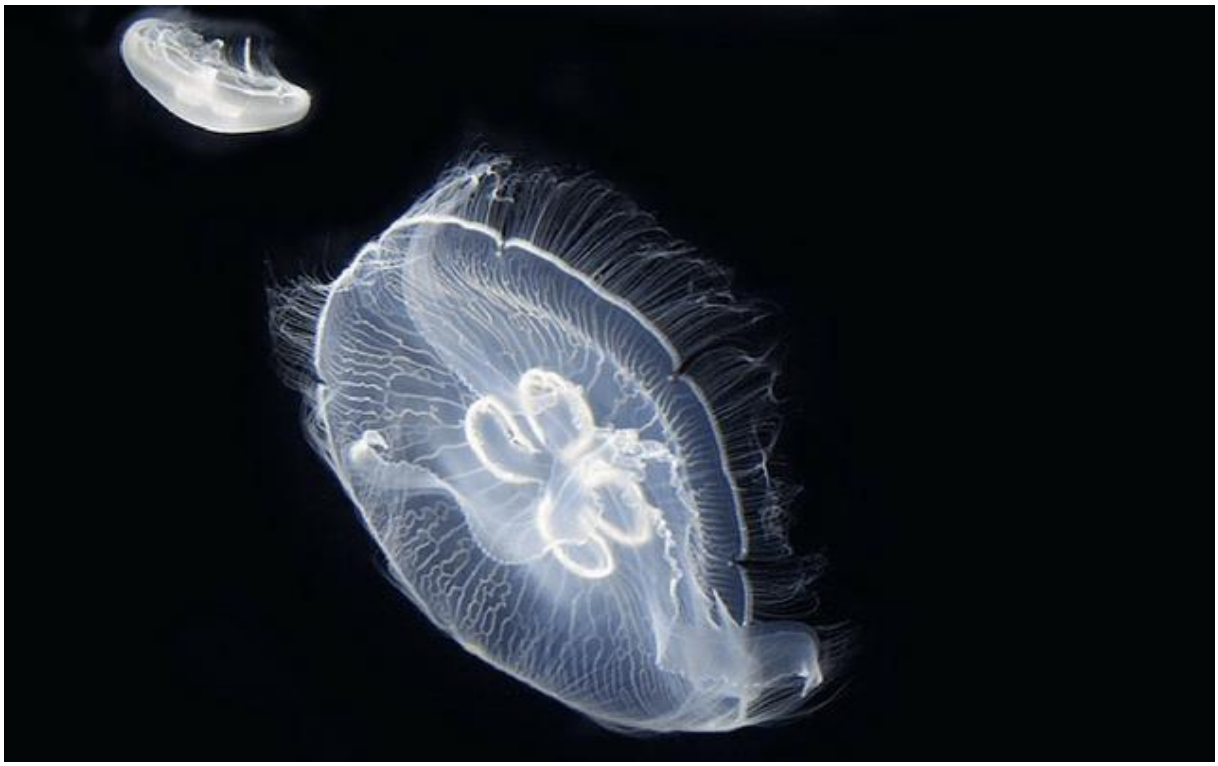
Jellyfish: Fascinating Facts About Blobs That Outlived the Dinosaurs [infographic]

by Justine Jackson-Ricketts, infographic by Nowreen Priyanka | May 19, 2017 | Infographics, Life and Evolution



Jellyfish. This word conjures up an image of a translucent jelly blob that pulsates around the ocean, stinging people. They don't look particularly resilient. In fact, adult jellyfish usually don't live more than a few months.

But jellyfish fossils date back 505 million years, three times earlier than the first dinosaurs. Researchers speculate that they may have even existed 700 million years ago. This means that jellyfish, those things that look like swimming grocery bags, survived five mass extinctions. This includes the Ordovician-Silurian extinction, which wiped out most small marine creatures. That's some staying power.

In this article, we're going to look at some things that make jellyfish cool. And try to figure out what makes them so persistent.

So, What Are Jellyfish?

Jellyfish aren't even fish. They're gelatinous zooplankton or jelly-like animals that drift in the ocean. They inhabit waters throughout the world, both deep and shallow. Even though we think of them as ocean-dwellers, some are found in freshwater. They're in the phylum Cnidaria with sea anemones and corals. Within Cnidaria, jellies are in the clade Medusazoa, of which there are 4,000 species.

This clade is further divided into four groups:

- the Scyphozoa, or “true jellies”,
- the Hydrozoa, which are usually colonial,
- the Cubozoa, or box jellies, and
- the Staurozoa, which don’t swim, but instead attach to rocks and seaweed.

Jellies are 95% water. Most are between 1 cm (<0.5 in) and 40 cm (16 in) across. But the Lion’s Mane Jelly grows to almost 1.8 m (6 ft) wide with 15-m (49-ft) tentacles.

Jellies have two layers of skin: an external epidermis, and an internal gastrodermis. These two skin layers make them special. As far as researchers know, jellies were the first animal to have such tissue layers. However, they lack stomach, intestine, and lungs. Their cell walls are permeable, so nutrients and oxygen flow through their skin layers.

Jellies don’t even have a brain. Instead of a true nervous system, they have a network of nerves throughout their epidermis, called a nerve net. This is also the earliest known animal nervous system. These creatures are so basic that they only have one opening for food to go in and waste and sperm or eggs to go out.

Between the two skin layers is a gelatinous substance called the mesoglea, which makes up most of the body. The mesoglea contains structural proteins and muscle cells that allow the jelly to keep its shape and more nerve cells.

To move, jellies contract and relax their bells. And, you guessed it, they are the earliest animals to swim using muscles. Before the jellies, animals just drifted along at the mercy of the currents.

Jellyfish have some interesting traits. Like butterflies, they exist in two different forms over their lifetimes. Juvenile jellies take a polyp form, which looks like an anemone, with the tentacles extending up. Polyps anchor to a hard substrate and catch plankton with their tentacles. Adult jellies take the more familiar medusa form, a bell with tentacles hanging down.

Jellies reproduce in both forms, asexually as polyps and sexually as medusa. Polyps reproduce by budding. Some divide into two identical new polyps. Others make little medusa buds on their sides that break off and swim away. Still others transform into a medusa.

Finally, others divide into a stack of pancake-like sections that each separate as a different juvenile form, called an ephyra, which matures into a medusa. Sexual reproduction in the medusa form occurs by spawning: jellies release eggs and sperm into the open ocean. The eggs become fertilized and develop into swimming larvae called planulae that look like a slice of pear. After swimming around for several days, developing, the planulae anchor to a hard surface and grow into a polyp.

Most jellies don’t have true eyes. Instead, they have light-sensing organs called ocelli. All these organs do is sense the presence or absence of light. Some jellies, however, have multi-talented receptor organs called rhopalia. They sense light, chemicals, and movement. Box jellies even have real eyes, complete with lenses, corneas, and retinas. These jellies have 24 eyes, four of them on stalks so they can see up through the water’s surface. The stalks can swivel, allowing the box jelly to see 360 degrees around. Since jellies don’t have a brain, though, scientists don’t know how they interpret what they see.

Jellies also have stinging cells, called nematocysts, armed with tiny, venomous harpoons. When something touches a jellyfish, these harpoons are propelled out of the nematocysts and into the offending party, and the toxins are released. The whole process, from touch to venom release, occurs in 700 nanoseconds. Talk about fast reflexes!

How Bad is a Jellyfish Sting?

Most jellyfish stings are mildly painful or irritating and some can damage the skin. Two species of jelly, however, can cause serious damage. One, the box jelly, has such a powerful sting that it can kill a person in under five minutes. The other, the Irukandji jellyfish, causes intense back, arm, and leg pain, continuous vomiting, rocketing blood pressure, difficulty breathing, and a skin-crawling sensation. The scariest part? You won't even feel the sting.

How Else Do Jellies Defend Themselves?

Jellyfish color works as camouflage. Most are translucent, making them nearly invisible. Some species of deep-sea jelly are bright red or orange, and difficult to see in darkness. Many jellies are bioluminescent: they can glow blue or green. If they light up bright enough, it may startle a potential predator, allowing the jelly to escape. The light may also attract another, larger predator, to prey on the original threat.

Jellies that glow green have what's called green fluorescent protein. Researchers can inject this protein into the DNA of other organisms. It is used in medicine as a marker to track cells throughout the body and has been used to track both cancer and Alzheimer disease.

Where Do Jellies Sit on the Food Chain?

Jellies are mostly carnivores, eating plankton, crustaceans, fish, and other jellies. Some have symbiotic algae, called zooxanthellae, that photosynthesize (like plants) and pass nutrients on to the jelly.

Jellies are prey to a host of different animals. Among the over 150 species that eat jellies are fish, sea turtles, crustaceans, and even humans. Sea turtles are one of the best-known jelly predators as they are often killed by mistaking plastic bags for their favorite food.

How Jellies Outlived Other Species

While it's not clear what makes jellies so successful, they do have some traits that confer persistence. They can eat a variety of different organisms. They reproduce quickly (one jelly can release 45,000 eggs in a night). And they can tolerate low oxygen.

This means that they can switch to new prey if one becomes depleted. They can keep up a supply of new baby jellies and they can survive in conditions many other species can't.

Not only have they outlived other species, but they are poised to take over the ocean. Throughout the world, jelly blooms have become more common. A jelly bloom is a mass of jellies that emerge rapidly in an area. Such blooms are dangerous for swimmers, can hinder fishing operations, and can damage power plants, causing outages. They can even change the water chemistry. Such outbreaks are likely a result of human activity, through overfishing, nutrient runoff, climate change, and "submarine sprawl".

As we overfish species that eat the same things as jellies, jellies thrive with less competition for food. The nitrogen and phosphorous in our fertilizer will do the same thing for phytoplankton (plant plankton) as it does for land plants: help them grow. Too many phytoplankton can deplete the oxygen in an area.

We already know jellies are more tolerant of low oxygen than other sea creatures. Warming oceans associated with climate change can allow the already rapid reproduction of jellies to go even faster. The warmth helps their embryos and larvae develop faster. While cold-water jellies may suffer, warm-water jellies can explode in number.

Finally, what's called "submarine sprawl", the increasing construction of structures in the ocean, gives jelly polyps more hard surfaces on which to anchor.

In addition to their superior competitive ability, one species of jelly is nearly immortal.

Wait, Immortal?

Turritopsis dohrnii, a tiny jelly no bigger than your fingernail, is the immortal jellyfish. It's also known as the Benjamin Button jellyfish.

When this jelly becomes stressed (usually from environmental changes or injury), it begins to age backward. It drops to the sea floor, where it collapses in on itself and becomes a jelly blob, which grows back up into a polyp. This occurs because the jelly's cells change from one type to another, much like human stem cells.

Still interested in learning more facts about Jellyfish? Check out our infographic below:

Information taken from: https://www.sciencelass.com/life-and-evolution/jellyfish-fascinating-blobs/ Accessed 23-10-17

12 Fascinating Facts about Jellyfish

1. Jellyfish is 95% Water
2. They do not have heart, brain, bones, or blood
3. Moon Jellyfish have been to space
4. Have been around for at least 600 Million Years!
5. Some Jellyfish eat other jellyfish
6. Sting of box jellies can kill a person in 2-5 minutes
7. Jellyfish are not actually fish, they are plankton
8. Jellies can sting even when they are dead
9. Some jellies are edible
10. Jellyfish move with ocean currents
11. Jellies can clone themselves
12. Their skin is so thin that they can breathe through them