

Blue fluorescent protein TagBFP

- Bright blue fluorescence
- Monomeric fast maturing protein with successful performance in fusions
- Extremely high pH-stability
- High photostability
- Recommended as a donor for green fluorescent proteins in FRET applications

TagBFP (scientific name mTagBFP) is a monomeric blue fluorescent protein generated by site-specific and random mutagenesis of TagRFP [Subach et al. 2008]. TagBFP possesses bright blue fluorescence with excitation/emission maxima at 402 and 457 nm, characterized by high photostability and extremely high pH-stability.

Compared to EBFP2 [Ai et al. 2007], TagBFP is more than 1.8 times brighter, much more pH-stable and has twice shorter maturation half-time at 37°C. Narrow fluorescence emission peak of TagBFP provides for accurate and easy spectral separation with cyan and green fluorescent proteins and makes it a preferable tag for multicolor labeling.

Good overlap between the emission spectrum of TagBFP and the absorbance spectra of TagGFP allows using these two proteins as a FRET pair.

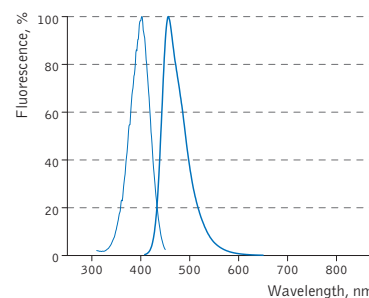
Main properties of TagBFP

Characteristic	
Molecular weight, kDa	26
Polypeptide length, aa	233
Fluorescence color	blue
Excitation maximum, nm	402
Emission maximum, nm	457
Quantum yield	0.63
Extinction coefficient, $M^{-1}cm^{-1}$	52 000
Brightness*	32.8
Brightness, % of EGFP	99
pKa	2.7
Structure	monomer
Aggregation	no
Maturation rate at 37°C	fast
Photostability	high

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

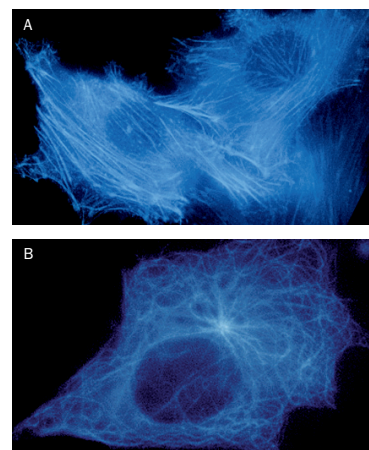
TagBFP can be easily expressed and detected in a wide range of organisms. Mammalian cells transiently transfected with TagBFP expression vectors give bright fluorescent signals within 10-12 hrs after transfection. No cell toxic effects and visible protein aggregation are observed. TagBFP performance in fusions has been demonstrated in the β -actin and α -tubulin models. It can be used in multicolor labeling applications with green, yellow, red, and far-red fluorescent dyes.

TagBFP can be successfully used as a donor in FRET pair also comprising TagGFP. The calculated Forster distance $R_0 = 5.25$ nm for TagBFP / TagGFP pair is larger than those reported for the standard ECFP-EYFP and mCyPet-mYPet pairs ($R_0 = 4.86$ nm and 4.93 nm correspondingly), suggesting that TagBFP / TagGFP is one of the best among available FRET pairs of monomeric fluorescent proteins. High efficiency of TagBFP as a FRET donor was demonstrated in living cells by Subach et al. [Subach et al. 2008].



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

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



HeLa cells expressing TagBFP fusion proteins.

(A) - confocal microscopy of TagBFP fusion with β -actin in transiently transfected HeLa cells; (B) - confocal microscopy of TagBFP fusion with cytoplasmic α -tubulin in transiently transfected HeLa cells.

Recommended filter sets and antibodies

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

TagBFP can be detected using common fluorescence filter sets for BFP, DAPI, and other blue dyes.

Recommended filter sets are: XF119-2*, QMAX-Blue*, XF131, XF06, XF13-2, XF03, XF11, XF129-2, XF05-2 (Omega Optical); DAPI-5060B* and DAPI-1160A (Semrock); 31037, 31041, 31016*, 31021, 31000v2, 1009v2, 31013v2, 11005v2, 31047 (Chroma Technology Corp.).

* - preferred filter sets

Available variants and fusions

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

TagBFP-AS codon usage is optimized for expression in Arabidopsis and Saccharomyces.

The available vectors encoding TagBFP variants and fusions are listed below in the section TagBFP-related products. For most updated product information, please visit Evrogen website www.evrogen.com.

If you need TagBFP 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 TagBFP 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.

TagBFP-related products

Product	Cat.#	Description	Size
TagBFP expression/source vectors			
pTagBFP-C	FP171	Mammalian expression vector encoding humanized TagBFP and allowing its expression and generation of fusions to the TagBFP C-terminus	20 µg
pTagBFP-N	FP172	Mammalian expression vector encoding humanized TagBFP and allowing its expression and generation of fusions to the TagBFP N-terminus	20 µg
pTagBFP-actin	FP174	Mammalian expression vector encoding humanized TagBFP fused with human cytoplasmic β -actin	20 µg
pTagBFP-tubulin	FP175	Mammalian expression vector encoding humanized TagBFP fused with human α -tubulin	20 µg
pTagBFP-H2B	FP176	Mammalian expression vector encoding humanized TagBFP fused with human histone H2B	20 µg
Gateway® TagBFP-AS-C	FP177	Gateway® entry clone for generation of fusions to the C-terminus of TagBFP; transfer of the construct encoding TagBFP or its fusion into Gateway® destination vectors; TagBFP codon usage is optimized for expression in Arabidopsis and Saccharomyces	20 µg
Gateway® TagBFP-AS-N	FP178	Gateway® entry clone for generation of fusions to the N-terminus of TagBFP; transfer of the construct encoding TagBFP or its fusion into Gateway® destination vectors; TagBFP codon usage is optimized for expression in Arabidopsis and Saccharomyces	20 µg
Antibodies against TagBFP			
Anti-tRFP	AB233	Rabbit polyclonal antibody against TurboRFP, TurboFP602, TurboFP635, TurboFP650,	100 µg
	AB234	NirFP, TagBFP, TagRFP, TagFP635, mKate2 and PA-TagRFP	200 µg

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

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MATERIAL SAFETY DATA SHEET INFORMATION: To the best of our knowledge, these products do not require a Material Safety Data Sheet. However, all the properties of these products (and, if applicable, each of their components) have not been thoroughly investigated. Therefore, we recommend that you use gloves and eye protection, and wear a laboratory coat when working with these products.

References

Ai et al. (2007) "Exploration of new chromophore structures leads to the identification of improved blue fluorescent proteins." *Biochemistry*, 46 (20): 5904–5910 / PMID: 17444659

Haas et al. (1996) "Codon usage limitation in the expression of HIV-1 envelope glycoprotein." *Curr Biol*, 6 (3): 315–324 / PMID: 8805248

Subach et al. (2008) "Conversion of Red Fluorescent Protein into a Bright Blue Probe." *Chemistry & Biology*, 15 (10): 1116–1124 / PMID: 18940671