

A baby's smile is a natural high

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The baby's smile that gladdens a mother's heart also lights up the reward centers of her brain, said Baylor College of Medicine researchers in a report that appears in the journal *Pediatrics* today.

The finding could help scientists figure out the special mother-infant bond and how it sometimes go wrong, said Dr. Lane Strathearn, assistant professor of pediatrics at BCM and Texas Children's Hospital and a research associate in BCM's Human Neuroimaging Laboratory.

"The relationship between mothers and infants is critical for child development," said Strathearn. "For whatever reason, in some cases, that relationship doesn't develop normally. Neglect and abuse can result, with devastating effects on a child's development."

To study this relationship, Strathearn and his colleagues asked 28 first-time mothers with infants aged 5 to 10 months to watch photos of their own babies and other infants while they were in a functional magnetic resonance imaging scanner. The machine measures blood flow in the brain. In the scans, areas of increased blood flow "light up," giving researchers a clue as to where brain activity takes place.

In some of the photos, babies were smiling or happy. In others they were sad, and in some they had neutral expressions.

They found that when the mothers saw their own infants' faces, key areas of the brain associated with reward lit up during the scans.

The areas stimulated by the sight of their own babies were those associated with the neurotransmitter dopamine. Specifically, the areas associated included the ventral tegmental area/substantia nigra regions, the striatum, and frontal lobe regions involved in emotion processing, cognition and motor/behavioral outputs.

"These are areas that have been activated in other experiments associated with drug addiction," said Strathearn. "It may be that seeing your own baby's smiling face is like a 'natural high' ".

The strength of the reaction depended on the baby's facial expression, he said.

"The strongest activation was with smiling faces," he said. There was less effect from pictures of their babies with sad or neutral expressions.

"We were expecting a different reaction with sad faces," he said. In fact, they found little difference in the reaction of the mothers' brains to their own babies' crying face compared to that of an unknown child.

Overall, the mothers responded much more strongly to their own infants' faces than to those of an unknown baby.

"Understanding how a mother responds uniquely to her own infant, when smiling or crying, may be the first step in understanding the neural basis of mother–infant attachment," said Strathearn.

Source: Baylor College of Medicine

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