

## Yellow fluorescent protein TurboYFP

- Super bright true-yellow fluorescence
- Emission wavelength is ideally positioned between those of green and red fluorescent proteins
- Fast maturation, high pH-stability and photostability
- Destabilized variant is available
- Recommended for gene expression analysis and cell labeling

TurboYFP is an enhanced variant of the yellow fluorescent protein PhiYFP from jellyfish *Phialidium* sp. [Shagin et al. 2004]. It possesses superbright yellow fluorescence with emission maximum at 538 nm and is ideally positioned between green and red fluorescent proteins, allowing easy separation from these markers by flow cytometry using common channels of detection and a single laser excitation line. Compared with Phi-Yellow proteins, TurboYFP matures faster in mammalian cells.

TurboYFP is mainly intended for applications where fast appearance of bright fluorescence is crucial. It is specially recommended for cell labeling and tracking the promoter activity. Destabilized TurboYFP variant allows analysis of rapid and/or transient events in gene regulation.

### Main properties of TurboYFP

Characteristic	
Molecular weight, kDa	26
Polypeptide length, aa	234
Fluorescence color	yellow
Excitation maximum, nm	525
Emission maximum, nm	538
Quantum yield	0.53
Extinction coefficient, M <sup>-1</sup> cm <sup>-1</sup>	105 000
Brightness*	55.7
Brightness, % of EGFP	169
pKa	5.9
Structure	dimer
Aggregation	at high concentrations
Maturation rate at 37°C	super fast
Photostability	high
Cell toxicity	at high concentrations

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

### Performance and use

TurboYFP can be expressed and detected in a wide range of organisms. Mammalian cells transiently transfected with TurboYFP expression vectors produce bright fluorescence in 8-10 hrs after transfection.

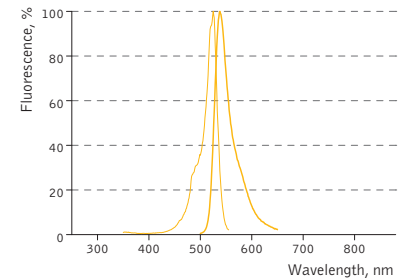
Being overexpressed in long-term culture of cells with high expression levels, TurboYFP shows slight tendency to aggregate. It might limit TurboYFP use in such experimental systems. Please use Phi-Yellow proteins for stable expression and for organelle labeling.

Despite its dimeric structure, TurboYFP performs well in some fusions. However for protein labeling applications we recommend using specially optimized monomeric TagFPs.

TurboYFP can be used in multicolor labeling applications with blue, cyan, green, red, and far-red fluorescent dyes.

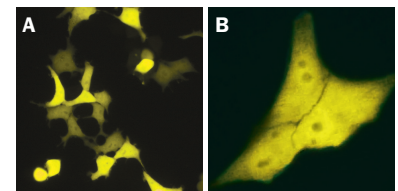
### Recommended filter sets and antibodies

TurboYFP can be recognized using Anti-TurboYFP (Cat.#AB605) antibody available from Evrogen. TurboYFP can be detected using Omega Optical filter set XF104-3 or Chroma Technology Corp. filter set 42003 ("ZsYellow1").



**TurboYFP normalized excitation (thin line) and emission (thick line) spectra.**

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



**TurboYFP expression in transiently transfected cells:** (A) Phoenix cells; (B) HeLa cells.

## Available variants and fusions

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

Destabilized TurboYFP variant (TurboYFP-dest1) is produced by addition of PEST amino acid sequence encoded by region 422-461 of mouse ornithine decarboxylase gene [Li et al. 1998]. This sequence targets the protein to degradation and enables a rapid protein turnover. TurboYFP-dest1 retains spectral properties of the initial protein, but has shorter half-life (approximately 1-2 hrs) as measured by the analysis of fluorescence intensity of cells treated with a protein synthesis inhibitor, cycloheximide. Because of rapid turnover, TurboYFP-dest1 can be used to measure changes in gene expression.

The available vectors encoding TurboYFP variants and fusions are listed below in the section TurboYFP-related products. For most updated product information, please visit Evrogen website [www.evrogen.com](http://www.evrogen.com).

If you need TurboYFP codon variant or fusion construct that is not listed on our website, please contact us at [product@evrogen.com](mailto:product@evrogen.com).

## Licensing opportunities

Evrogen technology embodied in TurboYFP 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](mailto:license@evrogen.com).

## References

Haas et al. (1996). *Curr Biol*, 6 (3): 315–324 / pmid: 8805248

Li et al. (1998). *J Biol Chem*, 273 (52): 34970–34975 / pmid: 9857028

Shagin et al. (2004). *Curr Biol*, 21 (5): 841–850 / pmid: 14963095

## TurboYFP-related products

Product	Cat.#	Description	Size
TurboYFP expression/source vectors			
pTurboYFP-C	FP611	Mammalian expression vector encoding humanized TurboYFP and allowing its expression and generation of fusions to the TurboYFP C-terminus	20 µg
pTurboYFP-N	FP612	Mammalian expression vector encoding humanized TurboYFP and allowing its expression and generation of fusions to the TurboYFP N-terminus	20 µg
pTurboYFP-B	FP613	Bacterial expression vector; source of the TurboYFP coding sequence	20 µg
pTurboYFP-PRL	FP615	Promoterless vector encoding humanized TurboYFP and designed for monitoring of activity of different promoters and promoter/enhancer combinations	20 µg
pTurboYFP-PRL-dest1	FP618	Promoterless vector encoding destabilized TurboYFP and designed for monitoring of activity of different promoters and promoter/enhancer combinations	20 µg
pTurboYFP-dest1	FP619	Mammalian expression vector encoding destabilized TurboYFP for its expression and generation of fusions to the TurboYFP-dest1 N-terminus	20 µg
Antibodies against TurboYFP			
Anti-TurboYFP	AB605	Rabbit polyclonal antibody against TurboYFP, PhiYFP and PhiYFP-m.	100 µg

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

## Notice to Purchaser:

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

The Products are covered by U.S. Pat. 7,951,923; European Pat. 03779067; 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://evrogen.com/support/MSDS-info.shtml>