肥満小児において食物のにおいは脳の衝動性領域を活性化させる(PD01A-02)

機能的MRI検査の結果、肥満は神経学的障害の側面を有していることが示された

Functional MRI exams show obesity has a neurological disorder component

肥満小児が食物の匂いに出くわすと衝撃性や強迫性障害の発症に関連する脳領域が活性化される、と2015年Radiological Society of North America年次集会で発表された。研究者らは30人の小児(6～10歳)を調査した。これらの小児のうち半数はボディーマスインデックス(BMI)が19～24と正常であった。その他の半数はBMIが30を超えていた。各小児に対し3つの匂い標本(チョコレート、玉ねぎおよびアセトンを希釈したニュートラルな匂い)が提示された。参加者が標本の匂いを嗅いでいる時に2つのMRI技術-機能的MRI(fMRI)および機能的結合MRI(fcMRI)-を用いて脳活性度が計測された。食物の匂いは、肥満小児において衝撃性や強迫性障害の発症に関連する脳領域の活性化のきっかけとなったが、衝撃性コントロールに関連した脳領域においては活性化が示されなかった。しかしBMIが正常な小児においては、快楽制御、組織および計画、そして感情処理または記憶機能の管理領域がより活性化した。

Full Text

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 presented at the 2015annual meeting of the Radiological Society of North America (RSNA).

"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."

Obese 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 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.

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