

Thirty years of research translates into new treatment strategies for polycystic ovary syndrome

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New treatment strategies for polycystic ovary syndrome. Credit: David H. Abbott, Bentham Science Publishers

Polycystic ovary syndrome (PCOS) afflicts over 14 million women in the United States. The disorder increases the risk of endometrial cancer, heart disease, high blood pressure, type 2 diabetes, asthma, obesity, depression and anxiety, as well as infertility and a variety of reproductive

disorders.

Despite its prevalence, no one has fully understood the origins of the syndrome nor has come up with any effective early treatment strategies for it—until now. Thanks to some long-time collaborating researchers in Wisconsin, Illinois and California—as well as their students, who have gone on to become better enlightened physicians and researchers themselves—the veil over understanding and treating PCOS is finally lifting.

A review published today in *Current Pharmaceutical Design* bundles those decades of research and education into overall progress toward improving the lives of women with PCOS: better counseling and managed care, new directions in genetic testing, new diagnostic tests, and earlier tests, such as measuring finger length ratios, and taking hormone samples from hair strands plucked off the heads of newborn girls. The diagnostic hormone hunting doesn't stop there: The review chronicles 114 scientific and clinical articles that have turned up suspected PCOS biomarkers in everything from head to tailbone.

"With so many different symptoms, it took a long time for physicians to identify the disease as more than infertility," explains David Abbott, professor of OB/GYN at the UW-Madison School of Medicine and Public Health. Abbott's office and lab are at the Wisconsin National Primate Research Center, where he has been tackling the PCOS problem for more nearly 30 years. He has hardly worked alone. His long-time clinical colleagues have included Daniel Dumesic, professor, physician and chief of the Reproductive Endocrinology and Infertility Division at UCLA; Andrea Dunaif, professor of endocrinology and metabolism and physician at the Northwestern University Feinberg School of Medicine, and Jon Levine, who previously studied the neuroendocrinology of PCOS in rodents at Northwestern and is now director of the Wisconsin National Primate Research Center, where he continues his active

research program as well.

Toni Ziegler and Amita Kapoor, scientists with the Wisconsin National Primate Research Center's Assay Services Unit also recently completed the world's first study showing that testosterone can be measured in the hair of newborn monkeys, to show if and when the monkeys were exposed to abnormal levels of testosterone while they were developing in the womb. "The hair sample test has the potential to become one of several pre-diagnostic tools for human infants suspected to be at risk for PCOS due to genetic or other factors," Abbott points out. "Earlier diagnosis will help physicians focus on pre-pubertal interventions to ameliorate PCOS onset."

From rodents to nonhuman primates to humans, these hormone hunters performed the breakthrough experiments that implicate fetal origins of PCOS. They discovered that, even though PCOS symptoms do not appear until puberty, the disease may be programmed in the fetus during the second trimester of pregnancy. The collaborators next revealed an even clearer picture of PCOS by identifying specific genetic and epigenetic pathogenic components shared among monkeys and women.

"Too many women are being treated for diabetes, excess body hair, obesity and other clinical presentations, but not the underlying problem," Abbott says. "From other investigators, we also know now that PCOS is highly heritable, and prospective gene candidates are emerging."

The monkey studies, in particular, implicate altered gene expression related to a constellation of genes suspected to play a role in PCOS, as well as in dysfunctional fat storage, regulation of blood sugar by the pancreas, and brain regulation of the menstrual cycle.

"This forward-thinking approach that the disease may be programmed in the fetus during intrauterine life promises to expand our understanding

of how the maternal-fetal environment affects the health of women and their offspring over the next generations," says Dumesic.

"Today, thanks to researchers and doctors working together on all aspects of this problem, many more clinicians cross-refer to one another, and catch more of the specific pathologies that can lead to a PCOS diagnosis and better care," adds Abbott.

More information: DH Abbott et al, Translational Insight Into Polycystic Ovary Syndrome (PCOS) From Female Monkeys With PCOS-like Traits, *Current Pharmaceutical Design* (2016). [DOI: 10.2174/1381612822666160715133437](https://doi.org/10.2174/1381612822666160715133437)

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