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In the news

SEEING RED

The power of fluorescent proteins in biological research was acknowledged in 2008, when the Nobel Prize in Chemistry was awarded to the scientists who discovered and pioneered the use of jellyfish green fluorescent protein (GFP). One of these Nobel laureates, Roger Tsien, is in the news once more, after reporting with colleagues in *Science* that engineered infrared fluorescent proteins (IFPs) allow the whole body imaging of live animals.

GFP and other fluorescent proteins have limited use because they are excited by visible light, which is unable to penetrate tissue. By contrast, "infrared penetrates tissue more efficiently," says Xiaokun Shu, the lead researcher of this work (*The Scientist*, 7 May 2009).

The authors took advantage of a bacteriophytochrome called DrBphP from *Deinococcus radiodurans*. DrBphP binds to a naturally occurring chromophore — the part of a molecule responsible for its colour — called biliverdin. After several rounds of mutation, they observed that the chromophore-binding domain of DrBphP omits light at 708 nm, in the infrared spectrum, when introduced into biliverdin-producing cells.

Expression of the engineered protein in intact mice, by an adenovirus known to infect the mouse liver, also produces infrared fluorescence. Although fluorescence in the liver was weak, the signal was enhanced by injecting mice with biliverdin.

The discovery and manipulation of genetically encoded IFPs is likely to become a valuable research tool for whole body imaging. "The development of IFPs may be important for future studies in animals — to find out how cancers develop, how infections grow or diminish in mice, or perhaps how neurons are firing in flies," adds Tsien (University of California, San Diego Medical Center news release, 7 May 2009).

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