



BIOLOGY

HEAR

WE

Go!

THE SOUND OF SYNAPSES

Supporting documentation

CONTEXT

Welcome to **CORTEX QUEST : HEAR WE GO!**

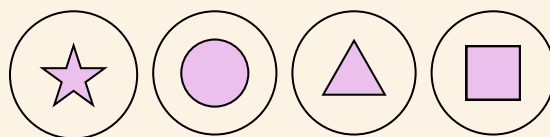
A scientific mishap has **miniaturized** your team of biologists... You've been projected inside the human body, right into the heart of the auditory system, for a mission of the utmost importance: to **understand** the auditory pathway and how the **sensory system** works!

Equipped with your VR tools, you will :

- Explore the **cochlea** and uncover its secrets;
- Activate the **hair cells**;
- Play with sound **frequencies** to understand how low and high tones are perceived;
- Trigger **action potentials** and follow their path through the neurons;
- Reach the **auditory cortex**.

Shapes

Throughout the game, you will encounter **shapes** that float around you.



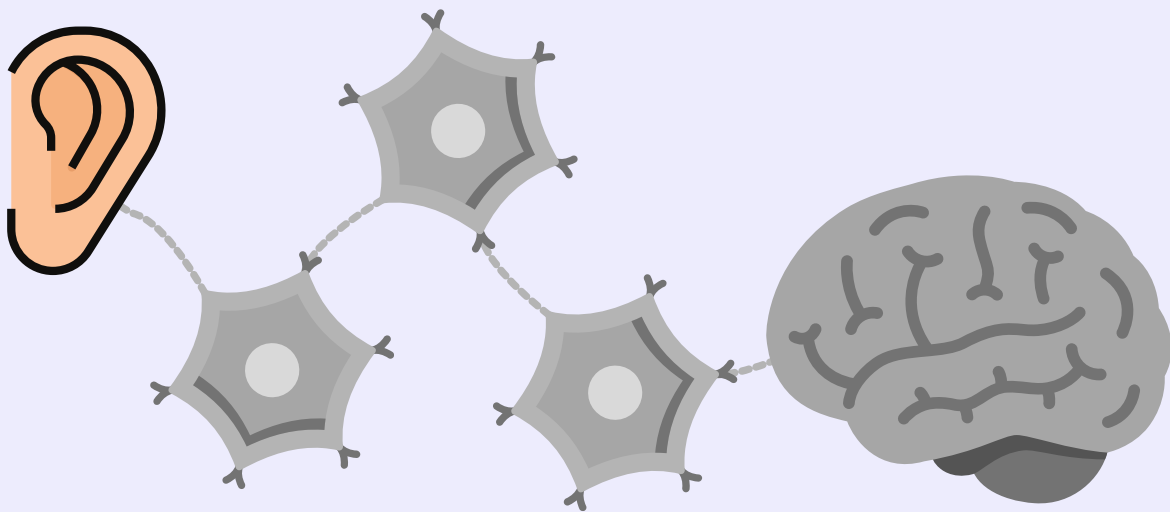
Each represents a different **action** to be taken depending on the context.

When you see it on-screen, it's time to communicate with your teammate!



SITUATION

The Hub serves as the **central** point of the game. It provides an overview of the **sensory system pathway** and helps you understand each stage within its larger context.



You will return here at **key moments** to understand how the actions you perform on a **microscopic** scale influence the entire system on a **macroscopic** level.

PLAYER'S GOALS

1 - Getting to the ear

Move to get right in front of the ear

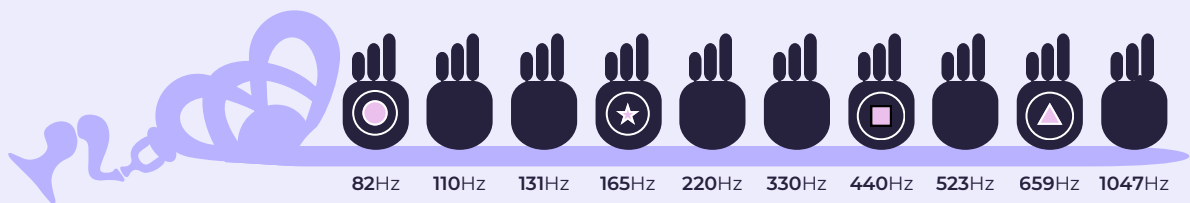
2 - Interact with the ear

Grab the ear to start the first level

Stimulating the cochlea LEVEL 1

SITUATION

You're looking at the **unfolded cochlea**, which contains **hair cells**. Each of these cells reacts to a specific range of sound **frequencies**.



The **bracelet** allows you to change the frequency of the **sound** .

PLAYER'S GOALS

1 - Activate all the hair cells

Activate all the hair cells at least once (by playing with the frequency).

2 - Activate a specific hair cell

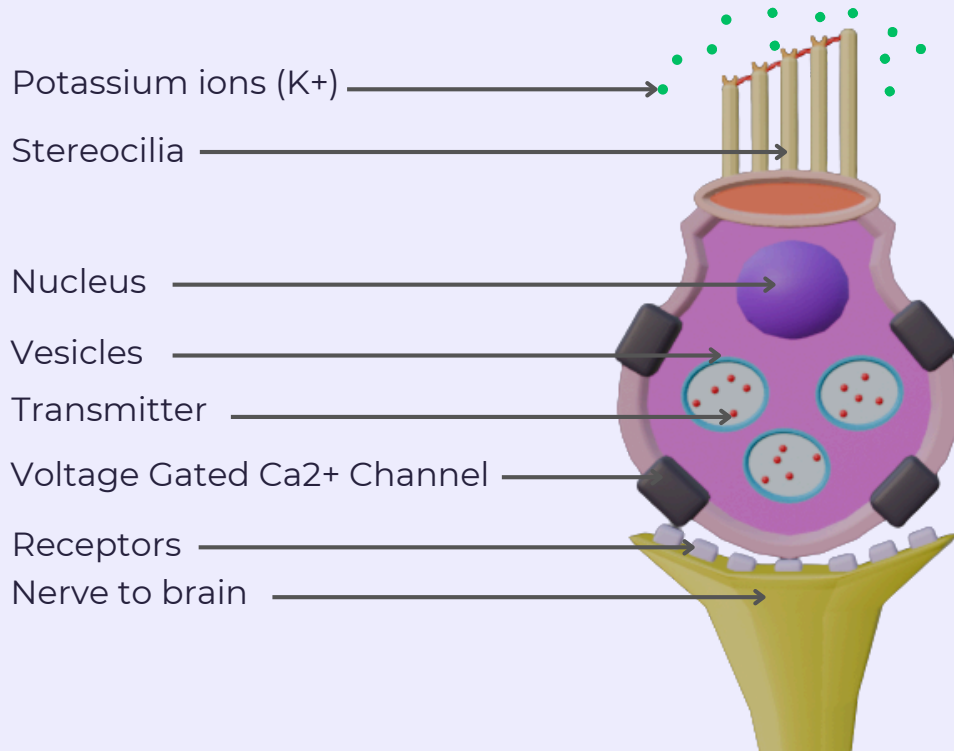
Use the visible shapes on the screen to identify and stimulate four **specific** hair cells.





SITUATION

Here you are, up close to a **hair cell**, where you can observe its structure in greater details.



PLAYER'S GOALS

1 - Manipulate a stereocilia

With one hand, **tilt** the stereocilia to the right to open the ion channel.

2 - Feed the ion channels

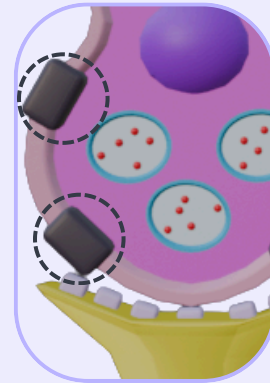
With the other hand, **grab** a potassium ion (K⁺) from those floating in the air and feed it into the ion channel.

Feed enough ions to **depolarize the cell**.

SITUATION

In the previous level, you managed to **depolarize** the hair cell, which unlocked the calcium channels.

They are now eligible to receive **Ca⁺⁺ ions**.



PLAYER'S GOALS

1 - Load

All around you, you will find calcium ion (Ca⁺⁺) **ammunitions**. Grab them and **reload** your laser!

2 - Aim & Shoot

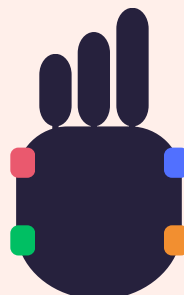
Your goal is to **hit** the **calcium channels**. Once you are aiming for one, pull the **trigger** to fire!

To know which channel to shoot among the four, carefully observe the shape in your field of view.

Circle
Top left



Star
Bottom left



Square
Top right



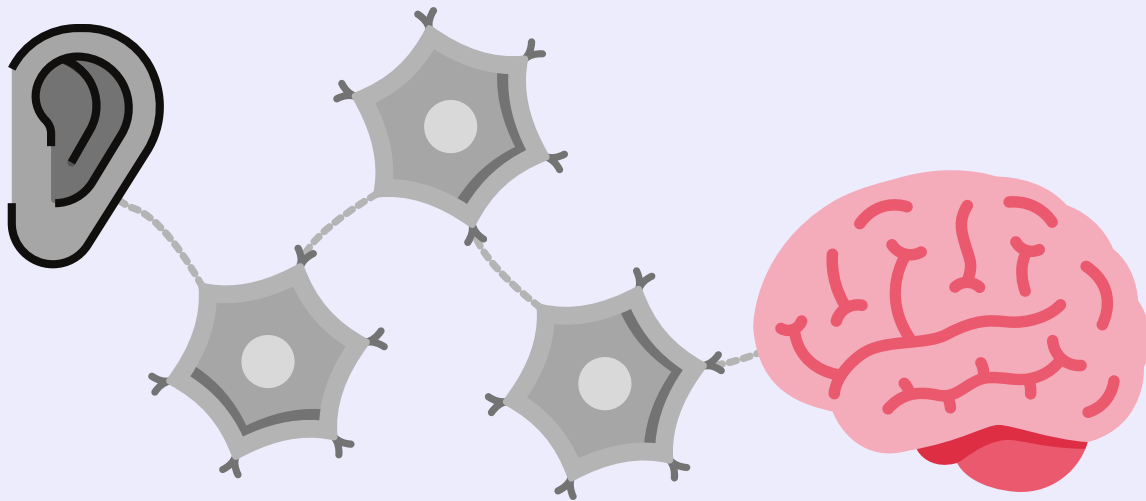
Triangle
Bottom right



SITUATION

Here you are in the hub for the **second** time. You can now witness the **consequences** of the actions you carried out in the **previous** levels, including the **action potential**, this time from a more distant view.

You unlocked the last level, **the brain : auditory cortex**



PLAYER'S GOALS

1 - Getting to the brain

Move to get right in front of the brain.

2 - Interact with the brain

Grab the ear to start the last level.



SITUATION

You are now facing the **brain**, specifically in the **auditory cortex** area. Beside you are terminal axons which, once connected to the right regions, emit a signal that allows your brain to interpret a sound.

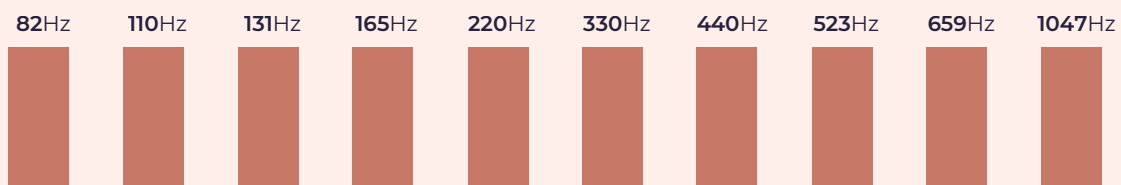


PLAYER'S GOALS

1 - Identification

Identify which neuron corresponds to which frequency by changing it using the **bracelet**.

The higher the pitch, the higher the frequency.



2 - Link

Plug the active cable in the appropriate **area**

Conclusion?
Remerciements?
Partenaires?