

Introducing...

The

EXTREMOPHILES

Earth's Toughest Organisms

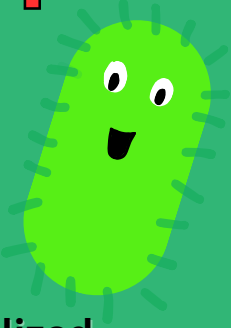
Extremophiles are organisms that thrive in what we consider to be extreme environments and conditions. These include temperature, pressure, acidity and more.

Let's meet the team!

Tommy the Thermophile

Thermophiles withstand very **high temperatures**, sometimes up to 100°C. They can be found in hydrothermal vents, hot springs and volcanoes.

To survive this, Tommy has **specialized enzymes** that are stable at higher temperatures which don't denature.

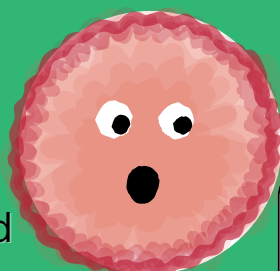


Tommy lives at the Grand Prismatic Spring in Yellowstone National Park, USA.
Credit: Siegfried Poepperl via Canva.com

Pam the Psychrophile

Psychrophiles live at freezing **cold temperatures**, such as Antarctic ice, the deep sea and glaciers.

Pam produces **antifreeze proteins** to withstand temperatures below 20°C and has a flexible cell membrane to enable functioning.



The *Xanthoria elegans* lichen can photosynthesize at -24°C.
Credit: Jason Hollinger

Huw the Halophile



Halophilic bacteria seen under a microscope.
Credit: Projet Ecolo



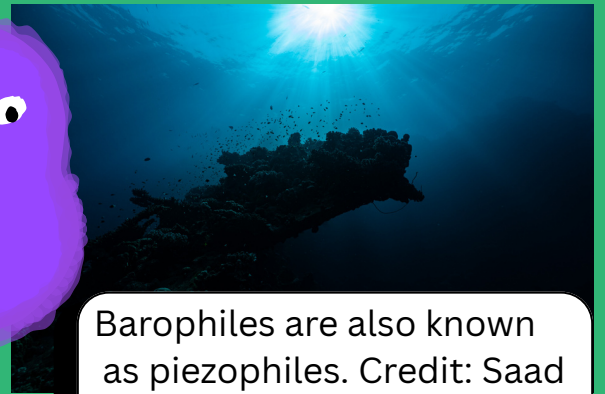
Halophiles survive **highly saline (salty)** environments by accumulating solute like potassium chloride to **balance** their internal salt concentration with the external environment.

Halophiles like Huw can be found in environments with salt concentration **5x greater than the ocean**, like the Dead Sea, salt flats and the Great Salt Lake, USA.

Barophiles live at **high pressures**, such as deep-sea trenches and even within the Earth's crust.

They have compact cellular structures that avoid damage under pressure and enzymes that **remain stable**. However, Betty has a weakness! Like many barophiles, she is **sensitive to UV rays/radiation**.

Betty the Barophile

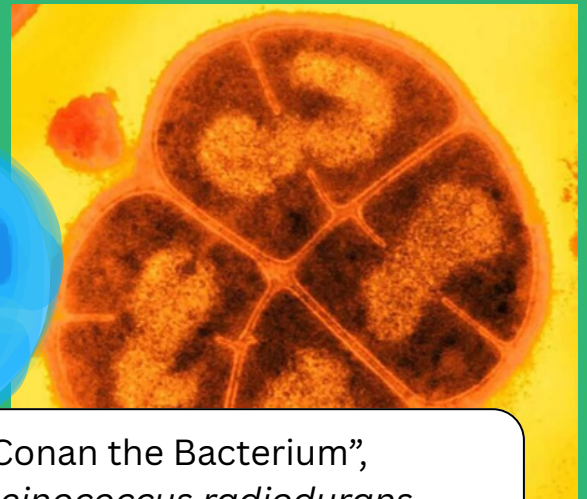


Barophiles are also known as piezophiles. Credit: Saad Alaiyadhi via Canva.com

Raj the Radiophile

Radiophiles can have **DNA repair mechanisms** that enable them to survive high doses of radiation.

Some radiophiles can be found in nuclear waste sites and their existence could suggest potential for **life on other planets** with high radiation exposure.



"Conan the Bacterium",
Deinococcus radiodurans
Credit: Michael J.Daly/USU.

The **EXTREMOPHILES** are always open to new team members. Who will be next? Perhaps an **acidophile** or **alkaliphile**?

If you want to learn more about extremophile organisms check out these links:

- [Extremophiles 101- National Geographic](#)
- [How Extremophiles Work- How Stuff Works Science](#)