DNA 2.0

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...ideas and questions about our products, what your needs are and how we can serve you better.
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Gene Synthesis & Protein Engineering News

by DNA2.0, Inc. JANUARY/FEBRUARY 2006

Dear Fellow Scientist,

Remember the time when green fluorescent protein was the only fluorescent protein (FP) out there, and how often it wasn't just right for your experiment?

Luckily, today there is a whole rainbow of different wavelength FPs to choose from, with improved characteristics such as faster speed of maturation, higher expression levels, increased brightness, monomeric *in vivo* structure and improved solubility. This progress promises many new tools for biological assays and imaging, but how do you know which FP is right for your application?

To help you choose the right FP we recommend reading "A guide to choosing fluorescent proteins" (Shaner *et al*, [2005] Nature Methods, 2:905). Shaner compares properties of the best available FPs head-to-head, and gives useful recommendations of applications for the different spectral classes. All of the publicly available FPs reviewed in this article are available in PlanetGene, our searchable catalog of predesigned genes, with the added benefits that they have restriction sites for convenient cloning. There are several versions of each available, codon-optimized for different expression hosts including *E. coli*, mammalian cells, *Bacillus*, yeast, and baculovirus.

As an example of what a difference it can make to codon-optimize your FP construct to fit your host system, David Rudner's group at Harvard Medical School recently published a paper where they looked at membrane protein localization in the sporulation cycle of *Bacillus subtilis* (Doan et al, [2005] Mol Microbiol, 55:1767). By using a DNA2.0 fluorescent fusion protein codon-optimized for *Bacillus* they obtained a more than 25-fold increase in their signal-to-noise ratio. This enabled Doan

and co-workers to perform experiments that they were unable to do with other commercial or public domain FPs.

In addition to Rudner's paper we are seeing more and more publications that have used DNA2.0 synthetic genes for their research. Scientists that publish in high-end journals, such as PNAS and Cell, use DNA2.0 synthetic genes to enable experiments, or to make their research process more convenient and efficient. To those of you who let us know that you published using DNA2.0 synthetic genes - Thanks and Congratulations on your success! Scroll down and you'll find a current list of references.

Glowing Greetings,

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DNA 2.0

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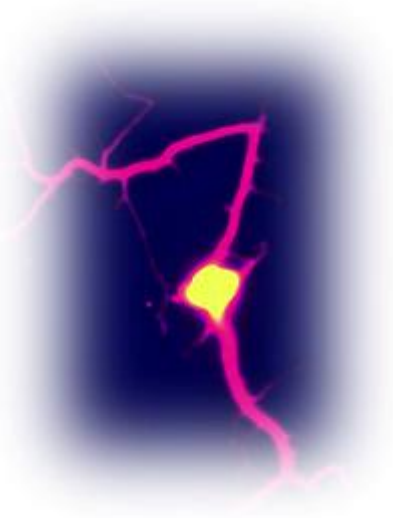
Expanding Repertoire of Fluorescent Protein (FP) Genes

New FP pair for FRET analysis



DNA2.0 now offers a new dazzling pair of FP genes ideally suited for FRET (Förster Resonance Energy Transfer) analysis, a method to measure molecular-scale distances through changes in fluorescence. An optimized cyan-yellow fluorescent protein pair was shown to provide substantially improved sensitivity and dynamic range for a broad range of molecular imaging and screening applications (Nguyen & Daugherty [2005] Nature Biotech. 23:355).
Following suggestions from our customers, we have improved these FP genes even further, optimizing them for enhanced expression in the most commonly used expression hosts; *E. coli*, mammalian, *Bacillus*, yeast and, baculovirus. If these do not meet your needs, we can easily re-optimize for more unusual hosts.

in temperature. mPlum is another popular choice, an excellent far-red monomer variant. DNA2.0's strategy is to provide these and other predesigned FP genes as part of the PlanetGene catalog so that scientists have tools for every specific application. We follow the literature so that any new, exciting discovery will be incorporated into PlanetGene to give scientists the best tools available at any given time.

All FP genes available through PlanetGene are also available as fusions with any of our other PlanetGene genes. The fluorescent tag may be ordered as either an N- or C-terminal fusion.

All FP genes that DNA2.0 has optimized came from the public domain. This means that there are no licensing fees other than the purchase cost for research and commercial use of these genes.

Go to list of PlanetGene FP genes

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Increase in Publications Citing Use of DNA2.0 Synthetic Genes

Published research using DNA2.0 synthetic genes:

Expansion of HIV-specific CD4+ and CD8+ T cells by dendritic cells transfected with mRNA encoding cytoplasm- or lysosome-targeted Nef
Daniel G. Kavanagh *et al.* (2006) Blood 107:1963

Cdk1-dependent regulation of the mitotic inhibitor Wee1
Stacy L. Harvey *et al*. (2005) Cell 122:407

Leucine-rich repeat kinase 2 (LRRK2) interacts with parkin, and mutant LRRK2 induces neuronal degeneration
Wanli W. Smith *et al*. (2005) Proc. Natl. Acad. Sci. USA 102:18676

Subcellular localization of a sporulation membrane protein is achieved through a network of interactions along and across the septum
Thierry Doan *et al*. (2005) Mol Microbiol. 55:1767

Bcl-xL inhibits T-cell apoptosis induced by expression of SARS coronavirus E protein in the absence of growth factors
Yu Yang *et al*. (2005) Biochem J. 392:135

Validation of RNAi silencing specificity using synthetic genes: salicylic acid-binding protein 2 is required for innate immunity in plants
Dhirendra Kumar *et al*. (2006) The Plant Journal 45:863

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