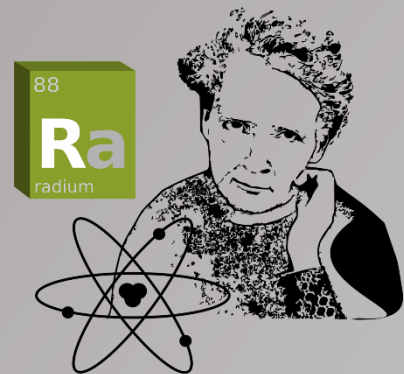


ANTIMATTER,  
WHAT'S THE  
MATTER?

$\vec{r} = r(1 + \frac{\pi}{2}\varphi)$   $F = \frac{d}{dt}(mv)$   $\omega = 2\pi f$   
 $\eta \rightarrow \eta^* = v \frac{d}{dt}(\frac{m_0}{\sqrt{1-v^2/c^2}}) + ma$   $PV = nRT$   
 $\mu u du + \frac{1}{2} dm = \frac{1}{2} c^2 dm$   $\Delta T_V = -\frac{1}{2c^2} \sum_{i=1}^k v_i^2 \Delta T_i$   
 $k = \int (m u du + \frac{1}{2} dm)$   $E = mc^2$   $mc^2 - m_0c^2$   
 $\Delta m = \frac{m_0}{\sqrt{1-v^2/c^2}} - m_0$   
 $\frac{c+v}{1+\frac{cv}{c^2}}$   
 $m^2 c^2 - m^2 u^2 = m_0^2 c^2$   $\sum m_i v_i = \sum m_f v_f$   $\Delta t = \frac{\Delta t_0}{\sqrt{1-v^2/c^2}}$   
 $P = \frac{mv}{\sqrt{1-v^2/c^2}}$   $d(m_0 u / \sqrt{1-u^2/c^2}) dt$   $pV = \frac{v}{N_A} kT$   
 $-\nabla p = \rho \frac{dv}{dt} + (v \cdot \nabla) \rho v$   $m = m_0 / \sqrt{1-u^2/c^2}$   $p = n \frac{RT}{N_A} = \frac{RT}{M} \rho$   
 $m = m_0 / [(1 - [v^2/c^2])^{1/2}]$   $E = \frac{mc^2}{\sqrt{1-v^2/c^2}}$



Be careful, bad mushrooms !



Marie Curie



MRI: a medical  
innovation and a  
job

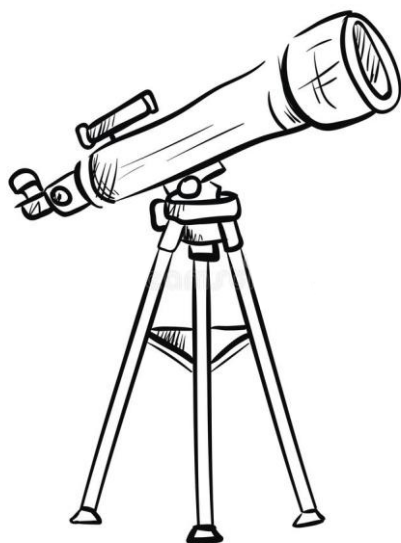


Corals: between ocean  
and medicine

Never cry.  
Never complain.  
Just work!

# Edito

We wrote this journal in a scholar project. We try to mix science and English. We study about science subjects which are not approach in school program. Let's go little scientists, come with us to discover science's secrets!



## Table

N°3, March 2023

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What is MRI used for? Let's explain with an interview.

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Magic Mushrooms, good or not?

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You can touch matter, right? But can you touch antimatter; let's see together the abyss of Universe.

### **Marie Curie** p.12

Marie Curie, a woman more important than you think!

### **Corals: between ocean and medicine** p.14

Corals aren't useless outside on the ocean...

# MRI

**M**RI is a medical examination allowing to obtain human body's interior images in two or three dimensions. MRI is efficient for looking organs and structures inside your body.

For what  
is an MRI  
used?

Joint  
example  
one:  
Knee

**MRI for knee used for diagnosing pain, weakness, swelling or bleeding in and around the joint. Knee MRI, it can help determine whether you require surgery MRI of the knee provides detailed images of structures**

**within the knee joint.**

**The examination is typically performed to evaluate:**

- Bone fractures
- Sport related
- Pain knee ect...



MRI :  
Magnetic  
Resonance  
Imaging

**Interview : Doctor Raymond Christian**

## **1. What is a qualification if necessary for make MRI and how long does it take?**

*It is necessarily having state manipulative qualification in radiology or a higher technician qualification in medical imaging and therapeutic radiology. It is two similar qualifications, that are made in three years after the baccalaureate.*

## **2. Where can we go to MRI?**

*MRI (Magnetic, Resonance, Imaging) can practice a hospital or a clinic or in private center.*

**3. What is the planning?**

*The timetable varies according to the type of structure. A hospital or in clinic, the timetable are carried on (he speaks PDS or permanence of care). The departments care work 24/24H 7/7D.*

**4. Our work, it is a work solidary or a work team.**

*MRI work is done in pairs. But at night, for example on guard, we find ourselves alone.*

**5. Do you work the night?**

*Guards are established within the hospital, again for the PDS.*

**6. To make appointment is compulsory or is there a MRI emergency?**

*Appointment booking is essential for scheduled exams with a medical prescription. In case of emergency, examinations are carried out without an appointment.*

**7. Everybody can go MRI or is there a particular case who is not possible?**

*He exists two main contraindications: having a pacemaker and claustrophobic (be fear locked up) Then relative contraindication, this is the after the operation when having recent metallic implant.*

**8. What is your way salary for this job?**

*Salary varies between 1500 and 3000 euros depending on seniority and skills.*

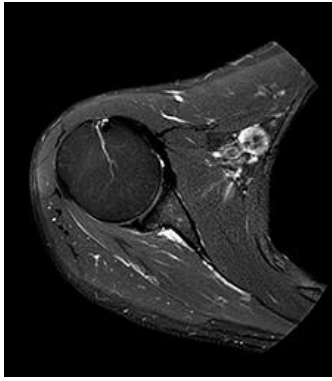
**9. Many is there a specialist for each type of MRI?**

*There may be specific specialists in some center, in cardiology, gastroenterology for example. But the centers do a bit of everything.*

**10. Do you like your job?**

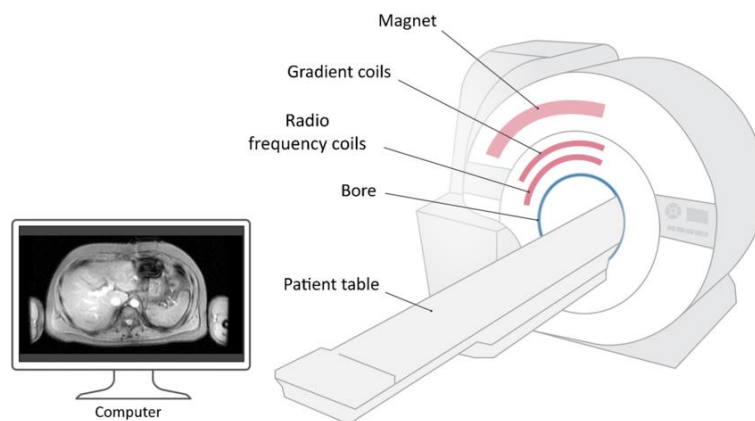
*Yes, I like my job.*





**MRI of the shoulder helps the doctor diagnose potential problems found in other imaging tests such as x-rays. It also helps the doctor diagnose unexplained pain in the area or better understand the condition causing the shoulder symptoms.**

**Joint  
example  
one:  
Shoulder**



### **Sources :**

- 👤 <https://www.ameli.fr>
- 👤 <https://medlineplus.gouv>

### **Vocabulary:**

- 👤 Efficient → efficace
- 👤 Joint →
- 👤 Pain → douleur
- 👤 Timetable → les horaires
- 👤 Appointment booking → la prise de rendez-vous
- 👤 Skills → les compétences
- 👤 Swelling → les gonflements
- 👤 Higher → supérieur
- 👤 Pairs → en binôme

*Written by Grimaux Elina and Raymond Margaux*



# Magic Mushrooms

*We will see magic mushrooms' effect and their regulation in different countries.*

**M***agic mushrooms are mushrooms with hallucinogenic and entheogenic properties due to various molecules depending on their species. Hallucinogenic mushrooms give psychotropic effects because they are containing hallucinogenic compounds such as psilocybin and psilocin.*

*Consumption of magic mushrooms can lead to bad trips. The production, sale and possession of magic mushrooms are illegal in Canada.*



*Figure 1: Pink psilocybin in nature*

## France

Specific mushroom called psilocybin, send it to France and from this mushroom, a molecule called psilocibin was extracted and tested at Sainte Annes hospital in order to prove effectiveness on mental disorders.

Unfortunately, all research stopped. In 1963 before having mushrooms completely forbidden. Research will restart again 15 years later but scientists are facing issues and miss support from overall scientist which prefer to use real medicines than drugs to care mental disorders.

Meeting between Aldous Huxley and Osmond, both convinced that mescaline could care Anxiety cancer addiction eating disorder. Then they get in touch with Robert Gordon Wasson to talk about Psilocybin and plan some studies. Unfortunately,

Nixon decides to forbid mushrooms in 1970 even some new age people in west coast will continue to use them

## USA

## Mexico

At the end of the 1950s, in southern Mexico, in a small town, a banker discovered the mushroom "psilocybin" with very powerful effects (hallucinations). This city became a popular destination for hallucinogenic mushroom enthusiasts. The city quickly became a destination for mass tourism because of the high concentration of mushrooms that were very popular with the enthusiasts. This practice was used a lot in the form of ritual during the Aztec era to worship the gods. It was only in 1950 that two physicians were able to synthesize psilocybin in the laboratory to help the Mexican economy.

## Canada

The production, sale and possession of magic mushrooms are illegal in Canada. There is growing interest in the potential therapeutic uses of magic mushrooms and

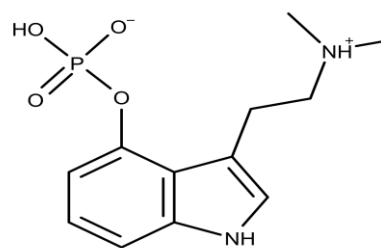




psilocybin, one of the active ingredients of magic mushrooms. Although clinical trials of psilocybin have shown promising result. There are currently no approved therapeutic products containing psilocybin in Canada or elsewhere. Clinical trials are the most appropriate and effective way to advance research on unapproved drugs such as psilocybin, while protecting the health and safety of patients.

Short term effect	Long term effect
<ul style="list-style-type: none"> <li>• <i>Distorts the sense of reality</i></li> <li>• <i>Visual, with intensification of colours, kaleidoscopic vision, and changes in shape</i></li> <li>• <i>Auditory with a sensation of increased hearing, buzzing, and whistling</i></li> <li>• <i>Tactile with increased sensitivity to touch</i></li> <li>• <i>Synesthetic with a change in the perception of sounds that are seen, or images that are heard or felt.</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>Bad trip</i></li> <li>• <i>Reliving a bad experience</i></li> <li>• <i>Risks of behavioural problems</i></li> <li>• <i>Effects on the body: The effects of hallucinogenic mushrooms on the body are mainly related to digestion, with the risk of nausea, vomiting or diarrhoea.</i></li> <li>• <i>Addiction</i></li> </ul>

Molecular synthesis:  $C_{12}H_{17}N_2O_4P$



### Vocabulary

- 🍄 Mushrooms = champignons
- 🍄 Psilocybe = type de champignons hallucinogènes

### Sources

<https://www.smhv.net/champignons-hallucinogene>

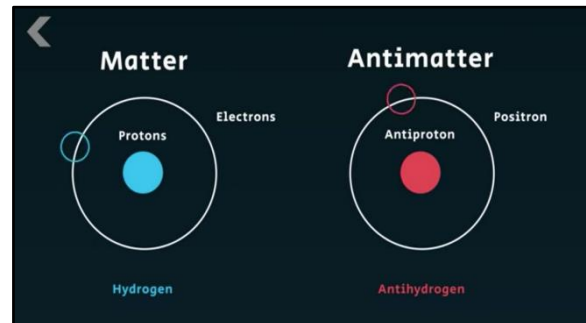
Written by Quentin Ricquebourg, Léo Bauchet and Martial Aimon

# The antimatter

**T**he antimatter is full of mystery, even if it was discovered for almost 100 years, we don't know much.

## 1. What is antimatter?

The antimatter is matter supposed to be composed of antiparticles. If matter is composed by proton + and electron -, antimatter is composed by antiproton – and antielectron (positron) +.



## 2. Discovery

The antimatter was discovered by Paul Dirac in 1931. He won the Nobel prize in 1933.

The first antielectron was discovered by Carl David in 1932.

## 3. Matter and antimatter.

A particle and an antiparticle have same properties, same mass, same spin (it's a characteristic of particles related to their rotation properties). If the proton is positive, the antiproton is negative.

But what happen if a particle and an antiparticle are in contact?

They are simply annihilating to make energy. We use the relation of  $E=mc^2$  with mass of the objects and C the speed of light.

**Example:** If a particle of 1 gram and an antiparticle of 1 gram are in contact, they will make an energy of  $1,8 \cdot 10^{14}$  joules because  $E=0,002 \cdot (3 \cdot 10^8)^2 = 1,8 \cdot 10^{14}$  J.

#### 4. Experiment

Roughly, at the CERN (European Nuclear Research Council), they have to transform energy in reduced space, make collide and like this, they can make them. After this, antimatter is made by many complicated experiments with assembly of antiproton and antielectron around atomic cores.

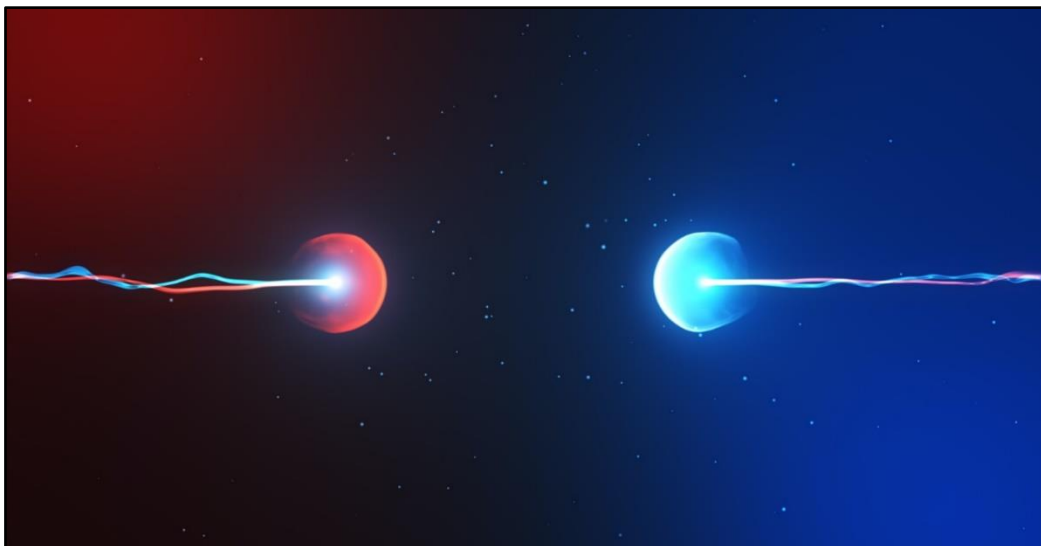
The decelerator of antiproton is a machine who make antiproton at low Energy to make antiproton at low energy to make and study antimatter.

##### Sources:

- ★ <https://www.youtube.com/watch?v=tGvPQLaJZcM>
- ★ <https://www.futura-sciences.com/sciences/definitions/physique-antimatiere-4998/>
- ★ <https://www.youtube.com/watch?v=Au4bDQvxN2w>

##### Vocabulary:

- ★ Exponent: exposant
- ★ Collide: entrée en collision
- ★ Atomic cores: noyaux atomiques



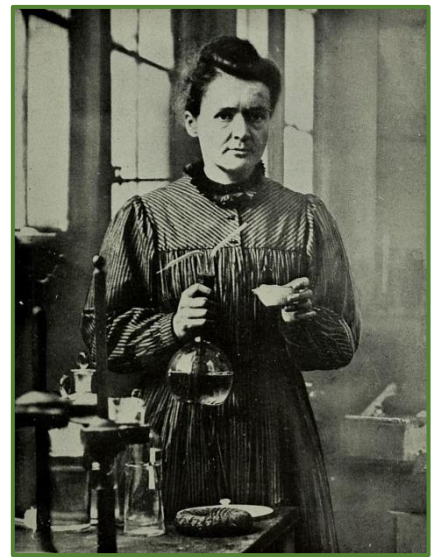
*Written by Wassim Rabhi and Samuel Therasse*

# Marie Curie

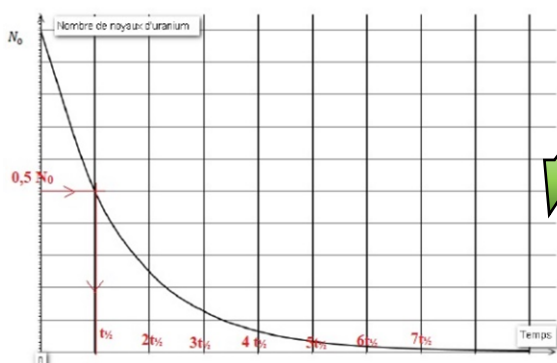
*Left Poland for France to study medicine, she marked the 19<sup>th</sup> and 20<sup>th</sup> century with her discoveries.*

## Life story

**M**arie Curie was born on 7 November 1867 in Poland, she died on 4 July 1934 in France because of pernicious anemia. She is the first woman being buried in Pantheon in 1995. Marie Curie has a lead coffin because she's still radioactive with all the experiments she did in contact with radium. Marie has studied at the Sorbonne in Paris; she had 2 bachelor's degrees in physics in 1893 and one in math in 1894. She got married to Pierre Curie on 26 July 1895. They had 2 daughters called Eve and Irene (who will walk on their mother's steps by having a chemistry Nobel Prize).



*« Remember to be less curious about people than about their ideas »*



*Uranium decay curve: it takes 4 billion years to have no more uranium nuclei.*

## Discovery

Marie has discovered an atomic character of uranium radiation in 1896 and in 1898 her work continues with polonium

and radium's discoveries. This work with Pierre Curie and Henri Becquerel, a scientist, have enabled her to win Nobel prize. She is the first woman to be recognized for her scientific implication.

### Vocabulary

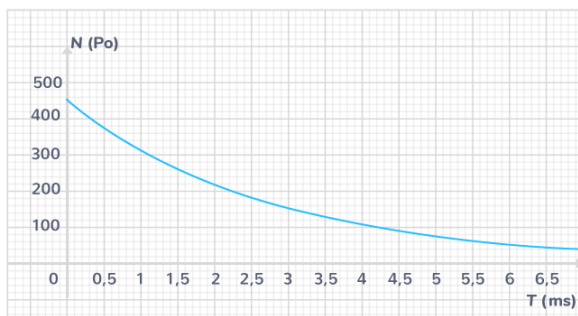
- ⊗ Buried → enterré
- ⊗ Lead → plomb
- ⊗ Suffrage → vote
- ⊗ Degrees → diplômes
- ⊗ Legacy → héritage
- ⊗ Breast → sein

She became the first woman teacher in French universities the Sorbonne in Paris.

The scientist had a second Nobel prize in 1911, she was the first to have two Nobel prizes.

### Marie's engagement and legacy

On 12 December 1909 the Institute Curie was created to fight cancer. It is a Brachytherapy. It is a radioactive source that they put in contact with the tumor. She has given a legacy to science with her cures for breast, eye and children's cancer.



She is a feminist, wants to train women in science and is for gender parity. She is also human because she is against the death penalty and participated in the first world war. During the First World War, the little curie were vehicles that Marie Curie equipped.

Marie and her husband have filed no patents to allow everyone to find applications for their discovery.

### Sources

- ⊗ <https://musee.curie.fr/decouvrir/la-famille-curie/biographie-de-marie-curie>
- ⊗ <https://www.mysciencework.com/omniscience/marie-curie-un-heritage-toujours-d-actualite>
- ⊗ [Marie Curie — Wikipedia \(wikipedia.org\)](https://fr.wikipedia.org/wiki/Marie_Curie)

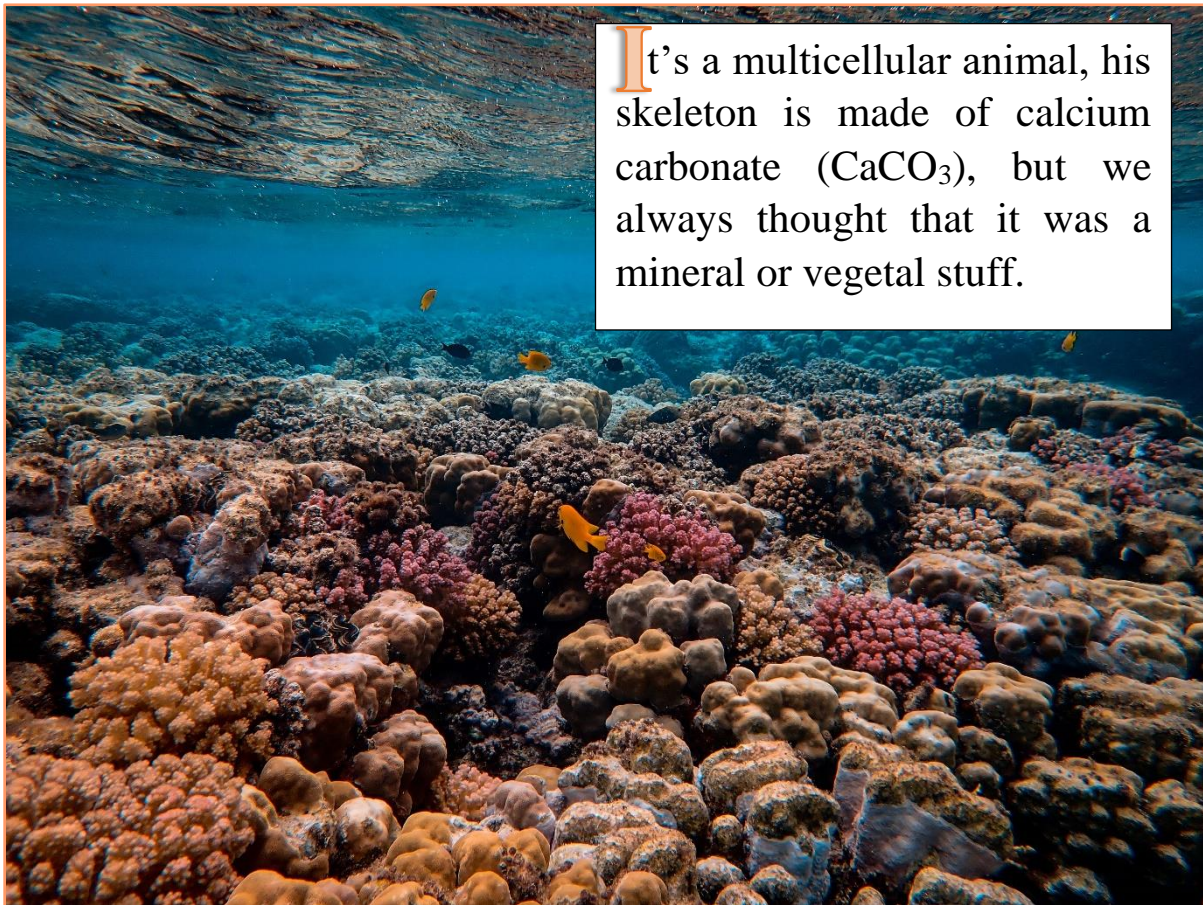
*Written by Louna Donneger and Adeline Rohaut*



# Corals: between ocean and medicine

*Since lots of years, corals destruction intensifies in the ocean but this resource is indispensable to Nature and Human.*

What is a coral?



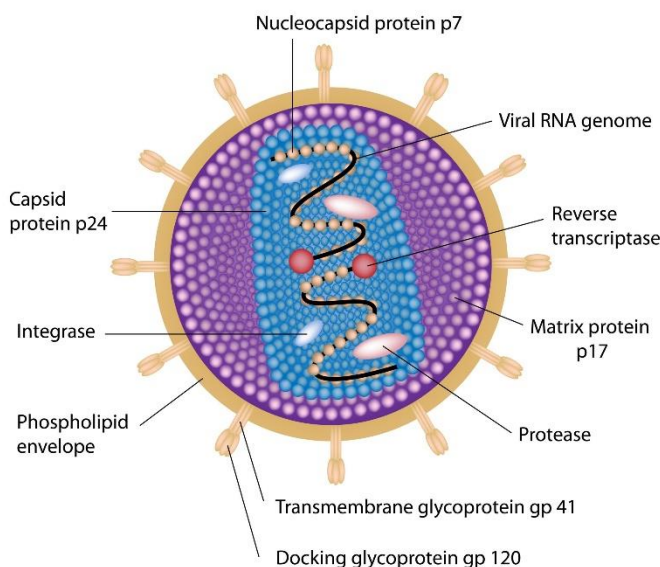
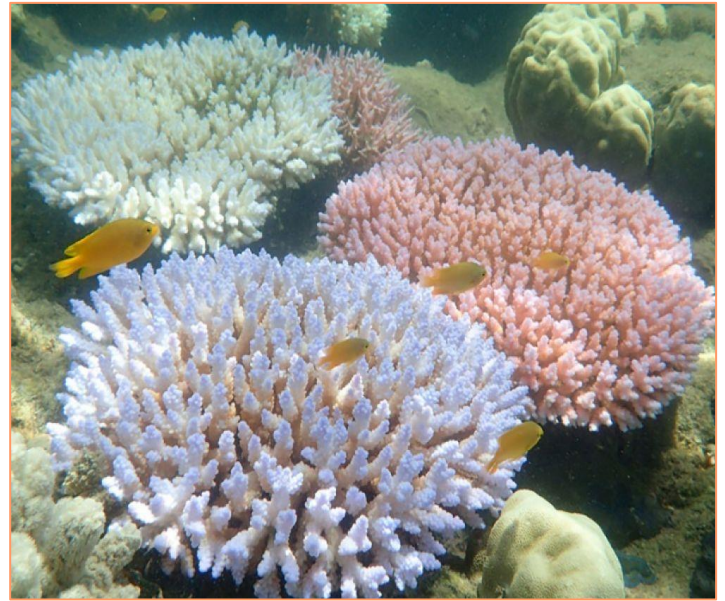
**I**t's a multicellular animal, his skeleton is made of calcium carbonate ( $\text{CaCO}_3$ ), but we always thought that it was a mineral or vegetal stuff.

Asset for the ocean

Corals need basic pH approximately 8 and a temperature between  $20^{\circ}\text{C}$  and  $32^{\circ}\text{C}$  to develop better. They are very important for the environment because corals protect shores from storms and erosion, and they are a shelter for a third of marine species.

## Asset for ourselves

Humans and corals have a common genetic heritage. The DNA correspondence of some corals with humans being close (48%), help for medical research. Researchers from the National Cancer Institute have found something to fight aids caused by the HIV which tackles immune system. Anti-HIV proteins have been found in a coral from Australia. They are called cnidarins.



This proteins are able to block the virus by preventing entry in T cells responsible for immunity. Researchers the have for purpose to product this protein in big amount to verify efficacy of these proteins.

After, these proteins anti-HIV can be develop in a gel and can avoid the sexual transmission of HIV.

## Coral's destruction

The increase of  $\text{CO}_2$  in the atmosphere causes a destabilization of the equality basic acid by the acidification of the ocean. Consequences are coral skeleton's dissolution and the weakening of coral reefs. It's a cause of accelerated destruction of marine life.

Currently, pH oh the ocean has a value of 8,2. In 2100, scientists predict a pH of 7,8 which make it more acid and coral need basic pH . Bellow you can find an experiment showing coral's destruction:

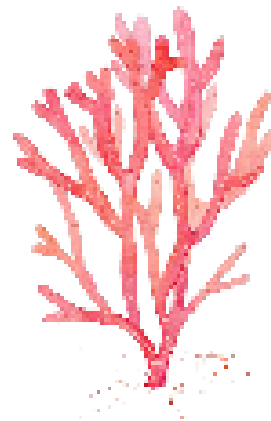


### Sources :

- \* ensad.fr
- \* ocean.org
- \* <https://www.youtube.com/watch?v=8cAYNSKYpmg>

### Vocabulary:

- \* Corals → coraux
- \* Skeleton → squelette
- \* Stuff → matière
- \* Asset → atout
- \* Aids → sida
- \* HIV → VIH
- \* Tackles → s'attaquer
- \* Increase → augmentation
- \* Shores → rivages
- \* Shelter → abri



*Written by CARON Elise and ROHAUT Marion*





