

# Sensory System

How Does Our Mind  
Know What is  
Happening Outside of  
Our Own Body?



Helena Carvalho, PhD  
Kids Tech University

# First, let me introduce myself.



- I was born in Brazil.



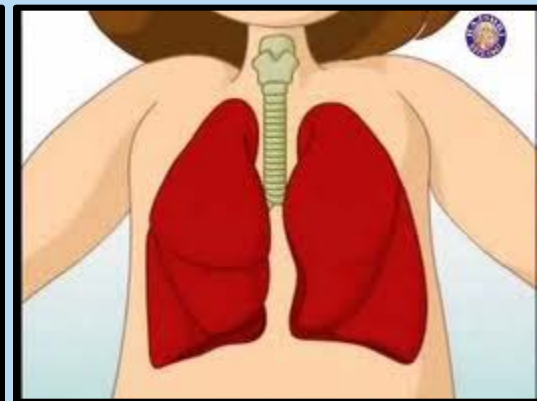
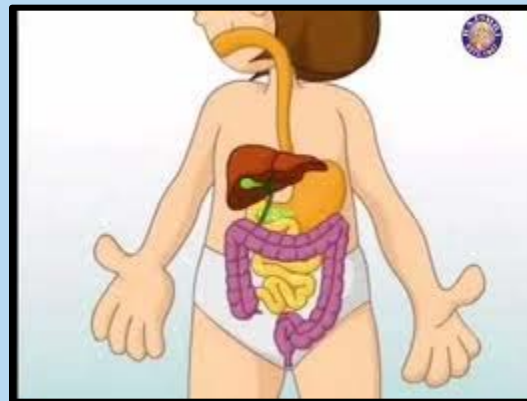
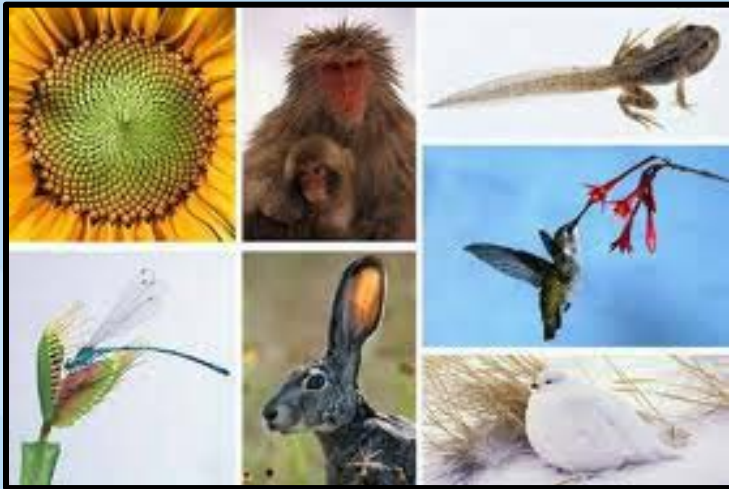
- I grew up in Rio de Janeiro.



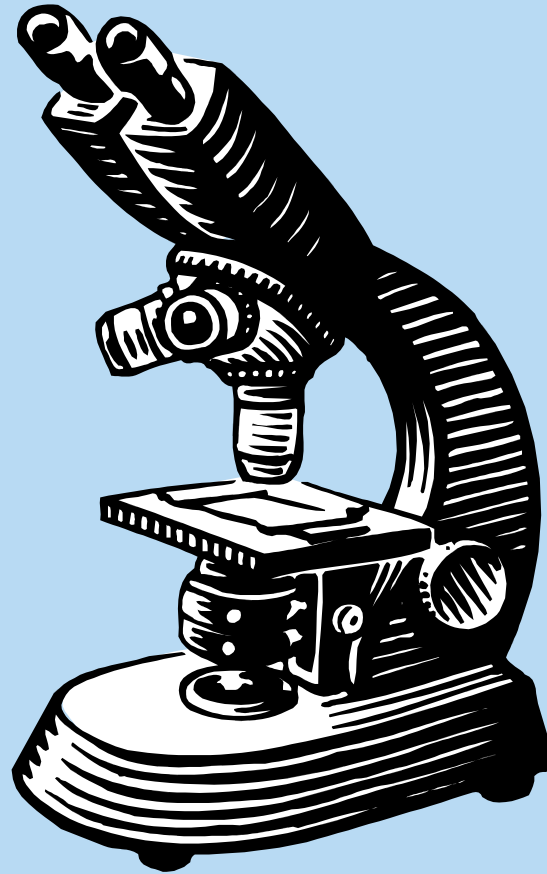
...and I love science !

I ❤️ Physiology

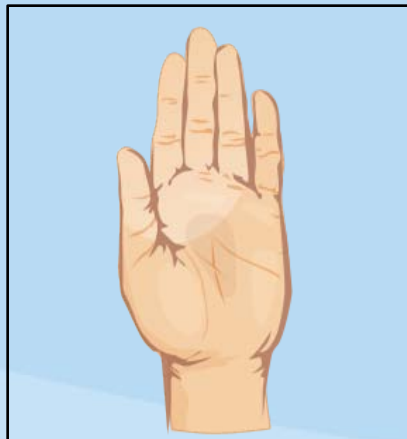
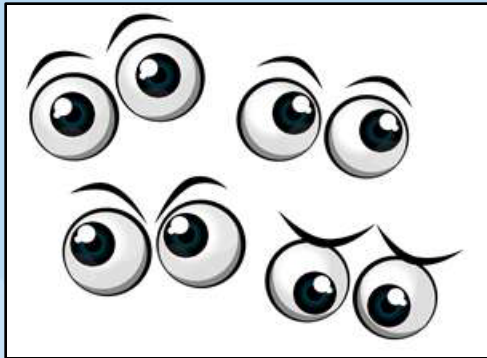
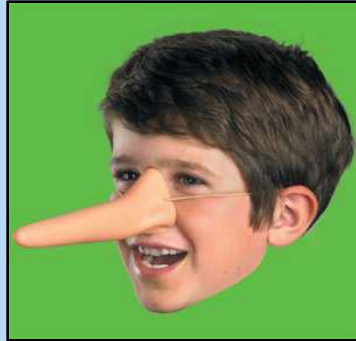
I study biology and how the body works.



# Let's talk about science.



# What are our senses?



# Our amazing brain.

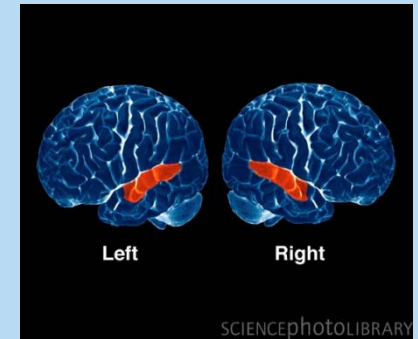
## Where sensations take place.



Vision



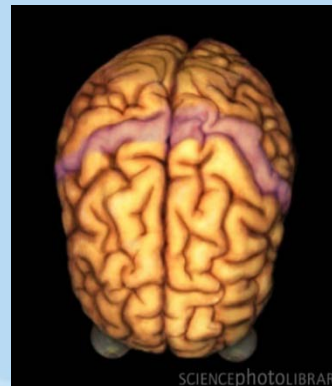
Smell



Hearing



Taste



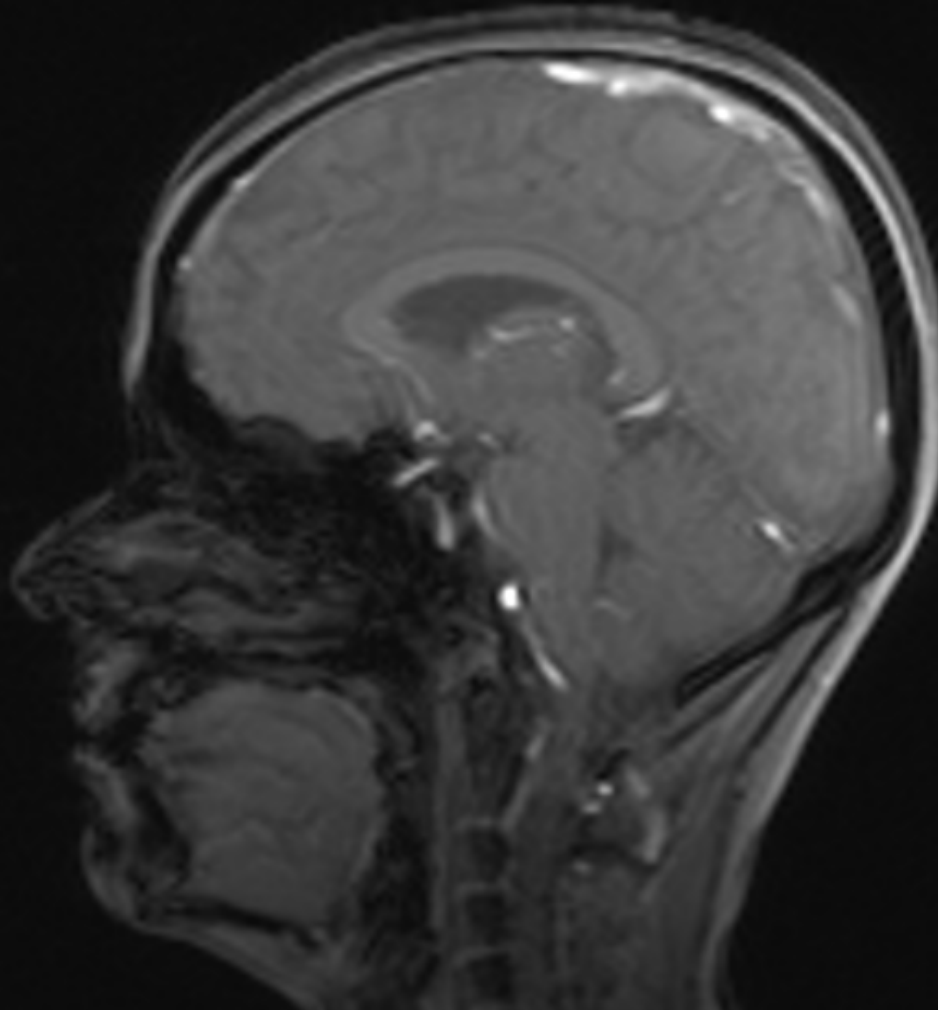
Touch

# My own brain !

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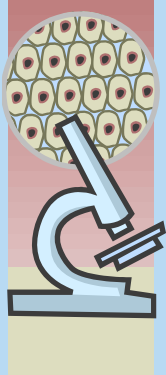


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Carilion  
Research Institute

Sensory  
Cells



Electrical  
signals



Nerves



Granule Cell

Brain



Sensations



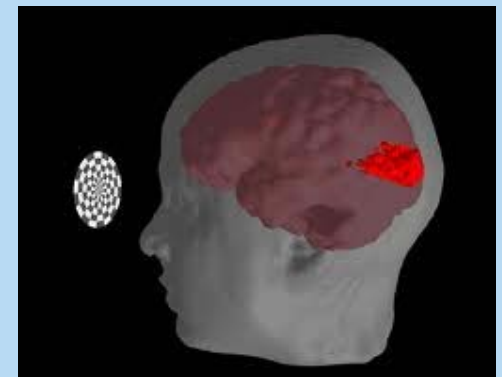
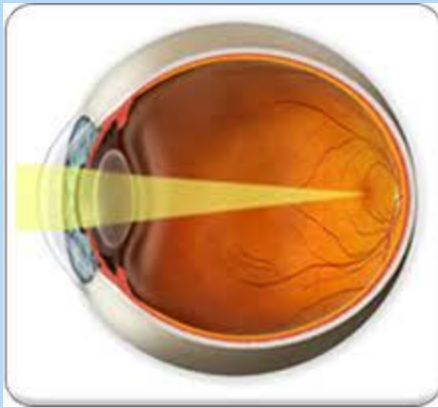
**What is  
common in all  
of the senses?**



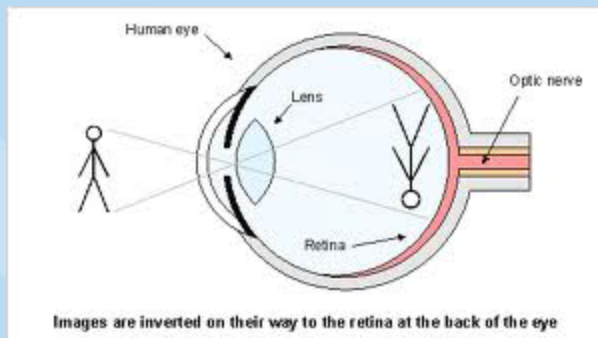
# Vision: Eyes



# How do our eyes work?



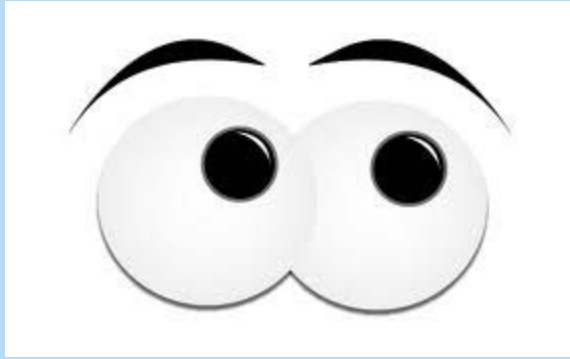
[Eye movie](#)



# Why do some of us need eyeglasses?

Sometimes the lens does not work properly.



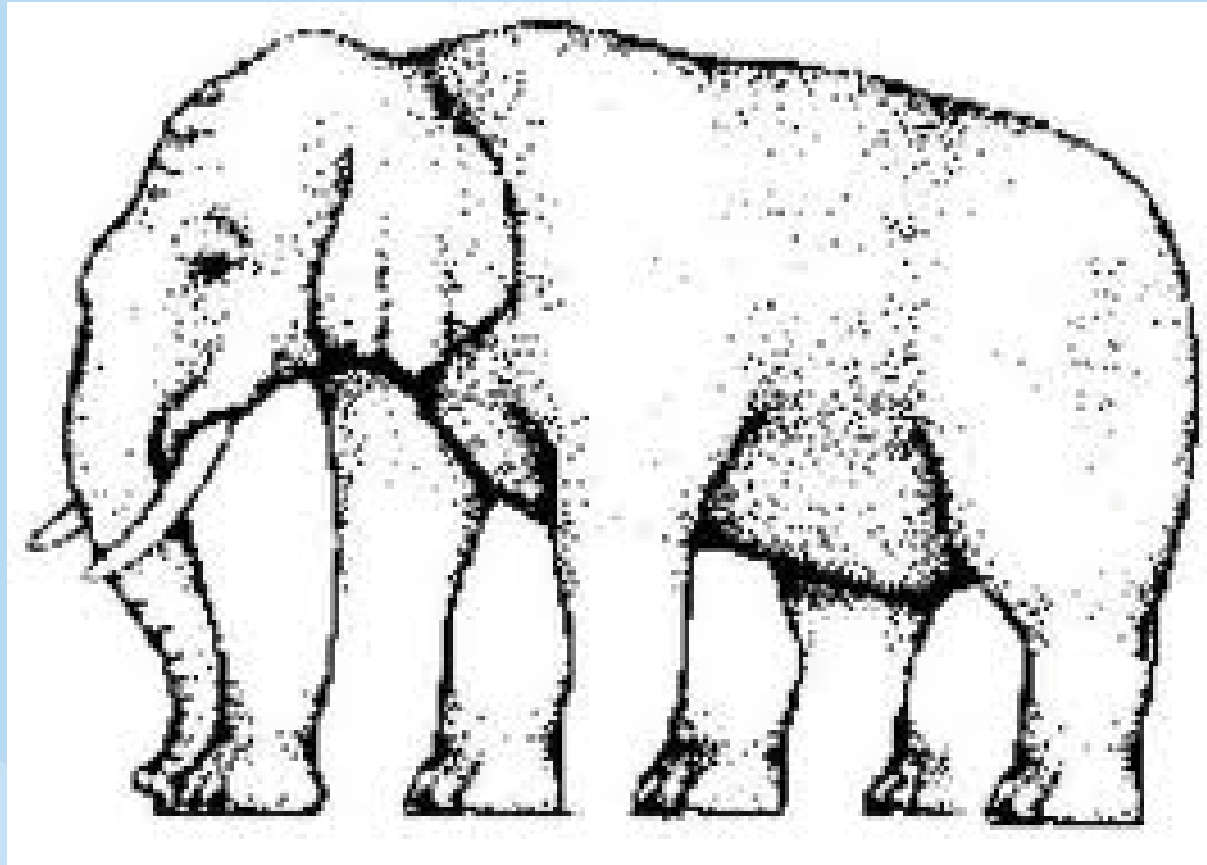


How many eyes do we  
need to see?

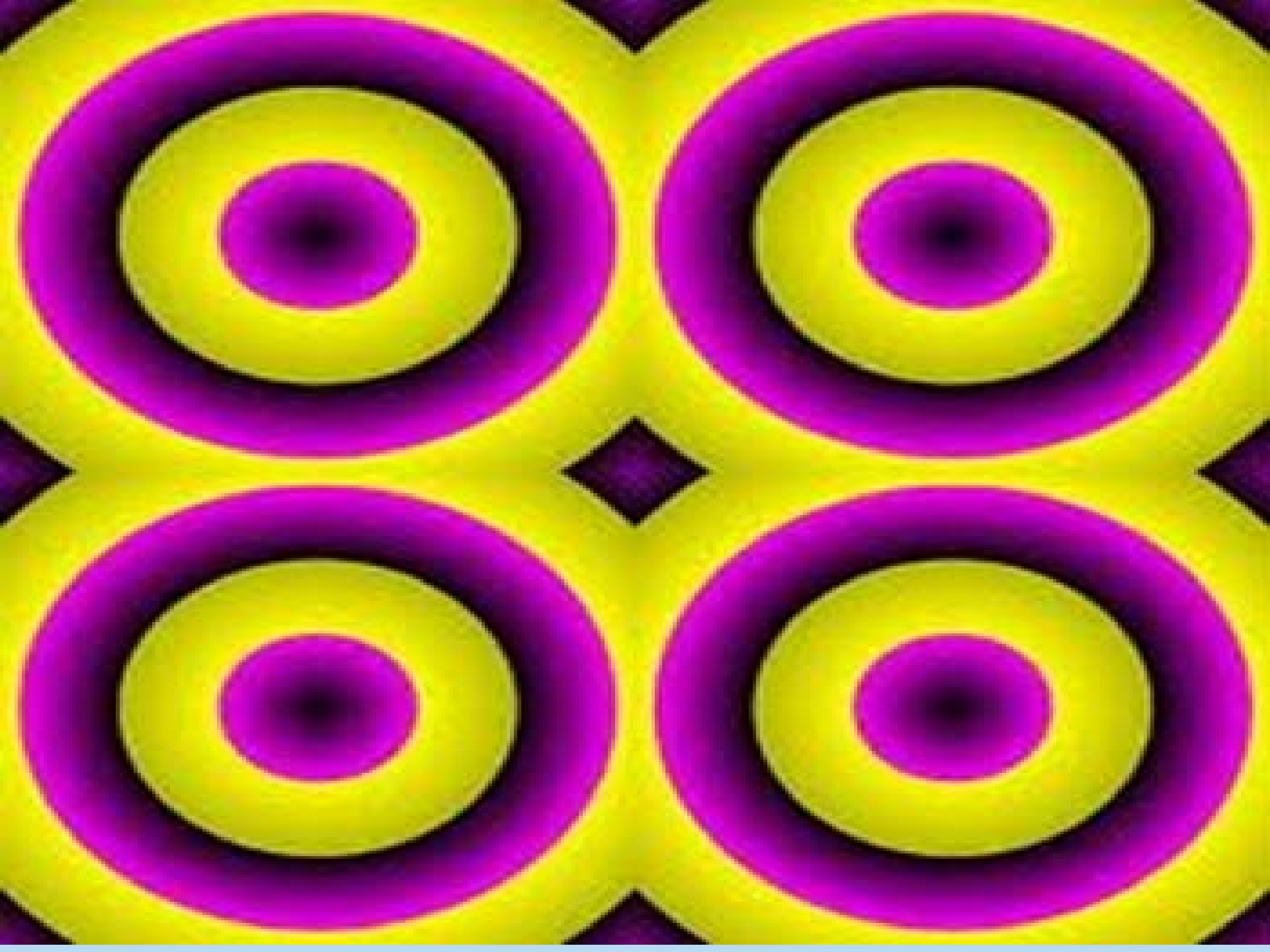
3D

You can test your 3D vision this afternoon!

# Optical Illusions







Sensory  
Cells



Electrical  
signals



Nerves



Granule Cell

Brain



Sight

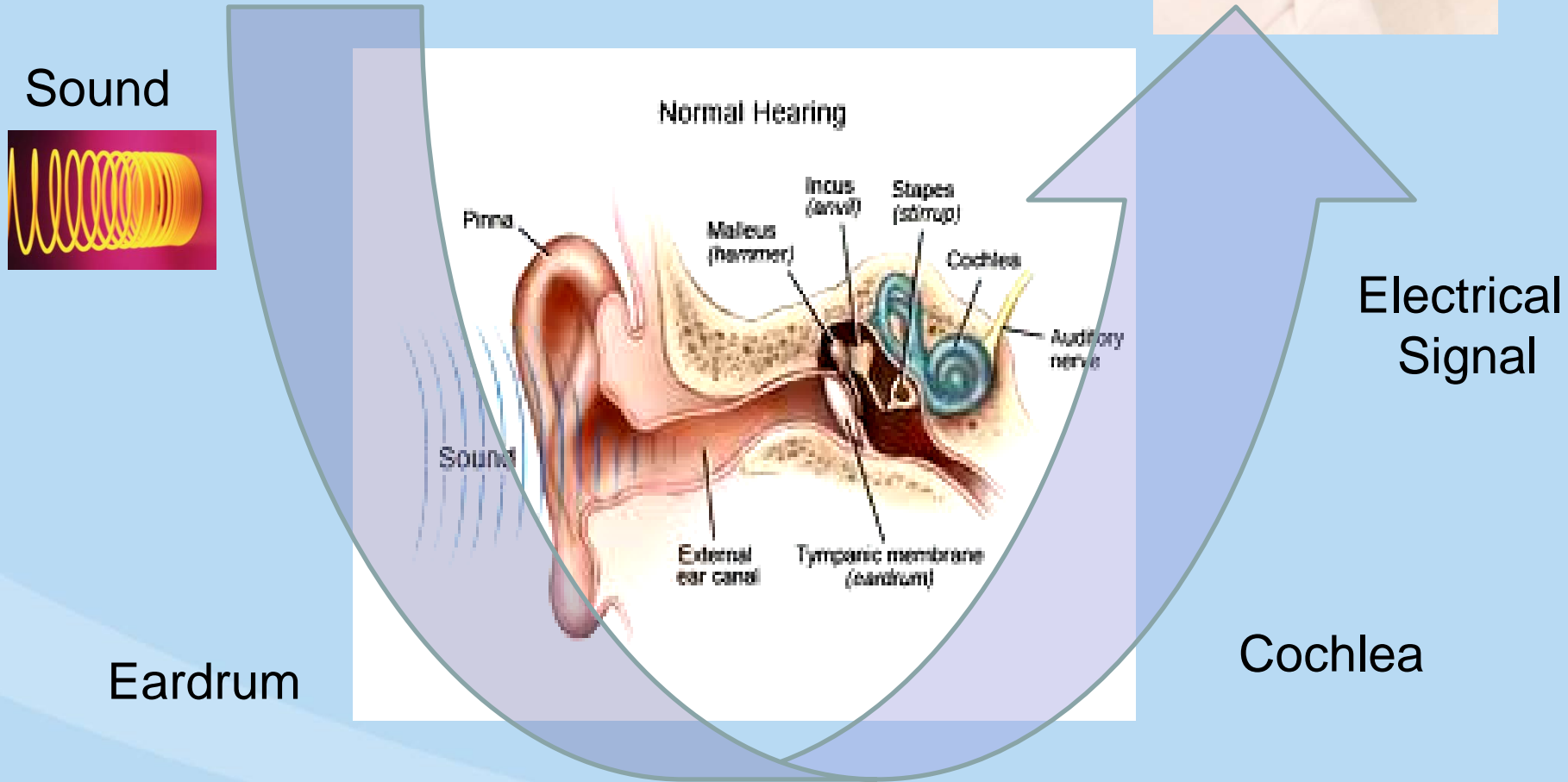


# VISION



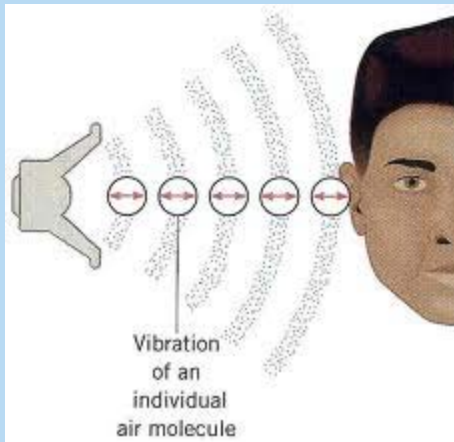
# How do we hear?

[Kid hearing video](#)



# How Sound Travels

We can hear sounds that travel by air or through bones.



Sciencephoto.com

You can test it this afternoon!

# Can we decide what to hear?



- You can focus on one sound and ignore the background noise.
- We stop listening to continuous noise.

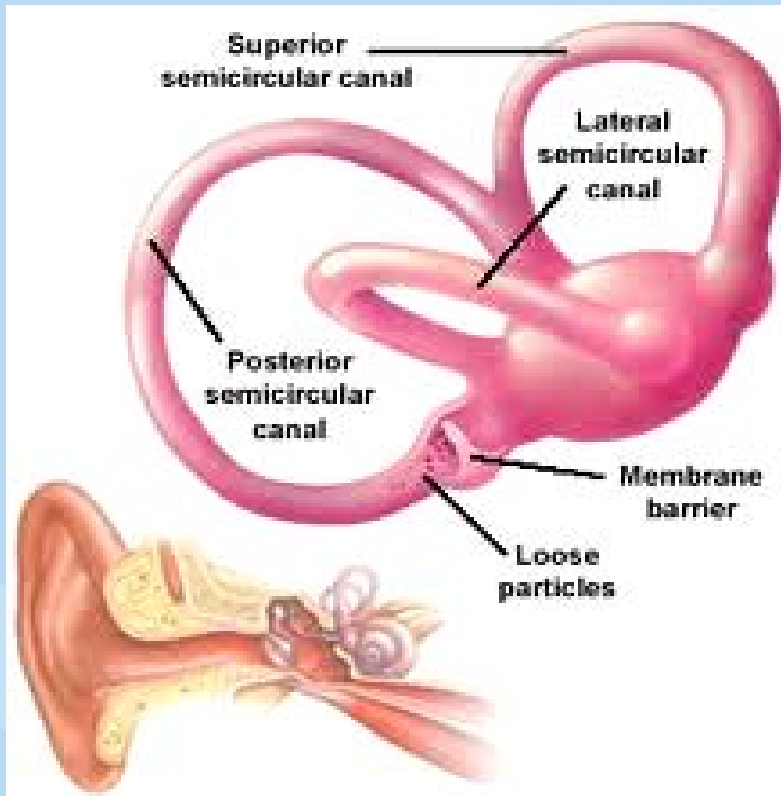


Why do we have one ear  
on each side of our head?

So we can figure out  
where the sound is  
coming from!

You can test it this afternoon!

# Ears for balance?



## Why?

- When you move, so does the liquid in the ear.
- You stop, but the liquid doesn't.
- Your brain thinks you're still moving.
- You lose balance and may fall down.

You can test it this afternoon!

# HEARING

Sensory  
Cells



Electrical  
signals



Nerves

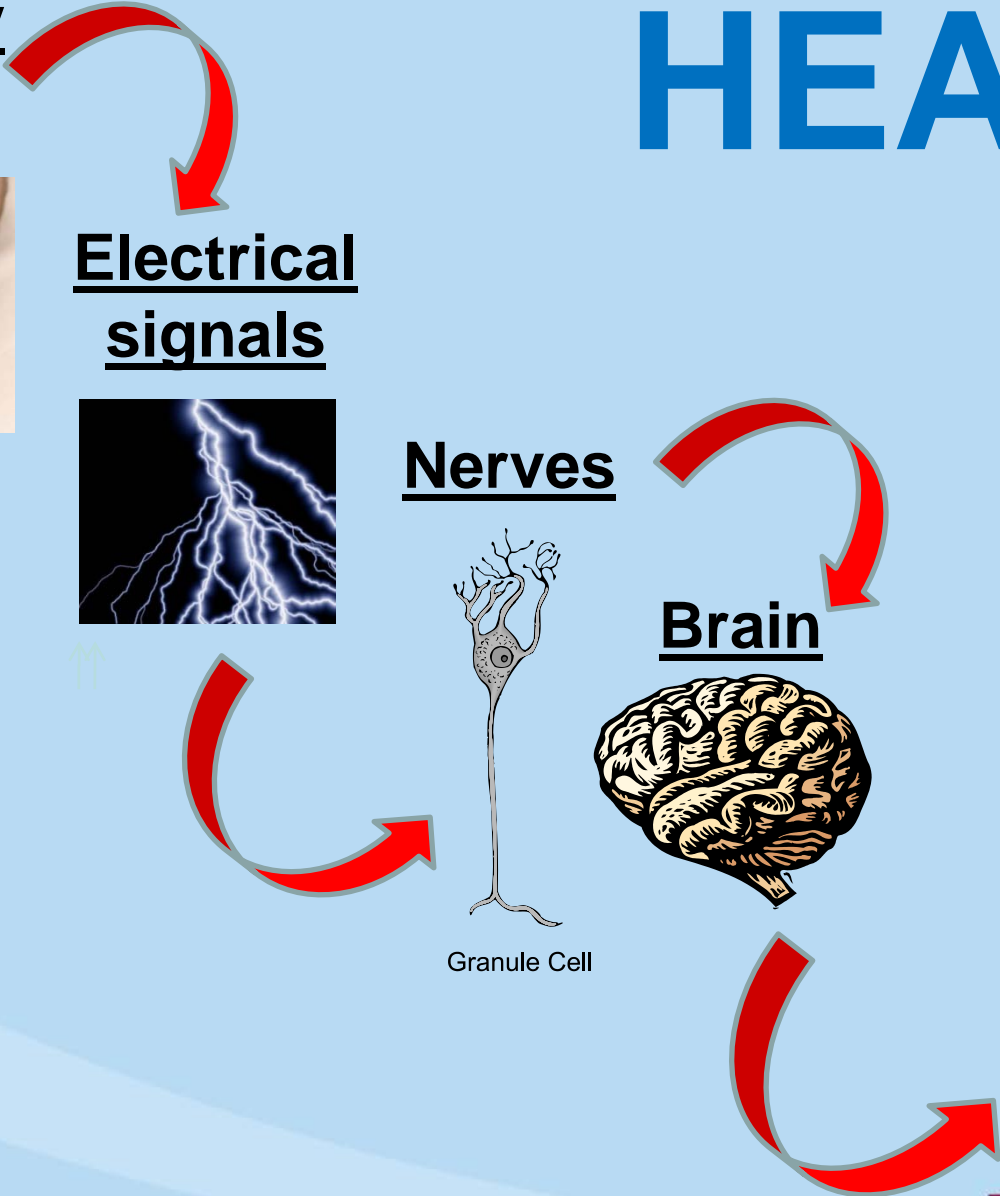


Granule Cell

Brain



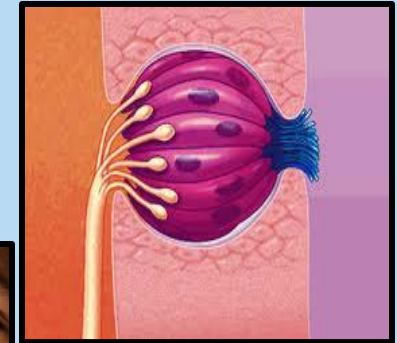
Sound





# How do we taste our food?

- Taste Buds (receptor cells) are on the tongue.
- Saliva and chewed food enter the taste buds which make an electrical signal.
- The brain recognizes these signals as taste.



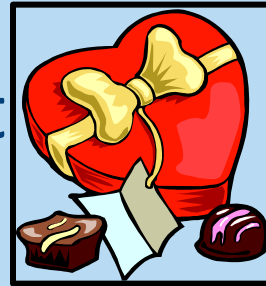
You can test it this afternoon!

# How many different tastes can our tongue recognize?

Salty



Sweet



Sour



Bitter



Umami (savory)

Then how can we taste more than five flavors?





# Why do we have the sense of smell?

- It's more than just **enjoying** food!
- It alerts us to **dangers**: poison, spoiled food, smoke.
- It helps us **recognize** many things.



Babies know their mothers by their smell !

SCIENCEPHOTOLIBRARY

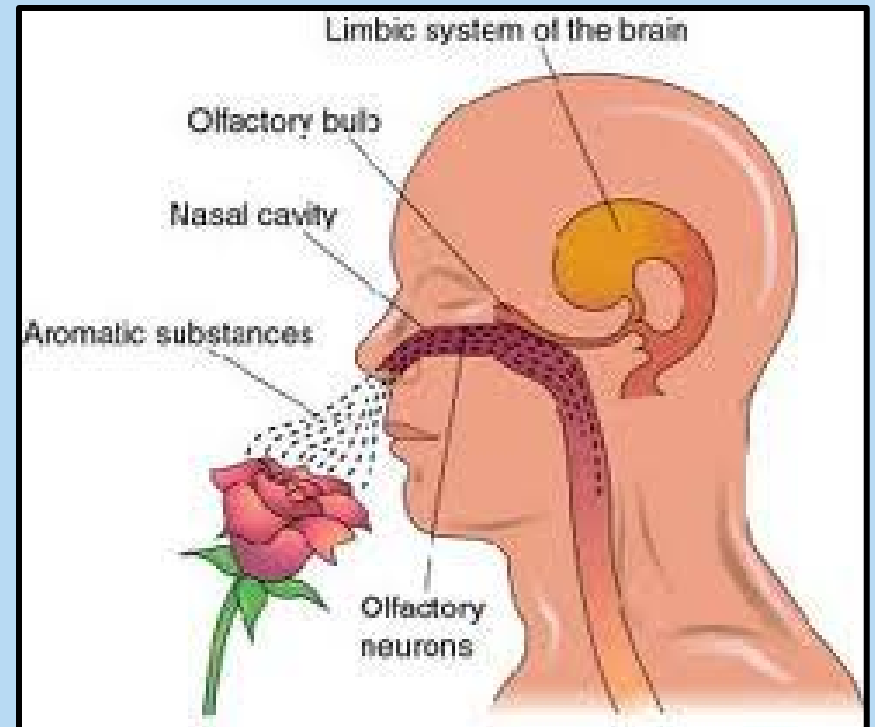


# How do we smell?

Scents reach **receptor cells** in the nose.

Nerve cells bring the signal to the **olfactory bulb**.

The signal then goes **directly** to the brain and is recognized as smell.



[Smell and taste together](#)



# Smell and Emotions?

Role in **memory** and  
**emotions.**



**Scents can trigger powerful emotions.**

Sensory  
Cells



Electrical  
signals



Nerves



Granule Cell

Brain



Tastes & Smells

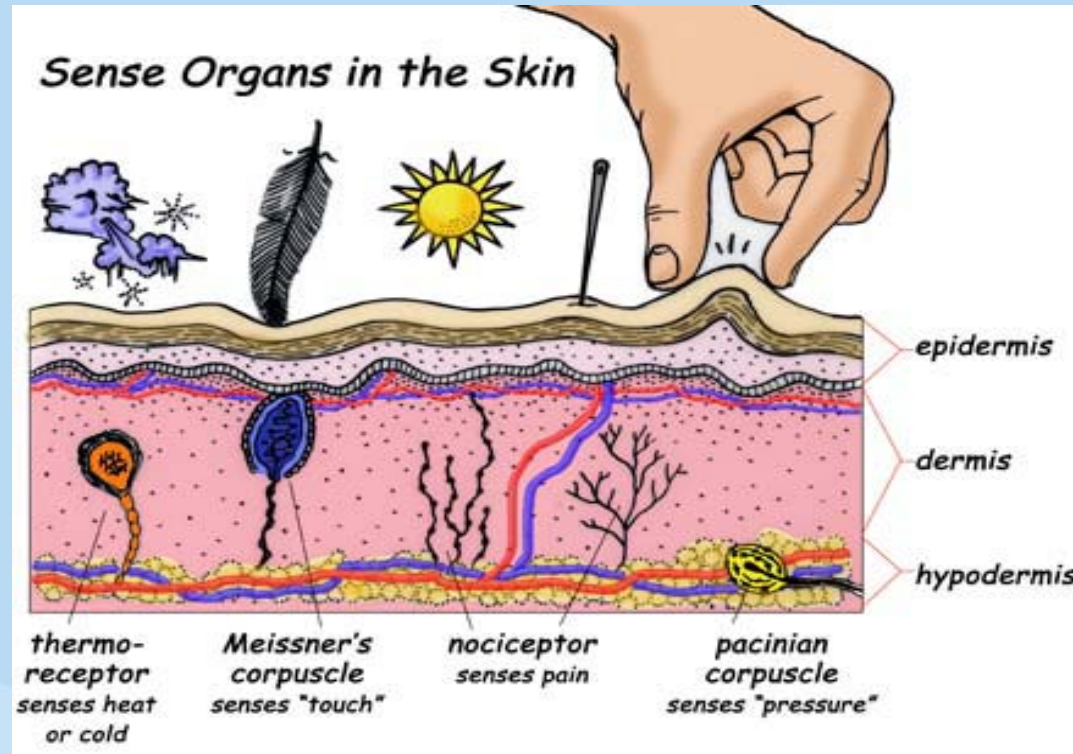


# TASTE & SMELL

# Touch and Feel



- **Skin:** the biggest organ in our body!
- Different types of **sensory receptor cells.**



You can test it this afternoon!



# Why we don't feel our shoes?



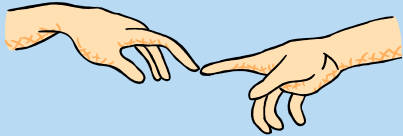
Our brain reacts to **new** sensations and ignores the old ones.





# Why do we touch with our fingertips?

Some parts of our skin are more sensitive than others. Can you give an example?



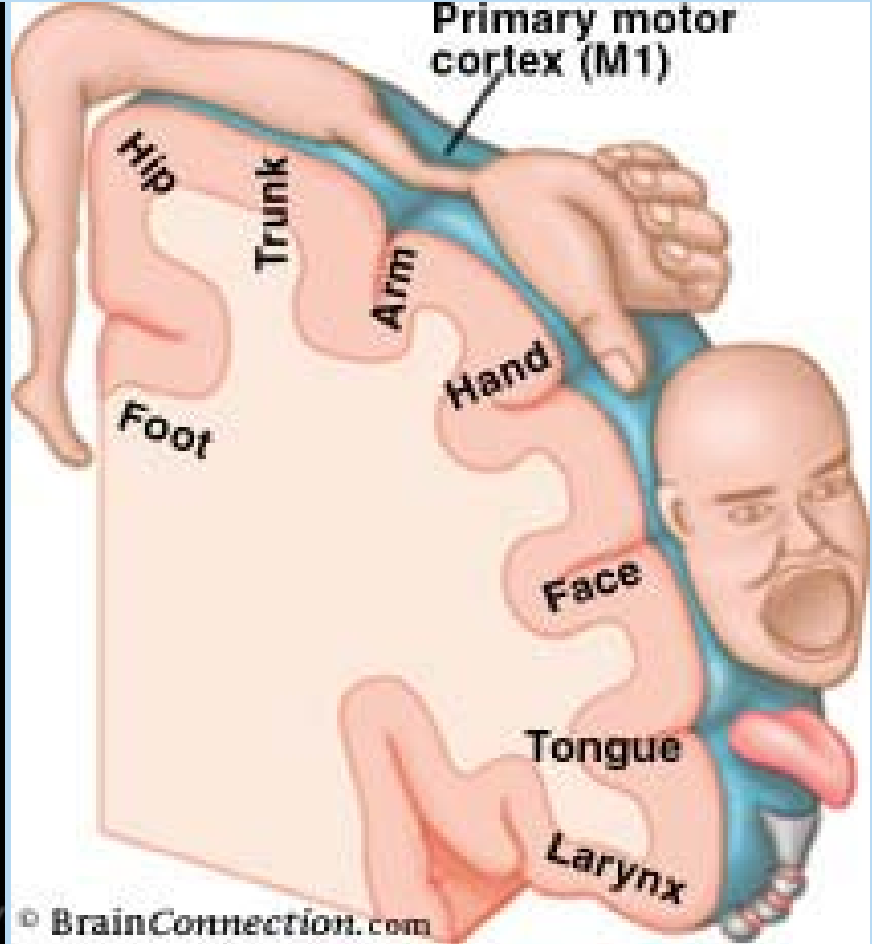
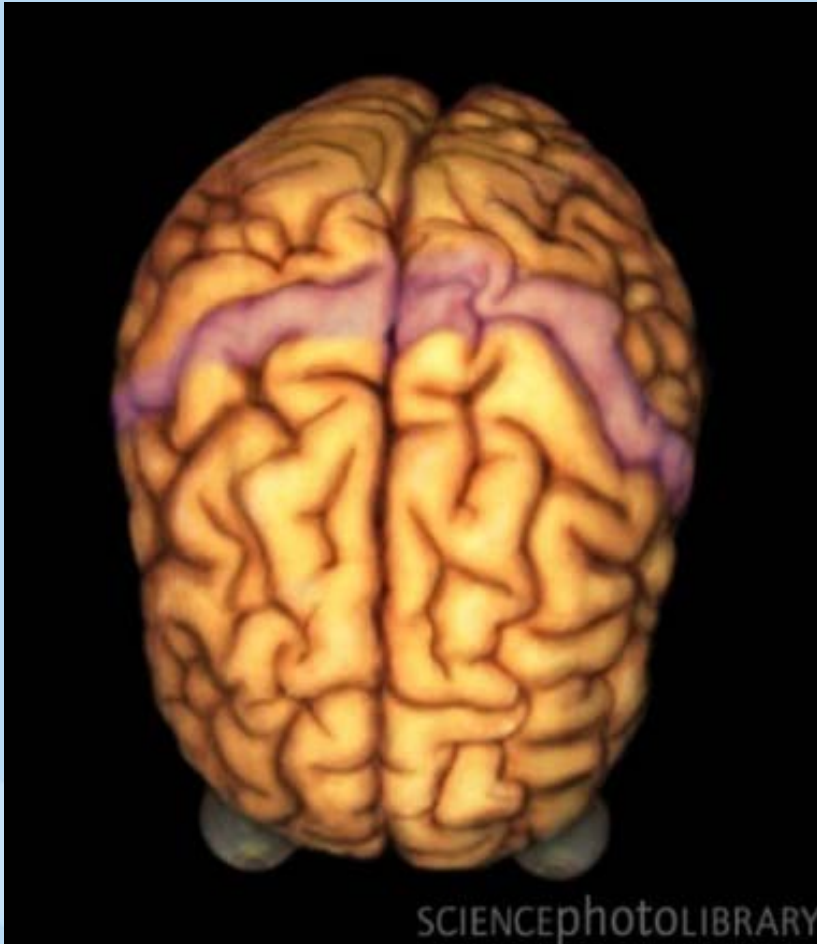
## Fingertips and Lips



You can test it this afternoon!



# Homunculus



Sensory  
Cells



Electrical  
signals



Nerves

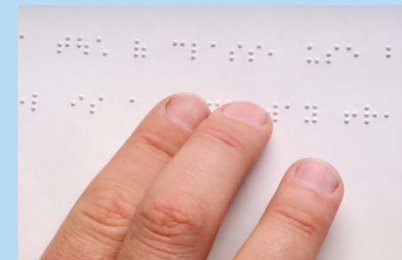


Granule Cell

Brain



Sensations



# TOUCH

# Senses work as a team!



Please come by the VTC  
School of Medicine  
booths this afternoon  
and have more fun!!!  
Thank You!