

## News

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### WSU biologist's discovery could help solve infertility

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**WICHITA** - A biologist at Wichita State University has made a breakthrough discovery about human reproductive hormones that scientists say could give women worldwide new hope in solving fertility problems.

The National Institutes of Health, the primary federal agency for conducting and supporting medical research, is giving WSU scientist George Bousfield a five-year, \$6.6 million grant for further research.

It is the biggest grant WSU has ever received, except for aviation research, university officials said.

What's more, they said, most NIH grants go to big universities or research institutions with big budgets. Bousfield, they said, won this grant while working for the past 10 years in his crowded lab on the fourth floor of Hubbard Hall.

Bousfield discovered a variation in a human fertility hormone that no one knew about before. And he is sure that the hormone variation acts in a way that might unlock secrets about human reproduction, and how to enhance it.

"What we discovered looked like a problem that we could attack," he said.

Other scientists say his research could lead to much more accurate understanding of fertility problems -- and eventually could lead to much more effective treatment.

Millions of women every year suffer through the emotional and physical trauma caused by infertility, and many thousands go through fertility treatments costing thousands of dollars.

"George's work has a lot of potential for helping a huge group of women worldwide," said David Grainger, a reproductive endocrinologist who has spent 19 years treating fertility problems in Wichita.

Grainger, who will work with Bousfield on the project, said about 15 to 20 percent of couples of reproductive age (16 to 45) have some form of fertility problem.

He said the applications of Bousfield's research go far beyond solving fertility problems. From his own studies of fertility, and from treating hundreds of people over many years, Grainger knows that people suffer when they cannot have children. The emotional problems can wreck marriages and prompt some would-be parents to question their self-worth. The depression can be so severe, he said, that clinics like his keep mental health staff on site to offer counseling.

Grainger said the social changes of the past three decades have resulted in infertility becoming much more common.

"The best child-bearing years without question are the early 20s," he said. "What happened with the women's liberation movement was absolutely a good thing, but millions of women began to put off having children until their 30s. No one really told them that fertility drops off a lot after the mid-20s, and especially after about age 35."

### **One mother's story**

One former patient of Grainger's who knows the trauma and the risks that come with infertility and some of its treatments is Sondra Headrick of Norwich.

Couples who try to conceive for at least a year without success likely have a fertility problem, says Grainger. Sondra and her husband, Eldon Headrick, tried for two years before coming to Grainger.

In 1999, after extensive and costly fertility treatments, Sondra, 29 at the time, gave birth to a daughter.

"The feelings I had before we had Aubrianna were awful," Headrick said. "It seemed like everyone around me was having babies; every time one of my friends would have a baby, I'd break down and cry."

A few years later, Grainger again helped the Headricks conceive, but this time accidentally with sextuplets, a development that horrified Grainger because it put Headrick's life and the lives of her six babies in danger.

Grainger and scientists at WSU say one reason Bousfield's discoveries are so profound is that they might vastly improve reproductive medicine, making it more accurate in diagnosis and in treatment.

The Headrick sextuplets were born healthy in 2002.

Headrick said this past week that Grainger's new studies could not only prevent some of the dangers she faced but also give new tools to doctors and to the women she knows who suffer the frustrations she and her husband endured as they struggled to conceive.

"I felt shame," she said. "I thought something was wrong with me. I thought God was somehow punishing me. We had to spend all our time in the clinic. Unless you go through something like this, where you so badly want to have a child, you can't understand how awful it is."

### **The discovery**

Bousfield said the research could lead to home fertility tests that are as accurate, simple to administer and widely available as home pregnancy tests.

What he did was discover a variation of the hormone that stimulates monthly fertility in women.

For decades before him, scientists thought there was only one form of the hormone, a protein molecule with four tiny chains of sugar molecules attached to it.

But one day about nine years ago a graduate student working for Bousfield performed a test he'd asked for and came to him with an X-ray film showing bands that represented hormones.

"She handed it to me and said 'Well, I don't know if this was what you were looking for, but I did it,' " Bousfield said. "And I looked at it and said, 'Oh, wow, look at that.' "

What he saw in those bands on film, he said, was clear evidence that the fertility hormone had not one form but two. The newly discovered second variation had only two sugar chains attached to it.

He later saw that this two-sugar hormone acted on cells in a different way than the four-sugar hormone.

He also noticed in further research that there seemed to be much less of the second variation of the hormone in women over 35.

Scientists who later studied his work said that this could mean that the two variations might act like separate keys in a combination lock, unlocking fertility in collaboration with each other.

If Bousfield can use the grant to figure out the roles of these hormones, WSU scientists said, it could lead to better diagnostic work and effective treatments for fertility problems.

"Right now the treatment for infertility is pretty much a blunt instrument because the tests for fertility are currently so inaccurate," said David McDonald, the bioscientist who heads research at WSU. "But George's work may soon make it possible for a woman in her own home to tell with great accuracy whether she is fertile."

This is a huge discovery, said Gary Miller, WSU's provost and a bioscientist himself. "You don't get an NIH grant unless you've passed an extensive review done by the most critical and independent scientists in the world," he said. "If you do get a grant, you have been affirmed by the very best people in the field."

The NIH, a part of the U.S. Department of Health and Human Services, is the primary federal agency for conducting and supporting medical research. Getting the institute to listen to a proposal, Miller and McDonald said, requires brilliance, years of preparation, and hard work. Bousfield's proposals were rejected twice. He won the grant on his third try.

William J. Hendry, chairman of biological sciences at WSU, said NIH-designated "program project" grants, like the one Bousfield obtained, more commonly go to major medical schools.

The grant will help Bousfield buy laboratory equipment, conduct extensive testing, and pay for research positions for graduate and postgraduate students, as well as technicians.

Bousfield, as director of the Protein Core Laboratory at WSU, will lead a collaborative effort that includes researchers in laboratories here as well as at the University of Kansas Medical School in Kansas City, Kan., and the University of Nebraska Medical School in Omaha. It also will have support from KU in Lawrence.

Bousfield said he is collaborating with Wichita physicians on his research, including Grainger and Bruce Tjaden at the Center for Reproductive Medicine, and Edmond Feuille, at Preferred Medical Associates-Wichita OB/GYN Associates.

Bousfield said any practical applications of his research are years away, because of the research involved and the vetting process he'll have to go through. But he's sure this work will advance reproductive science.

The fertility hormone shows up in urine, so, he joked, "at least one graduate student is going to get to study urine samples eight hours a day, five days a week for perhaps three years."

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