Name: _____

## Article of the Week #1

**Directions:**

1. Define all of the **bolded** words and write a synonym **next** to the word before reading.
2. Show evidence of a close reading. **Annotate** the text with questions and/or comments.
3. Answer the questions at the end in complete sentences and use evidence from the text when necessary.

# Can a Jellyfish Unlock the Secret of Immortality?

Source: Martin Cohen, *New York Times*/ November 28, 2012

After more than 4,000 years — almost since the dawn of recorded time, when **Utnapishtim** told **Gilgamesh** that the secret to immortality lay in a coral found on the ocean floor— man finally discovered eternal life in 1988. He found it, in fact, on the ocean floor. The discovery was made unwittingly by Christian Sommer, a German marine-biology student in his early 20s. He was spending the summer in Rapallo, a small city on the Italian Riviera, where exactly one century earlier Friedrich Nietzsche conceived "Thus Spoke Zarathustra": "Everything goes, everything comes back; eternally rolls the wheel of being. Everything dies, everything blossoms again. . . ." Sommer was conducting research on hydrozoans, small **invertebrates** that, depending on their stage in the life cycle, resemble either a jellyfish or a soft coral.

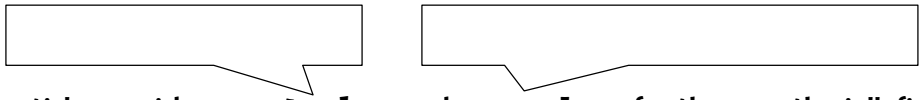
Every morning, Sommer went snorkeling in the turquoise water off the cliffs of Portofino. He scanned the ocean floor for hydrozoans, gathering them with **plankton** nets. Among the hundreds of organisms he collected was a tiny, relatively **obscure** species known to biologists as "Turritopsis dohrnii". Today it is more commonly known as the immortal jellyfish. Sommer kept his hydrozoans in petri dishes and observed their reproduction habits. After several days he noticed that his Turritopsis dohrnii was behaving in a very peculiar manner, for which he could **hypothesize** no earthly explanation. Plainly speaking, it refused to die. It appeared to age in *reverse*, growing younger and younger until it reached its earliest stage of development, at which point it began its life cycle **anew**. Sommer was **baffled** by this development but didn't immediately grasp its **significance**. (It was nearly a decade before the word "immortal" was first used to describe the species.) But several biologists in Genoa, fascinated by Sommer's finding, continued to study the species, and in 1996 they published a paper called "Reversing the Life Cycle." The scientists described how the species — at any stage of its development — could transform itself back to a polyp, the organism's earliest stage of life, "thus escaping death and achieving potential **immortality**." This finding appeared to **debunk** the most fundamental law of the natural world — you are born, and then you die.

One of the paper's authors, Ferdinando Boero, likened the Turritopsis to a butterfly that, instead of dying, turns back into a caterpillar. Another **metaphor** is a chicken that transforms into an egg, which gives birth to another chicken. The **anthropomorphic analogy** is that of an old man who grows younger and younger until he is again a fetus. For this reason Turritopsis dohrnii is often referred to as the Benjamin Button jellyfish. Yet the publication of "Reversing the Life Cycle" barely registered outside the academic world. You might expect that, having learned of the existence of immortal life, man would dedicate **colossal** resources to learning how the immortal jellyfish performs its trick. You might expect that **biotech multinationals** would **vie** to copyright its **genome**; that a vast **coalition** of research scientists would seek to determine the mechanisms by which its cells aged in reverse; that **pharmaceutical** firms would try to appropriate its lessons for the purposes of human medicine; that governments would broker international accords to govern the future use of **rejuvenating** technology. But none of this happened. Some progress has been made, however, in the quarter-century since Christian Sommer's discovery.

We now know, for instance, that the **rejuvenation** of Turritopsis dohrnii and some other members of the **genus** is caused by environmental stress or physical **assault**. We know that, during rejuvenation, it undergoes cellular **trans differentiation**, an unusual process by which one type of cell is converted into another — a skin cell into a nerve cell, for instance. (The same process occurs in human **stem cells**.) We also know that, in recent decades, the immortal jellyfish has rapidly spread throughout the world's oceans in what Maria Pia Miglietta, a biology professor at Notre Dame, calls "a silent invasion." The jellyfish has been "hitchhiking" on cargo ships that use seawater for **ballast**. Turritopsis has now been observed not only in the Mediterranean but also off the coasts of Panama, Spain, Florida and Japan. The jellyfish seems able to survive, and **proliferate**, in every ocean in the world. It is possible to imagine a distant future in which most other species of life are extinct but the ocean will consist overwhelmingly of immortal jellyfish, a great gelatin consciousness everlasting.

**Please TYPE answers to the following questions. Respond in detail and cite specific evidence from the text and parenthetically cite.**

1. Please provide an **objective summary** of the article (no quotes should be used)



2. The article provides a **metaphor** and an **analogy** for the way the jellyfish age. Please quote those and explain the purpose that they serve for you as the reader.

3. Do you think scientists should pursue immortality? Why? Why not?

4. What claim is the article making and what evidence does it provide to support that claim?

5. Draw a logical conclusion about why scientists have not utilized what they know about the jellyfish, to create pharmaceuticals/drugs to benefit the general public.

6. Discuss what you think would happen on this planet if immortality became a reality.

7. Would you like to live forever? Why? Why not?