Glowing protein researchers win Nobel Prize

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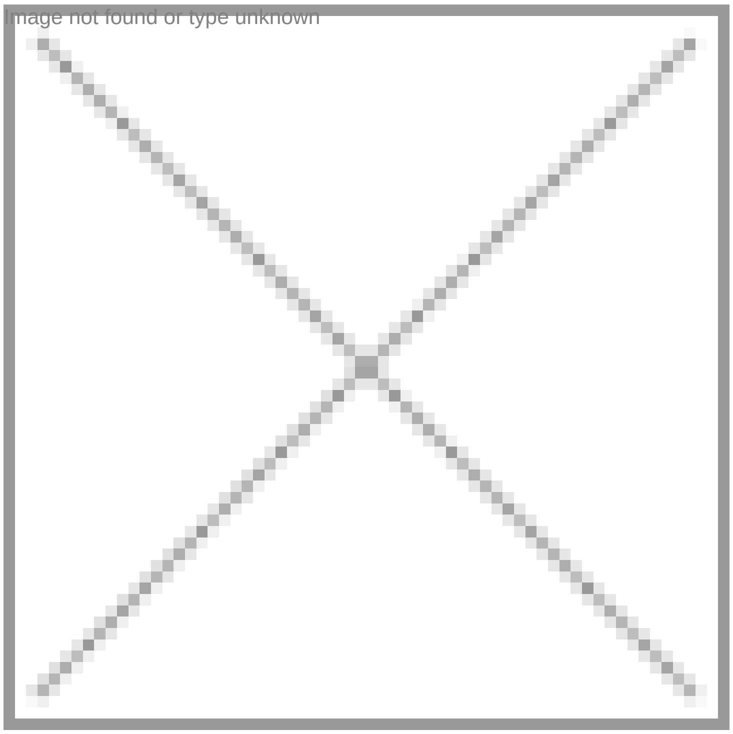

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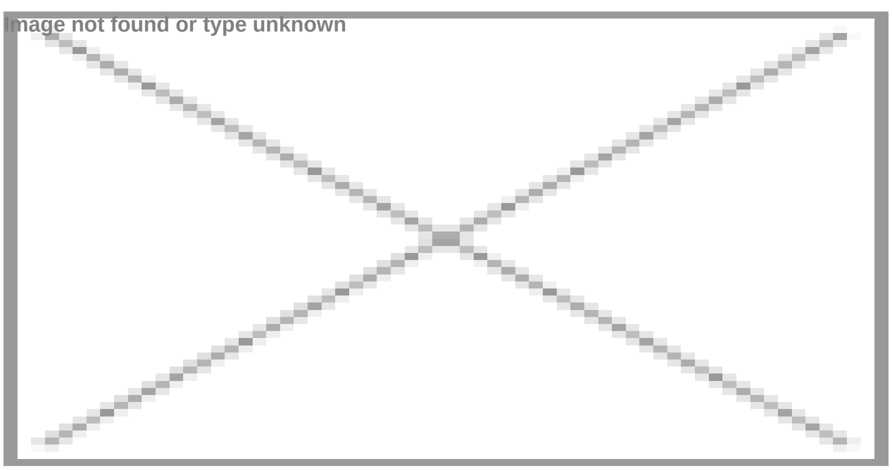

The Royal Swedish Academy of Sciences has decided to award the Nobel Prize in Chemistry for 2008 jointly to Osamu Shimomura, Marine Biological Laboratory (MBL), Woods Hole, MA, USA and Boston University Medical School, MA, USA; Martin Chalfie, Columbia University, New York, NY, USA; and Roger Y Tsien, Howard Hughes Medical Institute, University of

California, San Diego, La Jolla, CA, USA "for the discovery and development of the green fluorescent protein, GFP".

Glowing proteins is considered as a guiding star for biochemistry. The brightly glowing green fluorescent protein, GFP, was first observed in the jellyfish, Aequorea victoria in 1962. Since then, this protein has become 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.

This year's Nobel Prize in Chemistry rewards the initial discovery of GFP and a series of important developments which have led to its use as a tagging tool in bioscience. By using DNA technology, researchers can now connect GFP to other interesting, but otherwise invisible, proteins. This glowing marker allows them to watch the movements, positions and interactions of the tagged proteins.

Researchers can also follow the fate of various cells with the help of GFP: nerve cell damage during Alzheimer's disease or how insulin-producing beta cells are created in the pancreas of a growing embryo. In one spectacular experiment, researchers succeeded in tagging different nerve cells in the brain of a mouse with a kaleidoscope of colors.

The story behind the discovery of GFP is one with the three Nobel Prize Laureates in the leading roles:

Osamu Shimomura first isolated GFP from the jellyfish Aequorea victoria, which drifts with the currents off the west coast of North America. He discovered that this protein glowed bright green under ultraviolet light.

Martin Chalfie demonstrated the value of GFP as a luminous genetic tag for various biological phenomena. In one of his first experiments, he colored six individual cells in the transparent roundworm Caenorhabditis elegans with the aid of GFP.

Roger Y Tsien contributed to our general understanding of how GFP fluoresces. He also extended the color palette beyond green allowing researchers to give various proteins and cells different colors. This enables scientists to follow several different biological processes at the same time.

How the Jellyfish's Green Light Revolutionized Bioscience

In the 1960s, when the Japanese scientist Osamu Shimomura began to study the bioluminescent jellyfish Aequorea victoria, he had no idea what a scientific revolution it would lead to. Thirty years later, Martin Chalfie used the jellyfish's green fluorescent protein to help him study life's smallest building block, the cell. Today, scientists are able to study biological processes that were previously invisible with the aid of Roger Y. Tsien's proteins, which glow in all colors of the rainbow.

This year's Nobel Prize in Chemistry rewards a similar effect on science. The green fluorescent protein, GFP, has functioned in the past decade as a guiding star for biochemists, biologists, medical scientists and other researchers. The strong green color of this protein appears under blue and ultraviolet light. It can, for example, illuminate growing cancer tumors; show the development of Alzheimer's disease in the brain or the growth of pathogenic bacteria.

An even more interesting use of GFP means that researchers can actually follow processes inside individual cells. The body consists of billions of cells, from pumping heart muscle cells and insulin-producing beta cells to macrophages that destroy unwelcome bacteria. The more researchers know about a cell type â€“ how it develops and functions â€“ the greater the chance that they can develop effective drugs with minimal side-effects.

When researchers understand how cells start building new blood vessels, for example, they might be able to stop cancer tumors from acquiring a nourishing and oxygenating vessel system. There are tens of thousands of different proteins, each with different functions. By connecting GFP to one of these proteins, researchers can obtain vital information. They can see which cells a particular protein inhabits; they can follow its movements and watch its interactions with other proteins. Thanks to GFP's green light, scientists can now track a single protein under the microscope.