



Blue-Green Phytochrome-Based Fluorophores with Strong Fluorescence

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WARF: P08462US02

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing blue-green fluorescent molecules that are small and thermostable and can be used in place of GFP.

Overview

Several fluorescent reporter molecules, such as the Green Fluorescent Protein (GFP), are available as research tools to monitor gene activity and protein distribution within cells. However, currently known reporter molecules have several limitations that restrict their use. The discovery of novel molecules could provide additional tools for biotechnology.

Phytochromes are red/far-red light photoreceptors that direct photosensory responses in bacteria, fungi and plants. Cyanobacteria utilize diverse members of the phytochrome superfamily to allow them to respond to blue-green light.

The Invention

UW–Madison researchers have created unique blue-green fluorophores with increased fluorescence. These fluorescent molecules were created by targeted mutation of particular amino acid residues in the phytochrome domain from wild type cyanobacteria such as *Thermosynechococcus elongatus*. They have several advantages over currently used reporters such as GFP or luciferase, including their thermostability and small size. Additionally, different fluorophores can be used to “fine tune” the excitation/emission to a particular wavelength to meet the needs of a specific system or experiment.

Applications

- Tracking macromolecule movements in living cells
- High throughput detection of molecules in plate-based or chip assays
- Detection of protein-protein interactions in Fluorescence Resonance Energy Transfer (FRET)
- Nanotechnology applications
- Any application where GFP currently is used

Key Benefits

- New fluorophores are small and thermostable.
- They maintain monomeric form at concentrations greater than one mM.
- Different fluorophores can be used to fine tune wavelengths to meet the needs of a specific system.
- Blue-green fluorophores may be used with red fluorophores for FRET applications because their respective emission and excitation wavelengths overlap.

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- These phytochromes can be used for both C- and N-terminal protein fusions, in contrast to other widely used fluorescent reporters, such as GFP.

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Additional Information

Related Technologies

- [WARF reference number P07413US describes phytochrome-based fluorophores with strong fluorescence in the red/far-red region.](#)

Related Intellectual Property

- [View Divisional Patent in PDF format.](#)

Tech Fields

- [Research Tools : Detection](#)

For current licensing status, please contact Jennifer Gottwald at jennifer@warf.org or 608-960-9854

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