Vesely found that the hormones kill up to 97% of all cancers in cell cultures within 24 hours. He then turned to trials with mice, injecting some with pancreatic cancer cells and others with breast cancer cells. Once the mice developed tumors, he treated them with the hormones.

At the end of one month, the treatment had eliminated cancer in 80% of the mice injected with human pancreatic cancer and in 66% of the mice injected with breast cancer. The results with pancreatic cancer were

particularly exciting because it is a fast-moving cancer with poor prognosis.

No side effects in mice

The pancreatic cancers that were not cured were reduced to less than 10% of their original size. Treatment with vessel dilator gave the best results: reducing the tumor to 2% of its largest size. None of the mice died of cancer – all died of old age – and none suffered any side effects.

None of the mice received any other course of treatment such as surgery, chemotherapy or radiation and they did not suffer any side effects. After the mice died at the end of a normal life span, the researchers found that the cancer had not spread. If the hormones act the same way in humans, cancer could become a chronic condition treatable with these hormones, Vesely said.

A private biotechnology company is raising money to begin human trials, Vesely said. The Haley hospital and University of South Florida hold the patents on the discoveries.

The symposium that Vesely will moderate, “Cardiac hormones for the treatment of acute myocardial infarctions, congestive heart failure, acute renal failure and cancer,” also features presentations by other leading researchers in the field of cardiac hormones:

John C Burnett, Jr. of the Mayo Clinic and Foundation, who will discuss research on the use of a cardiac hormone orally to treat congestive heart failure and to reduce damage to heart tissue as a result of a heart attack.

Walter H. Hörl of the University of Vienna will discuss his research measuring the cardiac hormones in guiding treatment of kidney disease and dialysis.

Adolfo J. deBold and Mercedes deBold, of the University of Ottawa Heart Institute will discuss the physiology and gene expression of cardiac hormones, also known as natriuretic peptide hormones (ANPs) and the central role of G-protein signaling in natriuretic peptide secretion.

Source: American Physiological Society

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