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# Scientists investigate estrogen, heart disease connection in women

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A new study on old rats by a Penn State researcher will shed light on the connection between estrogen deficiency, heart disease and aging in women.

Heart disease is the leading cause of death in women over the age of 75. After menopause, women lose their ability to produce the hormone estrogen and researchers believe that low estrogen levels somehow make women more vulnerable to heart disease and heart attack.

Donna Korzick, associate professor of physiology and kinesiology in Penn State's College of Health and Human Development, has a $1.8 million, five-year project funded by the National Heart, Lung and Blood Institute of the National Institutes of Health to figure out why estrogen deficiency puts women in danger for heart disease.

Korzick will identify proteins in heart cells that might be affected by both aging and low estrogen levels. She will work with Bruce Stanley, director of scientific programs, Penn State Milton S. Hershey Medical Center, to identify these proteins.

"Proteins are the work horses of the cells," said Korzick. "When they become activated, they can trigger different functions within the cell. Some are even responsible for cell death as we age."

Proteins can become 'activated' in a variety of ways, including by low estrogen levels.

Korzick will analyze the proteins within one segment of heart cells, the mitochondria. These are the "gate keepers of cell survival," says Korzick. The mitochondria play a significant role in whether or not a cell lives or dies as we age, especially while experiencing a heart attack.

"Cell death is a natural process," explained Korzick "But when heart cells die, it means that the remaining cells have to do more work. In this way, cell death is directly linked to how well the heart can withstand a stress like a heart attack."

After identifying the heart cell's proteins, Korzick will determine which proteins respond to low-estrogen environments. She will then use protein-targeting drugs that can activate or inhibit specific proteins in the heart cells to change what is happening inside the cells. Korzick hopes that these experimental results will provide the missing piece to the estrogen deficiency -- heart disease puzzle.

Because of their short life span -- only two years, Korzick will look primarily at rats. According to Korzick, this short life span allows for a "true model of aging." Additionally, other researchers have already completed a large body of work involving aged rats so she will have a comprehensive knowledge base with which to work.

"At the very least, we'll be learning about heart disease in older females," says Korzick. "Right now, most of the estrogen-specific research is based on males, or young rats. Our research focuses on females, both young and old."

With the assistance of Tim Lancaster, who received his master's degree in kinesiology in 2008, Korzick has already identified nearly 600 proteins within the mitochondria of a rat heart cell.

Source: Pennsylvania State University (news : web)