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NEWS

RSNA Press Release

Food Odors Activate Impulse Area of the Brain in Obese Children

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CHICAGO — The area of the brain associated with impulsivity and the development of obsessive-compulsive disorder is activated in obese children when introduced to food smells, according to a study being presented next week at the annual meeting of the Radiological Society of North America (RSNA).

At A Glance

- Functional MRI exams show obesity has a neurological disorder component.
- Researchers studied 30 children, half of whom had a normal BMI between 19 and 24, and the other half exhibited a BMI over 30.
- In the obese children, areas of the brain connected to impulse and the development of obsessive-compulsive disorder were activated, while the areas of the brain associated with impulse control exhibited no activity.



Pilar Dies-Suarez, M.D.

"In order to fight obesity, it is crucial to understand the brain mechanisms of odor stimulus," said Pilar Dies-Suarez, M.D., chief radiologist at the Hospital Infantil de México Federico Gómez. "This study has given us a better understanding that obesity has a neurological disorder component, and the findings have the potential to affect treatment of obese patients."

In the United States, nearly 12.7 million children are obese, according to the Centers for Disease Control and Prevention (CDC). These children are at a higher risk to develop high blood pressure, type 2 diabetes, and breathing and joint problems, among many other health issues. They are also more likely to become obese adults.

The researchers studied 30 children between the ages of 6 and 10 years old. Half of the children had a normal body mass index (BMI) between 19 and 24, and the other half exhibited a BMI over 30, which is classified as obese. Each child was presented with three odor samples: chocolate, onion and a neutral odor of diluted acetone. As the participants smelled the samples, two MRI techniques—functional MRI (fMRI) and functional connectivity MRI (fcMRI)—were used to measure brain activity.

An evaluation of the fMRI results showed that in the obese children, the food odors triggered activation in the areas of the brain associated with impulse and the development of obsessive-compulsive disorder, while the areas of the brain associated with impulse control

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exhibited no activity. However, in the children with a normal BMI, the areas of the brain associated with pleasure regulation, organization and planning, as well as regions governing emotional processing or memory function, became more active.

In addition, the fcMRI results showed that when the normal-weight children smelled the onion, there was a connection between the gustatory cortex, which processes taste, and the area of the brain linked to reward anticipation. This connection did not occur in the obese children.

The chocolate smell elicited significant brain connections in obese children, compared to the normal-weight children.

"If we are able to identify the mechanisms that cause obesity, we will be able to change the way we treat these patients, and in turn, reduce obesity prevalence and save lives," Dr. Dies-Suarez said.

Co-authors on this study were Silva Hidalgo-Tobon, Ph.D., Benito De Celis IV, Eduardo Barragan, Eduardo Castro, M.D., Samuel Flores, M.D., Porfírio Ibanez and Manuel Obregon.

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Editor's note: The data in these releases may differ from those in the published abstract and those actually presented at the meeting, as researchers continue to update their data right up until the meeting. To ensure you are using the most up-to-date information, please call the RSNA Newsroom at 1-312-791-6610.

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