How Glowing Jellyfish Earned a Nobel Nod

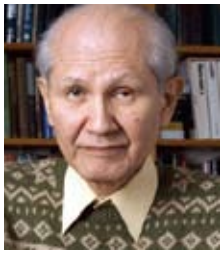
MED's Shimomura wins Nobel Prize in chemistry

IT TOOK MORE than thirty years for Osamu Shimomura to realize that his research on jellyfish would revolutionize cell biology, and another fourteen for the Nobel Prize committee to recognize that same thing. After learning that his discovery of luminescent proteins in jellyfish had won this year's Nobel Prize in chemistry, he told reporters what he had learned from the experience.

"If you find an interesting subject, go study it," he says. "Don't stop. There is difficulty in any research — don't give up until you overcome that."

Shimomura, a School of Medicine adjunct professor of physiology and a senior scientist emeritus at the Marine Biological Laboratory in Woods Hole, Massachusetts, was one of three winners of this year's chemistry prize. The other winners were Martin Chalfie of Columbia University and Roger Y. Tsien of the University of California, San Diego, both recognized for pioneering cellular research techniques that use the proteins Shimomura identified. The three are sharing the $1.4 million prize, which is awarded by the Royal Swedish Academy of Sciences.

Shimomura is credited with discovering green fluorescent protein, or GFP, which he observed in 1962 in the jellyfish *Aequorea victoria*, found off the west coast of North America. James Head, a MED professor of physiology and biophysics, recalls Shimomura's stories of collecting the jellyfish in Washington state.



"He and his wife used to spend summers at Friday Harbor and catch bucket after bucket of jellyfish," says Head, who collaborated with Shimomura on research into the behaviors and uses of aequorin, another fluorescent protein. "In those early days, he would purify the protein directly from the jellyfish, getting small amounts of protein from bucketfuls."

But although Shimomura pursued his studies of GFP for years, he says that he didn't realize the potential applications of his work until 1994, when Chalfie's research emerged. In an organism, GFP can be fused to proteins of interest to scientists, with minor effects on the organism's behavior. Researchers can then observe the locations and movements of the studied proteins by monitoring the GFP, which remains fluorescent.

The Royal Swedish Academy of Sciences, in announcing the prize, called the protein "one of the most important tools used in contemporary bioscience. With the aid of GFP, researchers have developed ways to watch processes that were previously invisible, such as the development of nerve cells in the brain or how cancer cells spread."

"These discoveries were seminal and decades ahead of their time," says Gary Borisy, director and chief executive officer of the Marine Biological Laboratory. "They really have ushered in a revolution in cell biology."

Since then, newer techniques have emerged, such as Tsien's research into GFP mutations that create fluorescence in various colors, which allow researchers to track different cellular processes in one organism.

Shimomura, who earned a Ph.D. in organic chemistry at Nagoya University in 1960 and began studying bioluminescence there before coming to America and joining a research team at Princeton University, says he never expected his work to change the world of cell biology.

"My subject was just discovery of a product," he says. "I'm surprised. And I'm happy." JU

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Osamu Shimomura (inset) was recognized for his discovery of luminescent proteins in jellyfish.