

# Understanding parallels of human and animal parenting can benefit generations to come

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A family of prairie voles. In some mammalian species, including monogamous prairie voles, both parents make an important contribution to rearing the offspring. Credit: Todd H. Ahern

Strong evidence now shows that human and animal parenting share many nervous system mechanisms. This is the conclusion of Yerkes National

Primate Research Center researchers Larry Young, PhD, and James Rilling, PhD, in their review article about the biology of mammalian parenting, published in this week's issue of *Science*. Better understanding this biology could lead to improved social development, benefitting generations of humans and animals to come.

In their article, Young and Rilling review the biological mechanisms governing a shift in mammals' parental motivation that begins with aversion and transforms into irresistible attraction after giving birth. They say the same molecules that prepare the uterus for pregnancy, stimulate milk production and initiate labor also activate specific neural pathways to motivate parents to nurture, bond with and protect their offspring.

According to Young, "We have learned a tremendous amount about the specific hormonal and brain mechanisms regulating parental behavior and how parental nurturing influences the development of the offspring brain by using animal models, and many of these same mechanisms influence human parenting behavior as well."

Young is division chief of Behavioral Neuroscience and Psychiatric Disorders at the Yerkes Research Center, director of the Center for Translational Social Neuroscience at Emory, a William P. Timmie professor in the Department of Psychiatry at Emory's School of Medicine and author of *The Chemistry Between Us: Love, Sex and the Science of Attraction*, which also summarizes the parallels between brain mechanisms regulating sexual and parenting behaviors in animals and humans.

Rilling, who is a Yerkes researcher and an associate professor in Emory's Department of Anthropology, adds, "The human brain has mechanisms in place to support parent-child bonding, and when functioning properly, these mechanisms facilitate the development of secure attachment and

sound mental health that is transmitted across generations."

The researchers divided their review into nine categories, including neural correlates of human parental care, two specific to parenting and oxytocin, two focused specifically on paternal caregiving by fathers and two related to the effect of parenting on [social development](#). Examples within these categories include that the frustration inconsolable infant crying induces is a risk factor for infant abuse, highlighting the importance of emotion regulation for sensitive parenting; that oxytocin affects maternal motivation and paternal behaviors essential for nurturing, bonding and defending the offspring; that testosterone may interfere with parenting effort; and that variation in parental nurturing can affect brain development, thus affecting future social behaviors.

"With this comprehensive review, we can see nervous system correlations across species that result in positive and negative parental care," says Young. "This information is critical to further studying social development in order to facilitate positive parental behaviors that will benefit generations to come," he continues.

Established in 1930, the Yerkes National Primate Research Center paved the way for what has become the National Institutes of Health-funded National Primate Research Center (NPRC) program. For more than eight decades, the Yerkes Research Center has been dedicated to conducting essential basic science and translational research to advance scientific understanding and to improve human health and well-being. Today, the Yerkes Research Center is one of only eight NPRCs. The center provides leadership, training and resources to foster scientific creativity, collaboration and discoveries, and research at the center is grounded in scientific integrity, expert knowledge, respect for colleagues, an open exchange of ideas and compassionate, quality animal care.

Within the fields of microbiology and immunology, neurologic diseases, neuropharmacology, behavioral, cognitive and developmental neuroscience, and [psychiatric disorders](#), the center's research programs are seeking ways to: develop vaccines for infectious and noninfectious diseases; understand the basic neurobiology and genetics of social behavior and develop new treatment strategies for improving social functioning in social disorders such as autism; interpret brain activity through imaging; increase understanding of progressive illnesses such as Alzheimer's and Parkinson's diseases; unlock the secrets of memory; treat drug addiction; determine how the interaction between genetics and society shape who we are; and advance knowledge about the evolutionary links between biology and behavior.

**More information:** "The biology of mammalian parenting and its effect on offspring social development," by J.K. Rilling; L.J. Young, [www.sciencemag.org/lookup/doi/...1126/science.1252723](http://www.sciencemag.org/lookup/doi/...1126/science.1252723)

Provided by Emory University

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