

2008 Nobel Prize in Chemistry: Green Fluorescent Protein, Its Variants and Implications

This year's Nobel Prize in Chemistry has been awarded to Martin Chalfie, Osamu Shimomura, and Roger Y. Tsien for the discovery and application of green fluorescent protein.¹ This remarkable molecule from the jellyfish *Aequorea victoria* (Figure 1)² can be genetically encoded as an indicator that genes have not only been successfully inserted and expressed, but also to report where and selected details of the local environment.^{3,4} This has opened up a multitude of studies of cellular processes, contents, and dynamics.^{4–6} Many related variants have been developed that report in a rainbow of colors.

These fluorescent proteins are sufficiently robust that they can be linked to other biomolecules or to nanomaterials so as to render the assembly multifunctional.⁷ Indeed, Tsien and co-workers succinctly laid out the pros and cons of different molecular and nanoscale reporter systems, as well as the advantages and importance of using them together.⁶ What we, as a community, might learn from these systems and mimic is how to gain the exquisite precision and tunability that has been developed by varying the protein structure through deliberate genetic variation.

Perhaps it will also become possible to program precise nanomaterial growth through genetic control, by advancing the biotemplating work that we have seen discussed on these pages.^{7–10} While this may remain some time off, it would seem that the interdisciplinary training and students described by Prof. Flemming Besenbacher, in our Conversation, would be right on the mark for such an effort.¹¹

Please join me in congratulating and celebrating the latest Nobel Laureates in Chemistry and all of their many collaborators and colleagues, who together have taken fluorescent proteins so far and to such wide and exciting applications.



Paul S. Weiss
Editor-in-Chief

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Figure 1. The jellyfish *Aequorea victoria* in which green fluorescent protein was discovered. Reprinted with permission. Copyright 2008 Sierra Blakely.

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