TED

糖如何影响大脑

题目：How sugar affects the brain?

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Picture warm, gooey cookies, crunchy candies, velvety cakes, waffle cones piled high with ice cream. Is your mouth watering? Are you craving dessert? Why? What happens in the brain that makes sugary foods so hard to resist?

想象一下温热、绵软的曲奇饼干， 酥脆的糖果， 天鹅绒般柔软的蛋糕， 还有堆着高高冰淇淋的华夫蛋筒。 你已经流口水了么？ 你想要吃甜点了么？ 为什么？ 你的大脑中到底发生了什么 才使得含糖类食物变得如此不可抗拒?

Sugar is a general term used to describe a class of molecules called carbohydrates, and it's found in a wide variety of food and drink. Just check the labels on sweet products you buy. Glucose, fructose, sucrose, maltose, lactose, dextrose, and starch are all forms of sugar. So are high-fructose corn syrup, fruit juice, raw sugar, and honey. And sugar isn't just in candies and desserts, it's also added to tomato sauce, yogurt, dried fruit, flavored waters, or granola bars.

糖是一个用来描述一类被称为 碳水化合物的分子 的统称术语， 在很多食品与饮料中都可以找到它。 只要去看一下你买的甜食上的标签。 葡萄糖、 果糖、 蔗糖、 麦芽糖、 乳糖、 右旋糖， 还有淀粉 都是糖的各类形式。 果糖含量很高的玉米糖浆、 果汁、 粗糖， 还有蜂蜜也是一样的。 而且，糖不仅存在于糖果和甜点中， 它也被添加于番茄酱、 酸奶、 果脯、 加味水， 亦或是燕麦棒中。

Since sugar is everywhere, it's important to understand how it affects the brain. What happens when sugar hits your tongue? And does eating a little bit of sugar make you crave more?

正因为糖无处不在， 所以要明白它如何影响大脑 才显得很重要。 当糖分接触到你的舌头时会发生什么？ 只吃一点点糖 会使你渴求更多么?

gooey
adj.胶粘的

crunchy
adj.易碎的

velvety
adj. 天鹅绒般柔软的

waffle
n.华夫

molecule
n.分子

carbohydrate
n.碳水化合物

corn syrup
玉米糖浆

tomato sauce
蕃茄酱

dried fruit
果脯

You take a bite of cereal. The sugars it contains activate the sweet-taste receptors, part of the taste buds on the tongue. These receptors send a signal up to the brain stem, and from there, it forks off into many areas of the forebrain, one of which is the cerebral cortex. Different sections of the cerebral cortex process different tastes: bitter, salty, umami, and, in our case, sweet. From here, the signal activates the brain's reward system.
你咬了一口麦片， 它所含的糖分 会触发甜味受体， 也就是舌头上味蕾的一部分。 这些受体会向脑干发送信号， 从那里，它会分支进入 前脑的许多部位， 其中一个就是大脑皮层。 大脑皮层的不同部分会处理不同的味觉： 苦、 咸、 鲜， 以及我们现在所谈的甜。 从这里（大脑皮层），信号会激活 大脑的犒赏系统。

This reward system is a series of electrical and chemical pathways across several different regions of the brain. It's a complicated network, but it helps answer a single, subconscious question: should I do that again? That warm, fuzzy feeling you get when you taste Grandma's chocolate cake? That's your reward system saying, "Mmm, yes!" And it's not just activated by food. Socializing, sexual behavior, and drugs are just a few examples of things and experiences that also activate the reward system. But overactivating this reward system kickstarts a series of unfortunate events: loss of control, craving, and increased tolerance to sugar.
犒赏系统是一系列 穿过大脑不同部位的 电化学途径。 它是个复杂的网路， 但是它会帮助解答一个单一的、潜意识中进行的问题：“我应该再来一次吗， 享受当你品尝祖母做的巧克力蛋糕时 那种温暖、却有些模糊了的感觉？”然后你的犒赏系统就会说： "嗯，当然了！' 然而，它不仅会被食物激活。 社交、 性行为， 还有毒品 都只是可激活 犒赏系统的事物 的几个例子而已。 但是过渡激活犒赏系统 会启动一系列不幸的事：失控、 渴求， 还有对糖分忍耐度的增长。

cereal
n.谷类食物

forebrain
n.前脑

subconscious
adj.潜意识的

reward system
n.犒赏系统

kickstarts
n.启动

Let's get back to our bite of cereal. It travels down into your stomach and eventually into your gut. And guess what? There are sugar receptors here, too. They are not taste buds, but they do send signals telling your brain that you're full or that your body should produce more insulin to deal with the extra sugar you're eating.

让我们回到吃麦片的例子上去。 它会来到你的胃里 并最终到达肠道。 然后你猜怎么着？ 那里也存在着糖分受体。 它们不是味蕾， 但它们也会发送信号 来向你的大脑表明你已经吃饱了 或者你的身体需要生产更多的胰岛素 来帮助消化你额外摄入的糖分。

insulin
n.胰岛素

The major currency of our reward system is dopamine, an important chemical or neurotransmitter. There are many dopamine receptors in the forebrain, but they're not evenly distributed. Certain areas contain dense clusters of receptors, and these dopamine hot spots are a part of our reward system. Drugs like alcohol, nicotine, or heroin send dopamine into overdrive, leading some people to constantly seek that high, in other words, to be addicted. Sugar also causes dopamine to be released, though not as violently as drugs. And sugar is rare among dopamine-inducing foods. Broccoli, for example, has no effect, which probably explains why it's so hard to get kids to eat their veggies.

犒赏系统的“主要流通货币”是多巴胺， 一种重要的化学物质或者说是神经递质。 前脑中存在着许多多巴胺受体， 但是它们的分布并不均匀。 某些部位的受体密集成群， 并且，这些多巴胺热点 就是我们犒赏系统的一部分。 像酒精、 尼古丁 或者是海洛因一类的麻醉药品 会使得多巴胺超过限度， 以至于令有些人不停地寻求那种快感， 换一句话说，就是上瘾了。 糖分也会促进多巴胺分泌， 尽管不像毒品那样极端。 而且，糖分在诱发多巴胺的食物中也非常少见。 比如说，西兰花就对此没有什么影响。 也许这就能解释为什么 让孩子们多吃蔬菜是如此的难。

dopamine
n.多巴胺

neurotransmitter
n.神经递质

nicotine
n.尼古丁

Speaking of healthy foods, let's say you're hungry and decide to eat a balanced meal. You do, and dopamine levels spike in the reward system hot spots. But if you eat that same dish many days in a row, dopamine levels will spike less and less, eventually leveling out. That's because when it comes to food, the brain evolved to pay special attention to new or different tastes. Why? Two reasons: first, to detect food that's gone bad. And second, because the more variety we have in our diet, the more likely we are to get all the nutrients we need. To keep that variety up, we need to be able to recognize a new food, and more importantly, we need to want to keep eating new foods. And that's why the dopamine levels off when a food becomes boring.

nutrient
n.养分

谈到健康食品，比方说你感觉很饿 决定要享用营养均衡的一餐。 用过餐后，犒赏系统热点中的 多巴胺含量就会激增。 但如果你连续很多天都吃这同一餐， 多巴胺的增量就会越来越少， 最终达到稳定。 这是因为在食物问题上， 大脑演变得对那些 崭新的亦或是不同的味觉异常敏感。 这是为什么呢？ 有两个原因： 第一，为了检查出已经变质的食物。 第二，我们的饮食 越多样， 我们就越有可能 得到所有我们需要的营养。 为了保持那种饮食多样性， 我们需要能够识别新的食物， 更重要的是，我们需要维持想吃新食物的欲望。 这就是为什么当食物一成不变的时候多巴胺的分泌就会逐渐趋于平稳。

Now, back to that meal. What happens if in place of the healthy, balanced dish, you eat sugar-rich food instead? If you rarely eat sugar or don't eat much at a time, the effect is similar to that of the balanced meal. But if you eat too much, the dopamine response does not level out.

sugar-rich food
富含糖分的食物

现在，让我们回到那一餐的问题上。 如果用富含糖分的食物 取代健康、平衡的饮食 会发生什么呢？ 如果你不怎么摄入糖分 或者不一次摄入太多， 它带来的影响就和平衡的饮食没有什么两样。 但是如果你吃的太多， 多巴胺的分泌就会不稳定。

In other words, eating lots of sugar will continue to feel rewarding. In this way, sugar behaves a little bit like a drug. It's one reason people seem to be hooked on sugary foods.
换句话说，摄取大量糖分 会持续使犒赏系统兴奋。 从这个角度来讲，糖类就有一点像毒品了。 这就是一个人们之所以对含糖食品 着迷的原因。

So, think back to all those different kinds of sugar. Each one is unique, but every time any sugar is consumed, it kick starts a domino effect in the brain that sparks a rewarding feeling. Too much, too often, and things can go intooverdrive. So, yes, overconsumption of sugar can have addictive effects on the brain, but a wedge of cake once ina while won't hurt you.
这样，想想之前那些所有不同种类的糖。 每一种都是独特的， 但是每一次摄取这些糖分的时候， 它就会在大脑中引发多米诺骨牌一般的效应， 并激活犒赏系统。 太多，太频繁， 就可能会过度。 因此，没错，糖分的过度摄取 可以使大脑上瘾，不过，偶尔品尝一块蛋糕并没有什么坏处。

intooverdrive
v.（使）喝醉

overconsumption
n.过度消费