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Shedding light on gene regulation

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Experimental systems in which gene expression can be carefully regulated are [powerful tools](#) for investigating gene function. In an Advanced Online Publication in [Nature Biotechnology](#), Shimizu-Sato and colleagues describe an ingenious gene expression system that exploits a light-sensitive protein from plants.

The system is binary, like the classical yeast two-hybrid system, and is based on a light-induced interaction between two fusion proteins. One is a fusion between the plant PhyB phytochrome and the DNA-binding domain of the yeast transcriptional activator Gal4, while the other contains the plant Pif3 basic helix-loop-helix protein fused to the Gal4 activation domain. A controlled transgene can be 'turned on' by red light, and 'turned off' again by far-red light. The findings demonstrate that their system works well in yeast, and they predict that it could be used in any light-accessible eukaryotic cell to offer a non-invasive, inexpensive and non-toxic gene induction system.

References

1. Conditional control of gene expression in the mouse.
2. *Nature Biotechnology*, [<http://www.nature.com/nbt/>]