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Do these genes make my heart seem big? Study finds a gene for empathy

November 16, 2009 | 6:09 pm

In the long-running nature-nurture debate over what makes us who we are, chalk up a new victory for nature.

A study published Monday in the [Proceedings of the National Academy of Sciences](#) has found a single coding variation in the human genome that appears responsible, at least in part, for individual variations in such personality and behavior traits as empathy and response to stress.

The gene they looked at -- the OXTR gene -- carries the design and production blueprint for cells scattered throughout the heart, uterus, spinal cord and brain that serve as docking stations for a chemical called oxytocin.

Scientists have long known oxytocin as the chemical of bonding and nurture. Produced in the hypothalamus and pumped into both the brain and the bloodstream, oxytocin responds to warm human interaction and drives us to seek it out when our stores are low. It is thought to cause the letdown of milk in breastfeeding mothers, and to soar for many after lovemaking. At the same time, oxytocin appears to have a pronounced calming effect: people and mice alike seem to chill out when the chemical is puffed up their noses or pumped into their bloodstreams, even under conditions of stress.

These two qualities prompted research psychologists from Oregon State University and University of California Berkeley to ask themselves: If some people's genetic endowment made them richer in oxytocin receptors, might they not, by nature, be more attuned to others and more unflappable when under stress?

In the massively complex human genome, it's a daunting challenge to find a single site where a tiny variation in the code of inheritance might produce observable differences in behavior. Fortunately, the authors of the PNAS study had a few clues to guide them: Researchers had earlier found a site on the OXTR gene where certain variations brought with them a [higher incidence of autism](#) -- a disorder marked by impairments in social interaction and communication. Variations in this site also had been shown to predict how [sensitively mothers responded to their offspring](#). Perhaps, they asked, coding variations at this same site would yield more subtle differences in a person's sociability and ability to withstand stress?

To make a long story short, they did. The researchers put 192 college students at UC Berkeley through a pair of experimental tests -- one that measured their ability to infer the emotional state of others from looking at their facial expressions and another that measured their jumpiness when warned that a loud blast of noise was imminent. The students also were asked to rate their own levels of empathy and ability to handle stressful situations.

The one in four subjects who inherited a variation in this allele called G/G were significantly better at accurately reading the emotions of others by observing their faces than were the remaining three-quarters of subjects, who had inherited either a pair of A's or an A and a G from their parents at this site. Compared to the three-fourths with A/A or A/G variations, the G/G individuals were also less likely to startle when blasted by a loud noise, or to become stressed at the prospect of such a noise.

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And by their own reports, the G/G subjects were mellow and more attuned to other people than were the A/As or A/Gs.

The group's findings would appear to strike a decisive blow for nature over nurture in shaping who we are and how we behave. In fact, subjects were asked to rate how nurturing their own parents were, and researchers found that a subject's genetic inheritance seemed a better predictor of his empathic disposition than did his mother and father's parenting styles.

But UC graduate student Laura R. Saslow, a co-author of the paper, cautioned that genetic inheritance -- nature -- is never the sole determinant of our personalities. While researchers will get closer to filling in the inborn components of our personalities, the environments in which we've been raised will always interact with our genetic inheritance and shape how it expresses itself, Saslow says.

"Really, both matter," says Saslow.

-- Melissa Healy

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