



*Water bears were discovered by a German biologist Johann A. E. Goeze in 1773. 3 years later, they were called "Tardigrada" which means "slow stepper" by Italian biologist Lazzaro Spallanzani.*

## The Strongest Creatures In The World **WATER BEARS**

**W**ater bears who can live in geysers, 4000 meters below the water or on the top of Himalayas can also survive temperatures between -200 and 151 degrees. They can remain alive in very low pressure areas and also extremely high pressures, more than 1200 times atmospheric pressure. It is known that some kind of water bears can survive even 6000 times atmospheric pressure, which is 6 times the pressure in Mariana Trench, the deepest part of the ocean. They are able to stay alive for 10 years without any water.

### **How Do They Do It?**

First of all, they aren't "fully" alive while they're surviving. They survive by undergoing a process called "Cryptobiosis" when there are too difficult conditions. It is similar to hibernation\*, they become half-dead-half-alive during this process. Their body loses a lot of water during that period, the water percentage in their bodies decreases from 85% to 3%. This prevents the damage that the water may cause by freezing inside the body. Their metabolism almost completely shuts down. Water loss helps with the protection against radiation as well. Because the reactions radiation causes can't activate in a waterless space.

### **Experiments**

In 2007, a good amount of water bears were sent to space. They were exposed to space conditions for 12 hours. They were able to survive the radiation from The Sun and the vacuum environment\*\*. Most of them were still alive when they came back to Earth, some of them were even still able to reproduce.

In 2016, a unique protein called "dsup" was discovered in a water bear's DNA by scientists. Dsup is a protein that protects the DNA from radiation or repairs the damaged DNA and only water bears have it in the whole world. To test it, water bears were exposed to high energy X rays along with other creatures. While the X rays caused big harms on the others, water bears only suffered 16% of that damage.

### **The Studies**

The studies on Cryptobiosis may help other animals survive as well. There have been some improvements in vaccine technology already. Thanks to Cryptobiosis, the 'weakened organisms' inside the vaccine can be stored dried up without being killed. Scientists have also been working on finding a way to use the protein Dsup against radiation and for going to the space.

Water bears usually live in water. They are invertebrate microorganisms. They breathe through their skin so they don't have a specific organ for respiratory. It is claimed that they've been living long enough to see the dinosaurs and their extinction.

### **The World's Weakness**

Recently, a weakness water bears have was discovered. These amazing creatures who can stay alive in space, survive all temperatures and pressures have only one weakness. A weakness that all of us share : climate change. Scientists have told that even though water bears can survive high temperatures the hot weather affects their generation negatively when it's long term. We can't know what climate change will do to humans when it can affect even the most resistant creatures in the world. We can't deny climate change no more, we must be careful to protect ourselves and all these amazing creatures.