

Far-red fluorescent protein TurboFP635

- Super bright far-red fluorescence
- Fast maturation, high photostability
- Proven suitability to generate stably transfected cell lines
- Fluorescent signal is easily distinguished from background fluorescence
- Recommended for cell and organelle labeling in autofluorescent environment, multicolor applications and whole body imaging

TurboFP635 (scientific name *Katushka*) is a far-red mutant of the red fluorescent protein from sea anemone *Entacmaea quadricolor* [Shcherbo et al. 2007]. Possessing excitation/emission maxima at 588/635 nm, TurboFP635 is 7 to 10-fold brighter compared to the spectrally close HcRed [Gurskaya et al. 2001] or mPlum [Wang et al. 2004]. TurboFP635 is characterized by fast maturation and a high pH-stability and photostability. The unique characteristics of TurboFP635 make it the protein of choice for visualization within living tissues and dual-color high-throughput assays.

TurboFP635 is mainly intended for applications where fast appearance of far-red fluorescence is crucial. It is specially recommended for whole body imaging, cell and organelle labeling, and for tracking the promoter activity in auto-fluorescent tissues.

Main properties of TurboFP635

Characteristic	
Molecular weight, kDa	26
Polypeptide length, aa	235
Fluorescence color	far-red
Excitation maximum, nm	588
Emission maximum, nm	635
Quantum yield	0.34
Extinction coefficient, $M^{-1}cm^{-1}$	65 000
Brightness*	22.1
Brightness, % of EGFP	67
pKa	5.5
Structure	dimer
Aggregation	no
Maturation rate at 37°C	super fast
Photostability	high
Cell toxicity	not observed

* Brightness is a product of extinction coefficient and quantum yield, divided by 1 000.

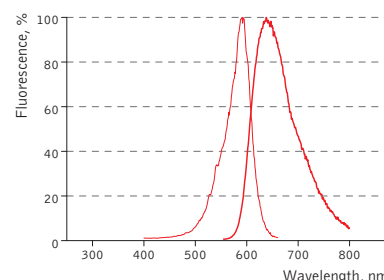
Performance and use

TurboFP635 can be easily expressed and detected in a wide range of organisms. Mammalian cells transiently transfected with TurboFP635 expression vectors produce bright fluorescence in 10-12 hrs after transfection. No cytotoxic effects or visible protein aggregation are observed. Despite its dimeric structure, TurboFP635 performs well in some fusions. However, for protein labeling applications we recommend using specially optimized monomeric TagFPs. TurboFP635 suitability to generate stably transfected cells has been proven by Marinpharm company. Cell lines expressing TurboFP635 are commercially available. TurboFP635 can be used in multicolor labeling applications with blue, cyan, green, yellow, and red (orange) fluorescent dyes.

Recommended filter sets and antibodies

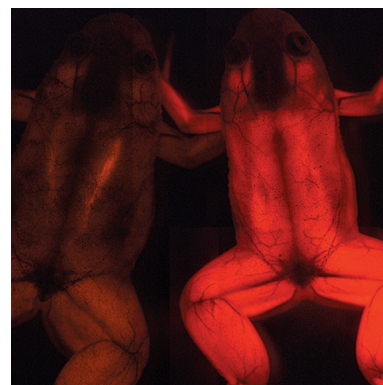
TurboFP635 can be recognized using Anti-tRFP antibody (Cat.# AB233-AB234) available from Evrogen.

Recommended Omega Optical filter sets are QMAX-Red and XF102-2. TurboFP635 can also be detected using Texas Red filter sets or similar.



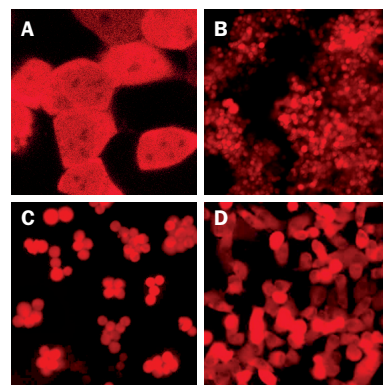
TurboFP635 normalized excitation (thin line) and emission (thick line) spectra.

Complete TurboFP635 spectra in Excel format can be downloaded from the Evrogen Web site at <http://www.evrogen.com>



DsRed-Express and TurboFP635 expression in transgenic *Xenopus laevis*.

Transgenic 2.5 months living animals expressing TurboFP635 and DsRed-Express under the control of cardiac actin promoter are shown from the dorsal side. TurboFP635 (on the right) is excellently visible in the whole body, while DsRed-Express (on the left) can be hardly visualized. This experiment clearly demonstrates the advantage of longer wavelength emission of TurboFP635 for the whole body imaging. Leica MZFLIII fluorescent stereomicroscope, excitation filter 546/10; emission filter 565LP. Data courtesy of Dr. A. Zaraisky, Institute of Bioorganic Chemistry, RAS (Moscow, Russia).



TurboFP635 expression in mammalian cells.

(A) Transiently transfected Phoenix cells; (B) stably transfected WALKER 256 rat tumor cells; (C) stably transfected mouse Ehrlich-Ascites cells; (D) stably transfected metastasizing melanoma MeJUSo cells. Photographs of stably transfected cell lines were provided by Dr. Christian Petzelt (Marinpharm).

Available variants and fusions

TurboFP635 mammalian expression vectors contain TurboFP635 coding sequence with codon usage optimized for high expression in mammalian cells, i.e. humanized [Haas et al. 1996]. Humanized TurboFP635 can also be expressed in *E. coli* and some other heterologous systems upon subcloning into appropriate vector.

The available vectors encoding TurboFP635 are listed below in the section TurboFP635-related products. For most updated product information, please visit Evrogen website www.evrogen.com. If you need TurboFP635 codon variant or fusion construct that is not listed on our website, please contact us at product@evrogen.com.

Licensing opportunities

Evrogen technology embodied in TurboFP635 is available for expanded and commercial use with an adaptable licensing program. Benefits from flexible and market driven license options are offered for upgrade and novel development of products and applications. For licensing information, please contact Evrogen at license@evrogen.com.

References

- Gurskaya, N.G. et al. (2001). *FEBS Lett*, 507 (1): 16–20 / pmid: 11682051
- Haas, J. et al. (1996). *Curr Biol*, 6 (3): 315–324 / pmid: 8805248
- Shcherbo, D et al. (2007). *Nat Methods*, 4 (9): 741–746 / pmid: 17721542
- Wang, L et al. (2004). *Proc Natl Acad Sci U S A*, 101 (48): 16745–16749 / pmid: 15556995

TurboFP635-related products

Product	Cat.#	Description	Size
TurboFP635 expression/source vectors			
pTurboFP635-C	FP721	Mammalian expression vector encoding humanized TurboFP635 and allowing its expression and generation of fusions to the TurboFP635 C-terminus	20 µg
pTurboFP635-N	FP722	Mammalian expression vector encoding humanized TurboFP635 and allowing its expression and generation of fusions to the TurboFP635 N-terminus	20 µg
Antibodies against TurboFP635			
Anti-tRFP	AB233	Rabbit polyclonal antibody against TurboRFP, TurboFP602, TurboFP635, TurboFP650,	100 µg
	AB234	NirFP, TagBFP, TagRFP, FusionRed, TagFP635, mKate2 and PA-TagRFP	200 µg

Please contact your local distributor for exact prices and delivery information.

Notice to Purchaser:

TurboFP635-related materials (also referred to as "Products") are intended for research use only.

The Products are covered by U.S. Pat. 8,138,320; European Pat. 1994149; and other Evrogen Patents and/or Patent applications pending. By use of these Products, you accept the terms and conditions of the applicable Limited Use Label License #001: <http://www.evrogen.com/products/Evrogen-FP-license.shtml>.

The CMV promoter is covered under U.S. Patents 5,168,062 and 5,385,839, and its use is permitted for research purposes only. Any other use of the CMV promoter requires a license from the University of Iowa Research Foundation, 214 Technology Innovation Center, Iowa City, IA 52242.

MSDS information is available at <http://www.evrogen.com/MSDS.shtml>