Massages for baby rats lead to better outcomes for premature infants

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Credit: Golden Goose Award

What could we possibly learn from massaging rat pups? The answer is, a lot. Just ask the millions of families whose prematurely born infants have survived and thrived on account of that research.

That's why the researchers behind this work – Saul Schanberg, Tiffany Martini Field, Cynthia Kuhn and Gary Evoniuk – will receive the

Golden Goose Award September 18 at a ceremony at the Library of Congress in Washington, D.C. (Katie Eimers will accept the award on behalf of her grandfather, Saul Schanberg, who died in 2009.)

The Golden Goose Award honors scientists whose federally funded research may not have seemed to have significant practical applications at the time it was conducted but has resulted in major economic and other benefits to society. In this case, the impact of the researchers' collective work has been momentous. The key discovery – that touch, in the form of infant massage, can vastly improve the outcome for babies born prematurely – has affected millions of lives around the world and saved billions of dollars in healthcare costs in the United States alone.

And it began when researchers studying infant rats decided to rub their backs with a tiny brush.

"Researchers massaging rats: Sounds strange, right?" said Rep. Jim Cooper (D-TN), who first proposed creation of the Golden Goose Award. "But infant massage has given premature babies a better start. Off-the-wall science saves lives."

"Federally funded science frequently results in unexpected benefits to mankind, and the work of these four researchers is no different," said Rep. Randy Hultgren (R-IL), a member of the House Committee on Science, Space and Technology. "Offbeat scientific research—even massaging rats—can lead to key discoveries in our understanding of human development and improve the lives of many. These results are often unintended and were not explicitly factored into the original grant. I applaud yet another Golden Goose breakthrough."

In 1979 Schanberg, a Duke University neuroscientist, Kuhn, a graduate student, and Evoniuk, a lab technician, were working with rat pups to study factors influencing two key growth markers, ornithine

decarboxylase and growth hormone. To conduct their work, which was funded by the National Institutes of Health, they needed to separate the pups from their mothers. However, they quickly found that the pups, though being fed and kept warm, were failing to thrive and their levels of the key growth markers were declining.

A series of experiments ruled out factors such as nutrition, body temperature and maternal pheromones. The researchers then made the key observation: the rat mothers spent a great deal of time grooming and vigorously licking their pups. Wondering whether the act of stimulation through licking was making the difference, the researchers simulated the mother's tongue with a small brush and stroked up and down the rats' tiny backbone. This was the missing link. Enzyme and growth hormone levels rose and the rat pups thrived again.

Field, a psychologist at the University of Miami Medical School who was conducting her own research on how to help premature infants survive and grow, learned of Schanberg's groundbreaking work and wondered whether it had implications for human infants. In 1986, Field published her own landmark study drawing from Schanberg, Kuhn and Evoniuk's work with rat pups. Funded by the National Institute of Mental Health (part of NIH), Field's study demonstrated that using similar tactile stimulation in preterm human infants had immediate positive effects. Premature infants who were massaged for 15 minutes three times a day gained weight 47 percent faster than others left alone in their incubators (standard practice at the time), were more alert and responsive, and were released from the hospital an average of six days sooner than the premature babies who were not massaged.

Today, Dr. Field serves as the director of the Touch Research Institute and professor in the Department of Pediatrics, Psychology and Psychiatry at the University of Miami Medical School.

Dr. Kuhn is a professor of pharmacology and cancer biology at the Duke University School of Medicine. Dr. Evoniuk is the director of publication practices at GlaxoSmithKline. Dr. Schanberg, internationally recognized for his pioneering work, served on the faculty of Duke University for more than 40 years before his death in 2009.

Drs. Field, Schanberg, and Kuhn continued to collaborate for a number of years, with NIH support, using insights from the animal work to explore potential physiological and hormonal mechanisms responsible for the benefits of touch in human infants.

All of the 2014 Golden Goose awardees will receive their honors on September 18 at the third annual Golden Goose Awards ceremony in Washington, D.C. Science correspondent Miles O'Brien will serve as Master of Ceremonies for the event, which will take place at the Library of Congress.

The other 2014 awardees, announced earlier this year, are Larry Smarr, whose basic research on colliding black holes in space led to the development of U.S. supercomputing capabilities and the creation of the first Internet browsers, and Robert Wilson, Paul Milgrom and R. Preston McAfee, whose basic research on game theory and auctions led to the first auctioning of the spectrum by the Federal Communications Commission (FCC) in 1994 and the subsequent rapid advance of the global telecommunications industry.

Rep. Cooper first proposed the Golden Goose Award when the late Senator William Proxmire (D-WI) was issuing the Golden Fleece Award to target wasteful federal spending and often targeted peer-reviewed science because it sounded odd. Rep. Cooper believed such an award was needed to counter the false impression that odd-sounding research was not useful.

In 2012, a coalition of business, university, and scientific organizations created the Golden Goose Award. Like the bipartisan group of Members of Congress who support the Golden Goose Award, the founding organizations believe that federally funded basic scientific research is the cornerstone of American innovation and essential to our economic growth, health, global competitiveness, and national security. Award recipients are selected by a panel of respected scientists and university research leaders.

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