REVERSIBLY PHOTOSWITCHABLE FLUORESCENT PROTEINS

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Reversibly switchable fluorescent proteins (RSFPs), or photochromic proteins, share the same overall fold as the green fluorescent protein (GFP) and its derivatives. Like in GFP, their autocatalytically formed chromophore is buried within an 11-stranded beta-barrel. However, the RSFPs can be repeatedly photoswitched between a fluorescent and a non-fluorescent state by irradiation with light of two different wavelengths. The structural basis for reversible switching here is a cis-trans isomerization of the chromophore, which is in many cases accompanied by a change in the protonation state of the chromophore. By semi-targeted approaches, we have created new and improved RSFPs based on several fluorescent proteins. The new RSFPs include red fluorescent ones as well as variants with strongly modified switching properties. These proteins may be used for several applications, including protein tracking, sub-diffraction-resolution microscopy and others.


