

Fluorescent Proteins (FPs)	Excitation max (nm)	Emission max (nm)	Photoactivation/ conversion/ switching laser	Buffer(s)	Comments
Photoactivatable (PA)					
PA-GFP	504	517	UV-violet (405 nm) or blue (488 nm)	Physiological buffer or culture medium	Recommended for certain live cell and multicolor experiments. Offers less flexibility and complexity in experimental design than others.
PA-TagRFP	562	595	UV-violet (405 nm)	Physiological buffer or culture medium	Very bright, photostable and monomeric, excellent for conventional microscopy and PALM imaging.
PA-mCherry1	570	596	UV-violet (405 nm)	Physiological buffer or culture medium	Good for two-color PALM. Its low photon count makes it one of the worst fluorophores for PALM tracking.
PA-mKate	586	628	UV-violet (405 nm)	Physiological buffer or culture medium	Monomeric, higher pH stability and slower photobleaching than PA-mCherry.
Photoconvertible (PC)					
PS-CFP2	400 (C), 490 (G)	468 (C), 511 (G)	UV-violet (405 nm)	Physiological buffer or culture medium	Irreversible photoconversion from cyan to green. Easily imaged without photo-activation, good candidate for multicolor imaging.
Kaede	508 (G), 572 (R)	518 (G), 582 (R)	UV-violet (405 nm)	Physiological buffer or culture medium	Irreversible photoconversion. Challenging to use for live-cell imaging experiments, as tetra-/oligo-merization can cause artefacts.
mEos2	506 (G), 573 (R)	519 (G), 584 (R)	UV-violet (405 nm)	Physiological buffer or culture medium	Tends to dimerize and oligomerize at high concentrations, recommended to use mEos3.2 or mMaple3 instead.
mEos3.2	507 (G), 572 (R)	516 (G), 580 (R)	UV-violet (405 nm)	Physiological buffer or culture medium	Monomeric, bright, matures fast, exhibits high photon count and label density. Along with mMaple3, considered best of the green-red photoconvertible FPs.
mEos4b	505 (G), 569 (R)	516 (G), 581 (R)	UV-violet (405 nm)	Physiological buffer or culture medium	Osmium tetroxide resistant, engineered for correlative EM imaging.
mMaple3	489 (G), 566 (R)	505 (G), 583 (R)	UV-violet (405 nm)	Physiological buffer or culture medium	Most recently introduced photoconvertible FP for SMLM, very high detectable FP: total FP ratio.
Dendra2	490 (G), 553 (R)	507 (G), 573 (R)	UV-violet (405 nm) or blue (488 nm)	Physiological buffer or culture medium	Blue light activation and good performance makes Dendra2 a good candidate for live cell SMLM. Recent efforts to improve it with primed photoconversion or point mutations to reduce phototoxicity.
PSmOrange	561(O), 636 (FR)	565 (O), 662 (FR)	UV-violet (405 nm) or blue (488 nm)	Physiological buffer or culture medium	The red-shifted spectra of both forms enable its simultaneous use with cyan-to-green photoswitchable proteins. Good for multi-color super-resolution microscopy.
Photoswitchable (PS)					
Dronpa	503	518	UV-violet (405 nm)	Physiological buffer or culture medium	Reversibly switchable dark-green. We recommend PS-CFP2 for most SMLM applications. Extensive mutagenesis of Dronpa has been used to generate additional variants with faster photoswitching kinetics, such as rsFastlime and Padron.
mGeosM	503	514	UV-violet (405 nm)	Physiological buffer or culture medium	Created by mutating the first amino acids in the chromophore of PC-mEos. Better than Dronpa but higher duty cycle than PS-CFP2.
Dreiklang	515	529	UV-violet (405 nm) to deactivate	Physiological buffer or culture medium	Reversible on-off switching accomplished at two different wavelengths of 365nm and 405nm, respectively, whereas fluorescence is elicited at 515 nm. Has high acid sensitivity, low contrast at low pH values; not good in some cell compartments.
mIrisFP	486 (G), 516 (R)	546 (G), 578 (R)	UV-violet (405 nm) for dark-green and green-to-red. Blue (488 nm) for dark-red	Physiological buffer or culture medium	Photoconvertible from green to red state, both green and red states reversibly photoswitchable to dark state. Demonstrated for combined SMLM with pulse-chase experiments.
NijiFP	469 (G), 526 (R)	507 (G), 569 (R)	UV-violet (405 nm) for dark-green and green-to-red. Blue (488 nm) for dark-red	Physiological buffer or culture medium	Photoconvertible from green to red state, both green and red states reversibly photoswitchable to dark state.
Synthetic dyes					
TAMRA/TMR (Tetramethyl Rhodamine)	546	575	-	10mM MEA/OS or Live-OS	TMR conjugates (TMR Star) often used for SNAP tag and Halo tag labeling.
PA-Janelia Fluor® 549	549	571	UV-Violet (405 nm)	PBS	Twice as bright as TMR in vitro and in live-cell experiments. Excellent cell permeability and maintains compatibility with various labeling strategies, such as Halo tag and SNAP tag systems. Good for high-speed and dual-colour live-cell single-molecule tracking (SPT) and fixed-cell PALM.
PA-Janelia Fluor® 646	646	664	UV-Violet (405 nm)	PBS	

LEGEND

C = cyan G = green O = orange R = red FR = far-red SMLM = single-molecule localization microscopy