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(Last updated 9/7/05)

Previous stories pertaining to Professor Ferketich's research:

["Scientists Identify A New Model Of NK Cell Development,"](#) 3/18/05.

["Women Heart Patients Suffer Lower Quality Of Life Than Do Men,"](#) 8/16/02.

SYMPTOMS OF DEPRESSION MAY WORSEN HEART FAILURE

COLUMBUS , Ohio – New research suggests that depression may hasten the progression of heart disease by increasing the levels of a key protein that causes inflammation.

In a study of 32 people with [heart failure](#), the 14 patients who felt the most depressed had nearly twice the levels of this protein in their blood.

The protein, tumor necrosis factor alpha (TNF-alpha), is one member of a large family of proteins called cytokines, chemical messengers that are mobilized when the body is injured or has an infection. These cytokines often cause inflammation in their effort to repair an injured or infected area of the body. In the case of heart failure, this inflammation makes it even more difficult for the heart to pump blood. (Heart failure is a disease in which the heart loses the ability to pump blood with normal efficiency.)



Amy Ferketich

“People with heart failure typically have much higher TNF-alpha levels than people without the disease,” said [Amy Ferketich](#), the study's lead author and an assistant professor of [public health](#) at Ohio State .

“But depression seems to make levels of this cytokine even higher, which is bad for patients.”

The study's results appear in a recent issue of the [American Heart Journal](#). Ferketich worked with Ohio State colleagues Jeanette Pohorence Ferguson, a graduate student in pathology, and [Philip Binkley](#), a professor of internal medicine.

They recruited 32 patients from the heart failure clinic at Ohio State . The participants answered the 21-question [Beck Depression Inventory](#), a tool that physicians and scientists use to measure symptoms of depression. Answers to each

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question are given a value of zero (no symptoms at all) to 3 (severe symptoms). A score of 10 or more suggests that a patient has at least mild symptoms of depression.

is if depression causes the inflammation which may lead to heart failure or if heart failure causes depression which accelerates inflammation.”

The researchers drew blood samples from each patient.

From these samples they evaluated levels of three cytokines: TNF-alpha, interleukin-6 (IL-6) and interleukin-1beta (IL-1beta). Previous research by other scientists has shown that the three cytokines, which all cause inflammation, are elevated in patients with heart failure.

Indeed, all of the patients in the study had higher-than-normal levels of each cytokine. However, TNF-alpha was still markedly higher in patients who reported feeling depressed on a regular basis.

“We were surprised to find that this wasn't the case for the other two cytokines,” Ferketich said. “That suggests that something about depression may trigger the production of TNF-alpha.”

The researchers measured cytokine levels in picograms, or trillionths of a gram. Patients with scores of 10 or higher on the BDI had levels of TNF-alpha nearly twice that of patients with a score less than 10 (4.9 pg/ml vs. 2.7 pg/ml.)

Levels of the other two cytokines were similar for depressed and non-depressed patients: 5.9 pg/ml vs. 5.1 pg/ml for IL-6 and 4.4 pg/ml and 3.6 pg/ml for IL-1beta, respectively.

Other researchers estimate that anywhere from 24 to 42 percent of heart failure patients also suffer from depression.

“Depression clearly raises the levels of one cytokine, which plays a role in increasing inflammation,” Ferketich said. “What we don't know for sure is if depression causes the inflammation which may lead to heart failure or if heart failure causes depression which accelerates inflammation.”

A study at [Duke University](#) found that patients with major depression are twice as likely to die or to be re-admitted to the hospital a second time within 12 months.

“Patients with heart disease are prone to developing depression,” Ferketich said. “Physicians need to pay more attention to this. But research still needs to be done to find out if treating patients with anti-depressants would help to actually slow the progression of heart disease.”

The study was supported by the [National Institutes of Health's National Heart, Lung and Blood Institute](#).

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