

Hope emerges for women with debilitating hormonal disorder

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When Emelyne Heluin of France was diagnosed at the age of 17 with a hormonal disorder that causes enlarged ovaries with cysts, her symptoms included weight gain, hair loss, fatigue and pain. She was forced to quit

her longtime hobbies of dancing and gymnastics.

Now, 18 years later, Heluin describes the [medical condition](#)—known as [polycystic ovary syndrome](#), or PCOS—as burdensome partly because of people's views of it.

New knowledge

"It's often disregarded as a lifestyle issue, which it's clearly not," she said. "The condition is really hard to handle."

A push by researchers to learn the root causes of PCOS and ultimately to identify a cure offers new hope.

"Our aim is to better understand the biological changes that happen in a woman's body when she has PCOS, but we also want to understand the origin of the disease," said Dr. Paolo Giacobini, a neuroscientist at the French Institute of Health and Medical Research in Lille, France.

The condition is linked to a number of serious health troubles, including obesity, diabetes and infertility, and can diminish the professional and social lives of many women who suffer from it.

The disorder affects as many as [one in 10 women](#) of childbearing age. There's no cure for PCOS—only drugs to manage some of the many resulting complications.

Giacobini led a project to investigate the biological mechanisms behind the condition and identify possible methods for prevention and treatment. Called [REPRODAMH](#), the project ended in February 2023 after almost six years.

The research resulted in significant progress that may help in the design

of new treatments and diagnostic tools for PCOS, according to Giacobini.

Mother-daughter link

His team gained insights into why various hormones become dysregulated in the first place and how they work together to trigger the condition.

Reproductive hormones play a key role in PCOS, with the ovaries of affected women commonly pumping out too much testosterone and a specific [hormone](#) called AMH needed to produce healthy eggs.

Excessive circulating insulin, another vital hormone, is another typical characteristic of the condition.

Giacobini was interested in the elevated levels of AMH (which stands for anti-Müllerian hormone) identified in patients with PCOS during pregnancy and chose to make this the focus of his research.

REPRODAMH investigated the potential role of exposure to high AMH levels in the womb as a possible contributing factor to the transmission of the disorder from mother to daughter.

Potential blood test

To test the theory, the researchers injected the hormone into mice in the late stages of pregnancy.

This resulted in the female offspring developing PCOS as well as accompanying fertility and metabolic problems such as overweight and diabetes.

"By exposing mice fetuses to an environment rich in AMH, we modeled many traits of the human condition," said Giacobini.

The research on the mice also explored the external factors such as behavior or environment involved in determining whether certain key genes associated with PCOS were turned "on" or "off"—a field known as epigenetics.

Giacobini hopes that this line of investigation may soon result in a simple blood test to diagnose the condition.

This would be a big step forward because currently the disease can be detected only through a mixture of patient history, hormonal blood tests and abdominal scans.

Safe-drug breakthrough

The research team also discovered a link to the brain: AMH seemingly effects the functioning of the hypothalamus.

The hypothalamus, a small cubic structure deep in the brain, is a major regulator of reproductive and other hormones. It transmits signals around the body that prompt the release of hormones in carefully managed doses.

"To our surprise, the hypothalamus of mice with PCOS showed that the [nerve cells](#) controlling reproduction were overly active, sending pulses that caused the ovaries to produce more AMH and testosterone," said Giacobini.

The researchers identified a compound that can regulate the communication between the hypothalamus and the ovaries, restoring healthy hormone levels in PCOS mice.

This breakthrough could eventually lead to the development of a safe drug for women.

Fertility focus

An often-distressing problem for women with PCOS is becoming pregnant.

Dr. Ellen Anckaert, head of the Follicle Biology Laboratory at the Free University of Brussels in Belgium, is committed to helping women with PCOS overcome fertility difficulties.

She coordinated a project that received EU funding to refine a method for in vitro culturing of ovary cells known as oocytes for women struggling to get pregnant—a variation on conventional in-vitro fertilization (IVF).

Called [POMOLIM](#), the project ran for two years until the end of March 2022.

A regular IVF protocol involves a woman receiving high doses of hormones to stimulate the growth and ripening of eggs in her ovaries. Typically, 10 mature eggs are then retrieved and fertilized in a lab dish.

But this procedure is associated with hormone-related side effects for women with PCOS, requiring close monitoring of the ovarian response and—as a result—frequent hospital visits.

"Women with PCOS can show an increased response to the hormones," said Anckaert. "A major feature of the condition is having an accumulation of eggs that fail to ripen, so when a large cohort of eggs matures all at once after hormone stimulation this exaggerated response may cause mild to serious side effects."

Pregnancy promise

An alternative method, called in-vitro maturation (IVM), involves extracting eggs at an earlier stage: two to three days after follicle-stimulating hormones have been administered rather than 10 days.

The extracted eggs, which are too immature to be fertilized, must first complete the maturation process in a culture dish.

In spite of recent improvements in IVM technology, the downside of this method is that it still results in fewer mature eggs and fewer usable embryos compared with conventional IVF.

But Anckaert's team optimized the microenvironment of the cultured eggs by adding growth factors.

The new technique has been tested successfully in mice and trials in women will start in September.

"The results of our work are very promising and can further enhance IVM technology as a patient-friendly alternative to IVF, with a substantial reduction in treatment burden and hormone-related side effects for PCOS women," said Anckaert.

Meanwhile back in France, Heluin is doing her part to help other women with the condition. She is the volunteer vice-president of a pan-European association called SOPK Europe that represents women with PCOS.

More information:

- [REPRODAMH](#)
- [POMOLIM](#)

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