

Olfactory perception

OLFACTORY CELLS

Your nose is home to around 30 million olfactory cells. It is therefore able to distinguish a very large quantity of odours and aromas – many more than the tastes perceived by your tongue. Our olfactory cells are renewed every four weeks throughout our lives. They allow us to perceive thousands of odorous molecules, generally in very small amounts.

There is a threshold for detecting odorous molecules, but it varies greatly from person to person and molecule to molecule. We each perceive a different amount of odours depending on our innate capacities and our training. A trained and skilled nose can identify thousands of odours, such as **jasmine**, or animal secretions like **musk** or **amber**, traditionally used when making perfume.

keywords > Jasmine, musk, amber, vanilla, cinnamon, aniseed, etc.

Unlike colours, we find it hard to name what we smell. It is quite normal for an odour to remind you of something but to be unable to name or describe it.

ODOROUS MOLECULES

Nearly all of the odours in our environment are a complex mixture of hundreds of different molecules. For example, coffee is composed of around 800 olfactory substances.

keywords > Coffee aroma = 800 olfactory substances

However, often only a few substances are enough to characterise a precise odour. Isoamyl acetate smells like bananas and ethylvanillin smells like vanilla, for example.

The brain does not identify all of the molecules that enter the nose. Two good examples are oxygen and carbon dioxide, two odourless chemical compounds in the air we breathe. Unlike primates and higher mammals, over the course of evolution, we have deactivated two thirds of all the genes in our olfactory receptors. As a result, we only have 350 genes to produce functional receiver proteins. That said, in spite of their low number, they are still the most important family of genes, which proves the importance of our sense of smell and demonstrates just how wrong anyone is who thinks that smell is a secondary sense.

THE IMPORTANCE OF OUR SENSE OF SMELL

Smell is essential if you want to fully enjoy a meal or food. To realise how important your nose is, you simply have to wait for it to be blocked! If you close your eyes, a

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cold can prevent you from being able to tell even simple fruit and vegetables apart – even to differentiate between a potato and a carrot, for example.



Your tongue can always recognise the 5 basic tastes, but without the sensory abilities of your nose, eating is no longer a pleasure.

EMOTIONS AND MEMORIES

The olfactory brain is connected to the parts of the brain which analyse emotions and memories. This link is the reason why odours can bring back even distant memories. For example, can you remember the smell of some of the food you ate when you were a child? In his famous novel *In Search of Lost Time* Marcel Proust talks about how the madeleine he had with his tea reminded him of his past.

"When from a long-distant past nothing subsists, after the people are dead, after the things are broken and scattered, still, alone, more fragile, but with more vitality, more unsubstantial, more persistent, more faithful, the smell and taste of things remain poised a long time, like souls, ready to remind us, waiting and hoping for their moment, amid the ruins of all the rest; and bear unfaltering, in the tiny and almost impalpable drop of their essence, the vast structure of recollection."

This connection between odours and our memories can also explain why odours are appreciated in different ways by different people. You cannot say there are 'good' and 'bad' smells or odours. Each individual associates odours with their experiences and their emotions. We each have our favourites. These preferences are very varied and can change. You can also get used to and learn to love an odour.

In conclusion, we can also say that we start to learn odours from a very early age. It has been scientifically proven that some odours can be perceived by an embryo inside its mother's womb. This may be at the root of some eating preferences.

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What is the average number of olfactory cells in a human nose?

- 30 billion
- 30 million
- 30

Our olfactory cells are renewed on average every...

- year
- week
- 4 weeks

We all perceive odours in the same way.

- False
- True

How many olfactory receptor genes do humans have?

- 350
- 3500
- 35

How many different olfactory substances are there in coffee?

- 800
- 100
- 2

We all smell the same amount of a specific olfactory substance.

- True
- False

Our olfactory potential is identical to that of monkeys.

- False
- True

A sense of smell is not essential to enjoy food.

- True
- False

The process of learning to smell begins...

- before birth
- at birth
- during adolescence

We can name all the odours we perceive.

- False
- True

Answers

What is the average number of olfactory cells in a human nose?

- 30 billion**
Wrong! Your nose can recognise a myriad of odours and aromas, but with less cells.
- 30 million**
Well done! When it comes to recognising odorous molecules, sometimes your nose is underused.
- 30**
Wrong! It's much more. Think about all the aromas and odours your nose can distinguish using its olfactory cells.

Our olfactory cells are renewed on average every...

- year**
Wrong! They are renewed more frequently.
- week**
Wrong! It's not that frequent.
- 4 weeks**
Well done! That's right!

We all perceive odours in the same way.

- False**
Well done! We perceive odorous molecules differently based on our personal experiences and our sensitivity.
- True**
Wrong! We are not all equal when it comes to recognising odours.

How many olfactory receptor genes do humans have?

- 350**
Well done! That is less than the 800 genes that dogs have, but more than enough to enable us to detect a great number of odours.
- 3500**
Wrong! It's less than that.
- 35**
Wrong! Think about all the odours you can recognise.

How many different olfactory substances are there in coffee?

- 800**
Well done! Coffee does in fact contain some 800 different olfactory substances.
- 100**
Wrong! It's more than that.
- 2**
Wrong! We may not realise it, but it's actually much more than that.

We all smell the same amount of a specific olfactory substance.

- True**
Wrong! We all have different sensitivities with regard to a same olfactory substance.
- False**
Well done! That's right! Sometimes, we can perceive substances that someone right next to us is unable to detect.

Our olfactory potential is identical to that of monkeys.

- False**
Well done! Over the course of evolution, around two thirds of our olfactory receptors have become inoperative.
- True**
Wrong! Monkeys have receptors that we have lost in the course of evolution, which enable them to detect olfactory substances we can no longer sense.

A sense of smell is not essential to enjoy food.

- True**
Wrong! Think about what happens when your nose is blocked.
- False**
Well done! A sense of smell is actually essential to enjoy food fully.

The process of learning to smell begins...

- before birth**
Well done! When inside the womb, we already learn to identify certain odours that we will recognise later.
- at birth**
Wrong! It is earlier than that.
- during adolescence**
Wrong! It is long before that.

We can name all the odours we perceive.

- False**
Well done! Language is not particularly well tailored to the world of odours and, even if we recognise an odour, we are often unable to find the right words to describe it.
- True**
Wrong!

The role of the sense of smell in perceiving flavour

[8-10 years old and 11-13 years old]

Instructions:

Choose four different kinds of fruit juice (e.g. orange, apple, peach, apricot).

Pour a glass of each juice.

Pour water into a fifth glass.

Ask someone to close their eyes, take a sip from one of the four glasses of juice and guess the flavour.

Get them to rinse their mouth with water before tasting each of the other three kinds of juice.

Is it easy to identify the flavours?

Repeat the experiment, this time asking them to pinch their nose as they taste each juice.

Is it easier or harder to identify the flavours?

Explanation:

Your tongue can only recognise tastes such as the sweetness of an apple, but some foodstuffs taste similar. Your nose that helps you distinguish between them. The sense of smell therefore plays a key role, enabling us to recognise and enjoy food.