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Fetal 'programming' of sweet taste's elicited pleasure

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Research to be presented at the Annual Meeting of the Society for the Study of Ingestive Behavior (SSIB), the foremost society for research into all aspects of eating and drinking behavior, suggests that feeding behavior and preferences may be shaped very early during development, even during fetal life.

Newborns of different species react to the sweet taste demonstrating facial expressions of pleasure, such as licking (tongue protusions) and thumb sucking. These "hedonic" responses are related to brain activity in regions that respond to pleasure and reward.

In this study, rat pups derived from dams that experienced undernutrition during gestation (intra-uterine growth restricted, IUGR) and controls received a droplet of sucrose solution or water at their first day of life. When compared to controls, IUGR newborns demonstrate an increased and more prolonged hedonic response to sucrose versus water.

We and others have previously described that, in humans, these IUGR individuals demonstrate altered feeding preferences at different adult ages, eating more sugars and fatty foods, and less fruits and vegetables. We also have shown that fetal growth correlates with the hedonic responses to sweet taste in preterm newborns born at 27 weeks gestation.

This becomes of importance when it is well established that poor fetal growth is associated with an increased risk for chronic diseases in adulthood (cardiovascular disease, type II diabetes, atherosclerosis).

Therefore, a persistent alteration in food preferences in individuals exposed to fetal adversity possibly contributes to the development of these diseases. Our animal model will allow a deeper understanding of the mechanisms involved in these processes.

"This translational approach permits us to study different systems that may affect food preferences in IUGR individuals, which will point out to targets for intervention planning", said lead researcher Roberta Dalle Molle. As more than 20 million children are born low birth weight annually worldwide, part of whom will become adults with the chronic diseases described above, the understanding of how early life may shape the individuals' eating behavior and preferences is of great importance.

Provided by Society for the Study of Ingestive Behavior