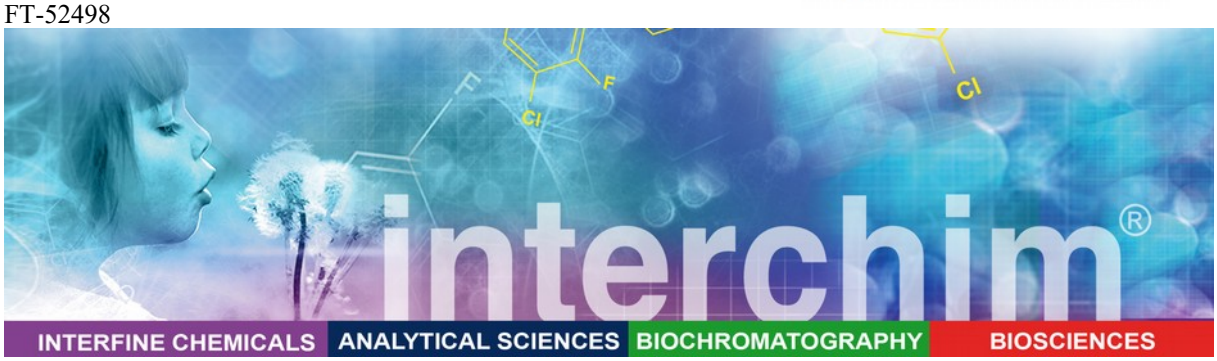
FluoProbes®

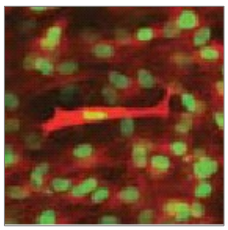
FT-52498



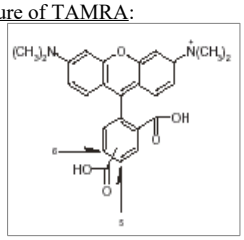
TAMRA and its derivatives

Product Description

A popular orange-red fluorophore used in various bioconjugations for immunochemistry, notably with nucleic acids as well as peptides and proteins. Also an excellent fluorescence acceptor for fluorescein derivatives in FRET-based assays. Available derivatized with various chemical reactive groups.



Chemical structure of TAMRA:



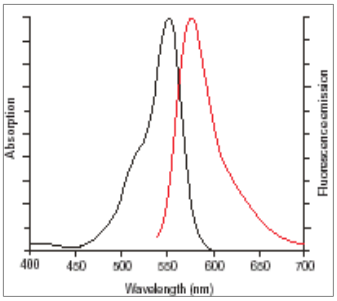
(FP-AM381)

Fluorescent properties:

Extinction Coeff. : $\varepsilon_{(540)}$: 95 000 M^{-1} cm^{-1}

$\lambda_{exc.\ max.}$\$\lambda_{em.\ max.}$(nm): 540/565 nm (coupled)

Note: In pH 8 buffer compared to MeOH, absorption and emission (540/565nm) are red-shifted ~8 nm with EC lowered by ~10%.



Typical absorption and emission spectra of TAMRA in pH7.0 buffer (coupled).

Product name cat.number	Formula [CAS]	MW (g·mol^{-1})	Soluble in	Reactivity	Comments
5(6)-TAMRA (K) FP-46644A, 100mg FP-JQ4610, 1mg	$C_{25}H_{22}N_2O_5$.HCl	466.92	DMSO, DMF, MeOH, or pH >6.5 buffer	COOH	Mixed isomer of 5-(and 6) used to modify amino and hydroxy groups using EDAC-mediated couplings when there are difficulties in using 5-(and 6)-TAMRA-SE
5-TAMRA (K) FP-05867A, 10mg	$C_{25}H_{22}N_2O_5$	430.5	DMSO, DMF, MeOH, or pH >6.5 buffer	COOH	Single isomer used when they are difficulties with the mixed isomer, typically used in protein labeling
6-TAMRA (K) FP-M1306A, 10mg	$C_{25}H_{22}N_2O_5$. [91809-66-4]	430.5	DMSO, DMF, MeOH, or pH >6.5 buffer	COOH	Single isomer typically used in nucleotide labeling.
5-TAMRA-PEO3-amine (K) FP-BV3780, 5mg	$C_{37}H_{42}F_6N_4O_{11}$	832.74	DMSO, DMF, or H_2O	NH2	The amine derivate, with an hydrophilic spacer
5(6)-TAMRA-SE (K') FP-52498A, 25mg	$C_{29}H_{25}N_3O_7$. [150408-83-6]	527.5	DMF or DMSO	NHS/Amines	Contains an reactivity toward amines in physiological conditions
5-TAMRA-SE (K') FP-67480A, 5mg	$C_{29}H_{25}N_3O_7$ [150810-69-7]	527.5	DMF or DMSO	NHS/Amines	Is preferred for peptides and proteins.

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interchim 211 bis, avenue JF Kennedy BP 1140 - 03100 Montluçon Fax +33 4 70 03 82 60 Hotline +33 4 70 03 73 06 • interbiotech@interchim.com

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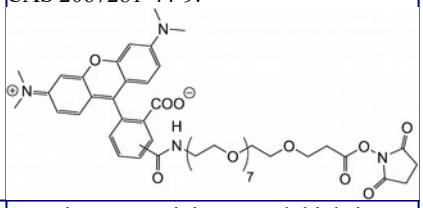
Product name cat.number	Formula [CAS]	MW (g·mol^{-1})	Soluble in	Reactivity	Comments
6-TAMRA-SE (K') FP-84634A, 5mg FP-CD6831, 100µl at 90mg/mL	$C_{29}H_{25}N_3O_7$; [150810-69-8]	527.5	DMF or DMSO	NHS/Amines	Is preferred for labeling nucleotides and DNA sequencing.
6-TAMRA-X-SE (K') FP-33406A, 10 mg		640.69	DMF or DMSO	NHS/Amines	Contains an extended spacer to reduces self quenching upon high level conjugation.
5-TAMRA-PEO$_8$-SE (K') FP-CD6821, 1mg	$C_{48}H_{62}N_4O_{16}$	951.02	DMF or DMSO	NHS/Amines	Contains an hydrophilic spacer to improve conjugates conjugation, fluorescence and stability
5-TAMRA-PEO$_{12}$-SE (K') FP-CD6811, 1mg	$C_{56}H_{78}N_4O_{20}$	1127.23	DMF or DMSO	NHS/Amines	The extreme extension version.
TAMRA-PEG8-SE (K') FP-B3A8E0, 5mg	$C_{48}H_{62}N_4O_{16}$	951.04	DMF or DMSO	NHS/Amines	CAS 2067281-44-9. 
5(6)-TAMRA-C$_5$-maleimide (K') FP-AM381A, 5mg	$C_{34}H_{34}N_4O_6$	594.66	DMF or DMSO	Mal/Thiols	Contains an reactivity toward thiols in physiological conditions and an extended spacer
5(6)-TAMRA-C$_6$-maleimide (K') FP-LV8390, 5mg	$C_{35}H_{36}N_4O_6$	608.70	DMF or DMSO	Mal/Thiols	Contains an reactivity toward thiols in physiological conditions and an extended spacer
5-TAMRA-maleimide (K') FP-21873A, 5mg	$C_{28}H_{23}N_3O_5$	481,51	DMF or DMSO	Mal/Thiols	Contains an reactivity toward thiols in physiological conditions – single isomer
6-TAMRA-maleimide (K') FP-862231, 1mg	$C_{28}H_{23}N_3O_5$	481,51	DMF or DMSO	Mal/Thiols	Contains an reactivity toward thiols in physiological conditions – single isomer
5(6)-TAMRA-maleimide (K') FP-IT2471, 5mg	$C_{28}H_{23}N_3O_5$	481,51	DMF or DMSO	Mal/Thiols	Contains an reactivity toward thiols in physiological conditions
TAMRA-MTS (K') FP-60222A, 5 mg	$C_{28}H_{29}N_6O_6S_2$	567.69	DMF or DMSO	MTS/Thiols	Superior specificity to maleimide.

Storage: Free acid: at +4°C (K) or –20°C for long term(K). Protect from light
SE, Maleimide and MTS derivatives: at –20°C (M) Protect from light and moisture.
Storage can also be done at +4°C, but for short-term for SE, Maleimide, MTS derivates.

Technical and scientific information

- **Carboxy tetramethylrhodamine** (**TAMRA**) is one of the most popular orange-red fluorophore used in various bioconjugations for immunochemistry, notably with nucleic acids as well as peptides and proteins. It is an excellent fluorescence acceptor for fluorescein derivatives in FRET-based assays.

The absorption and emission spectra of TAMRA-labeled proteins may vary depending on the labeling location and on the degree of substitution. One can adress such limitations or when a fluorescence quenching is a serious problem, using alternative dye: try an extended spacer version (TAMRA-X-SE, TAMRA-PEOx-SE), or our excellent FluoProbes®547 (#FP-AK773 for the SE form) that has brighter and more stable fluorescence.
It is available with various chemical reactive groups, as mixed **isomers** of carboxytetramethylrhodamine, and some derivatives as single isomer. Pure isomers are are preferred for specific biological applications where reproducibility is more critical than material cost since the minor positional difference between 5-TAMRA and 6-TAMRA might significantly affect some biological properties of the underlying conjugates.

- The **carboxyl free acid** derivate (TAMRA) can be coupled to primary or secondary amines via standard peptide chemistry, and to hydroxy groups. EDAC-mediated conjugation is useful when there are difficulties in using SE derivates.

- The **Amine derivative** can be coupled via standard chemistry to activated carboxyl groups (i.e. via EDC mediated amidation) or sulfonyl chlorides. It is available as standard spacer, and with a long water-soluble PEG spacer separating the dye and the amine functional group (5-TAMRA-PEO_3-amine).

- The **succinimidyl ester** (SE, NHS) reacts readily with primary or secondary amines under mild conditions. It is available with a standard linker, and an improved hydrophilic and long spacer: 5-TAMRA-PEO_{12} SE has a long water-soluble PEG spacer between tetramethylrhodamine and the amine reactive SE group. This results in improved conjugation of proteins (do not require organic solvents, allows higher ratio of coupling) and higher fluorescence properties as well conjugate stability (reduce aggregation risk).

- The **maleimide derivative** (Mal) reacts readily and specifically with sulfhydryls. It is available with a C_5 linker molecule enhances the fluorescence after the dye is conjugated to proteins.

- The **MTS derivative** reacts highly and specifically with sulfhydryls.

Please refer to technical notices and the scientific literature for more information on chemical reactivity and protocols, or ask FluoProbes.

References :

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- **Andreev, OA**, *et al.,* « Polarization of fluorescently labeled myosin subfragment-1 fully or partially decorating muscle fibers and myofibrils », *Biophys J,* **65**, 1027 (1993*) ;* abstract
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- **Jordan, JA**, *et al.,* **« TaqMan-Based Detection of *Trichomonas vaginalis* DNA from Female Genital Specimens »**, *J Clin Microbiol,* **39,** 3819 (2001) article
- ***Kask P***. *et al.*, ***« Two-Dimensional Fluorescence Intensity Distribution Analysis: Theory and Applications »***, Biophys. J., ***78,*** *1703(2000) article*
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- **Schutz,E,** *et al.*, « **Genotyping of Eight Thiopurine Methyltransferase Mutations: Three-Color Multiplexing, "Two-Color/Shared" Anchor, and Fluorescence-quenching Hybridization Probe Assays Based on Thermodynamic Nearest-Neighbor Probe Design »,** *Clin Chem* **46**, 1728 (2000) article
- **Wazawa, T**, *et al.,* « Spectral Fluctuation of a Single Fluorophore Conjugated to a Protein Molecule », *Biophys J,* **78**, 1561 (2000) ; article
- **Yoo, H**, *et al.*, « Enhanced delivery of antisense oligonucleotides with fluorophore-conjugated PAMAM dendrimers », *Nucleic Acids Res* **28**, 4225 (2000) article

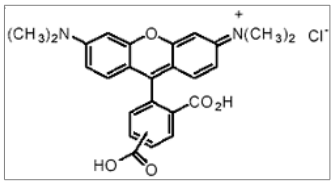
TAMRA-SE :

- **Fuller ME**., *et al*., « **Application of a Vital Fluorescent Staining Method for Simultaneous, Near-Real-Time Concentration Monitoring of Two Bacterial Strains in an Atlantic Coastal Plain Aquifer in Oyster, Virginia »,** *Appl. Envir. Microbiol*., **70**,1680 (2004) Article
- **Byersdorfer C.A.**, *et al*., « **Visualization of Early APC/T Cell Interactions in the Mouse Lung Following Intranasal Challenge »,** *J. Immunol*., **167**, 6756(2001) Article

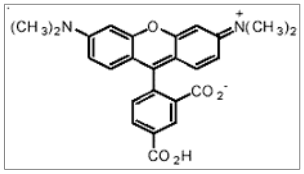
Handling and Storage

All products should from light and moisture.
Storage of amine and carboxylic acid derivates can be stored at +4°C, or at –20°C for long term.
SE, Maleimide and MTS derivates should be stored at –20°C, or for short-term at +4°C.
Allow reaching room temperature before opening. Dissolve in suitable solvent or buffer as depicted in table page 1. Typically SE and MTS derivatives are dissolved in anhydrous DMSO, and can be stored frozen some weeks (SE) or months (MAL). Be aware that stability is reduced once in solution, because of light sensitivity, and because of hydrolysis for SE and Maleimide derivatives.

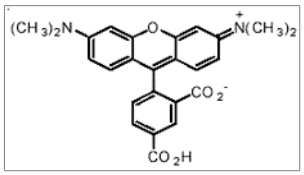
Name :	**5(6)-TAMRA**
	5-(and-6)-Carboxytetramethylrhodamine, mixed isomers
Catalog Number :	FP-46644A, 100mg
Structure / MW :	$C_{25}H_{22}N_2O_5$.HCl ; MW=466.92
Solubility:	Dark red solid soluble in DMSO, DMF, MeOH, or pH >6.5 buffer
Absorption / Emission :	$\lambda_{exc}\backslash\lambda_{em}$ (MeOH) = 540/565 nm
	Store at +4°C or -20°C and protect from light (K)



Name :	**5-TAMRA**
	5-Carboxytetramethylrhodamine, single isomer
Catalog Number :	FP-05867A, 10mg
Structure :	$C_{25}H_{22}N_2O_5$.; CAS: [91809-66-4] ; MW=430.5
Molecular Weight :	
Solubility:	Dark red solid soluble in DMSO, DMF, MeOH or pH>6.5 buffers
Absorption / Emission :	$\lambda_{exc}\backslash\lambda_{em}$ (MeOH) = 540/565 nm
Storage:	Store at +4°C or -20°C and protect from light (K)

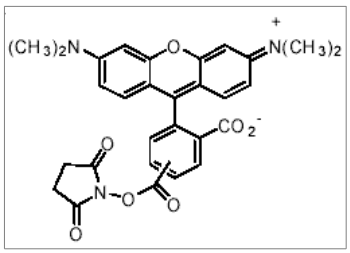


Name :	**6-TAMRA**
	6-Carboxytetramethylrhodamine, single isomer
Catalog Number :	FP-M1306A, 10mg
Structure :	$C_{25}H_{22}N_2O_5$.; CAS: [91809-66-4] ; MW=430.5
Molecular Weight :	
Solubility:	Dark red solid soluble in DMSO, DMF, or MeOH, or pH>6.5 buffers
Absorption / Emission :	$\lambda_{exc}\backslash\lambda_{em}$ (MeOH) = 540/565 nm
Storage:	Store at +4°C or -20°C and protect from light (K) especially in solution



Name :	**5-TAMRA-PEO3-amine**
	Tetramethylrhodamine-PEO3-amine, TFA salt
Catalog Number :	FP-BV3780, 5mg
Structure :	$C_{37}H_{42}F_6N_4O_{11}$; MW=832.74
Molecular Weight :	
Solubility:	Dark purple solid soluble in DMSO, DMF, or H2O
Absorption / Emission :	$\lambda_{exc}\backslash\lambda_{em}$ (MeOH) = 544/571 nm
Storage:	Store at +4°C or -20°C and protect from light (K)

Name :	**5(6)-TAMRA-SE**
	5-(and-6)-Carboxytetramethylrhodamine succinimidyl ester (mixed isomers)
Catalog Number :	FP-52498A, 25mg
Structure / MW :	$C_{29}H_{25}N_3O_7$. CAS: [150408-83-6] ; MW=527.5
Solubility:	Red solid soluble in DMF or DMSO
Absorption / Emission :	$\lambda_{exc}\backslash\lambda_{em}$ (MeOH) = 540/565 nm
	ε = 95 000 M^{-1} cm^{-1}
Reactivity :	High and specific amine reactivity
Storage :	Store at -20°C and protect from light (M)



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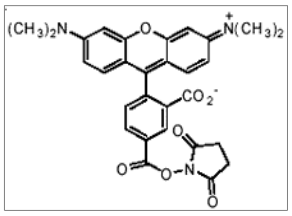
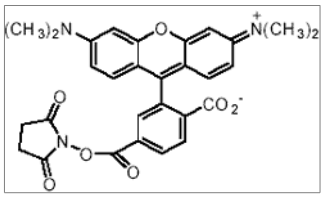
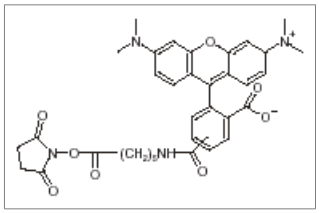
Name :	**5-TAMRA SE** 5-Carboxytetramethylrhodamine succinimidyl ester (single isomer)
Catalog Number :	FP-67480A, 5mg
Structure / MW :	$C_{29}H_{25}N_3O_7$. : CAS: [150810-68-7] ; MW=527.5
Solubility:	Dark red solid soluble in DMSO or DMF
Absorption / Emission :	$\lambda_{exc}\backslash\lambda_{em}$ (MeOH) = 540/565 nm
Reactivity:	High and specific amine reactivity
Storage:	Store at -20°C and protect from light (M)



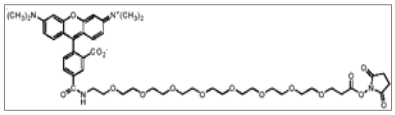
Name :	**6-TAMRA SE** 6-Carboxytetramethylrhodamine succinimidyl ester (single isomer)
Catalog Number :	FP-84634A, 5mg FP-CD6831, 100µl at 90mg/mL (0.17M) in anhydrous DMSO (6-TAMRA SE in DMSO)
Structure / MW :	$C_{29}H_{25}N_3O_7$; [150810-69-8] ; MW=527.5
Solubility:	Dark red solid soluble in DMSO or DMF
Absorption / Emission :	$\lambda_{exc}\backslash\lambda_{em}$ (MeOH) = 540/565 nm
Reactivity:	High and specific amine reactivity
Storage:	Store at -20°C and protect from light (M)



Name :	**5-TAMRA-X SE** 6-(Tetramethylrhodamine-5-(and-6)-carboxyamido)hexanoic acid, succinimidyl ester
Catalog Number :	FP-33406A, 1mg
Molecular Weight :	MW=640.69
Solubility:	Dark red solid soluble in DMSO or DMF
Absorption / Emission :	$\lambda_{exc}\backslash\lambda_{em}$ (MeOH) = 540/565 nm
Reactivity:	High and specific amine reactivity
Storage:	Store at -20°C and protect from light (M)

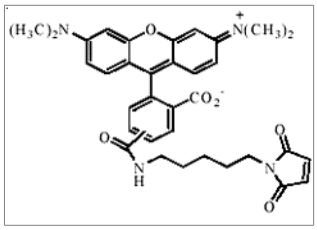


Name :	**5-TAMRA-PEO8 SE** 5-Carboxytetramethylrhodamine-PEO8-propionate succinimidyl ester
Catalog Number :	FP-CD6821, 1mg
Structure / MW :	$C_{48}H_{62}N_4O_{16}$; MW=951.02
Solubility:	Dark red solid soluble in DMSO or DMF
Absorption / Emission :	$\lambda_{exc}\backslash\lambda_{em}$ (MeOH) = 540/565 nm
Reactivity:	High and specific amine reactivity
Storage:	Store at -20°C and protect from light(M))

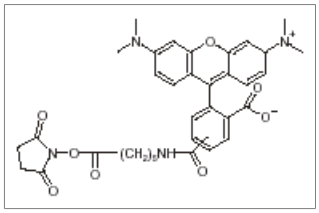


Name :	**5-TAMRA-PEO12 SE** 5-Carboxytetramethylrhodamine-PEO12-propionate succinimidyl ester
Catalog Number :	FP-CD6811, 1mg
Structure / MW :	$C_{56}H_{78}N_4O_{20}$; MW=1127.23
Solubility:	Dark red solid soluble in DMSO or DMF
Absorption / Emission :	$\lambda_{exc}\backslash\lambda_{em}$ (MeOH) = 540/565 nm
	High and specific amine reactivity
	Store at -20°C and protect from light, especially in solution (M)

Name :	**5(6)-TAMRA-C5-maleimide**
Catalog Number :	5(6)-Carboxytetramethylrhodamine-C5-maleimide FP-AM381A, 5mg
Structure / MW :	$C_{34}H_{34}N_4O_6$; MW=594.66
Solubility:	Red solid soluble in DMF or DMSO (>10mg/ml).
Absorption / Emission :	$\lambda_{exc}\backslash\lambda_{em}$ (MeOH) = 540/565 nm EC : 61 000
Reactivity:	High and specific thiol reactivity
Storage:	Store at -20°C and protect from light (M)



Name :	**TAMRA-MTS**
Catalog Number :	MethaneThioSulfonate-CarboxyTetraMethylRhodamine FP-60222A, 1mg
Structure / MW :	$C_{28}H_{29}N_6O_6S_2$.; MW=567.69
Solubility:	Soluble in DMF or DMSO
Absorption / Emission :	$\lambda_{exc}\backslash\lambda_{em}$ (MeOH) = 540/565 nm
Reactivity:	High and specific thiol reactivity
Storage:	Store at -20°C and protect from light(M)



Ordering information

Related products

- Desalting tools: Gelfiltration columns UP84874, UptiSpin Concentrators, CelluSep dialysis tubings
- FluoProbes®547-SE (#FP-AK773), a great alternative to TAMRA that has brighter and more stable fluorescence λexc./λem.: 557/574nm

Catalog size quantities and prices may be found at http://www.fluoprobes.com
Please inquire for higher quantities (availability, shipment conditions).

For any information, please ask : FluoProbes® / Interchim; Hotline : +33(0)4 70 03 73 06

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LIFE SCIENCES interchim 211 bis, avenue JF Kennedy BP 1140 - 03100 Montluçon Fax +33 4 70 03 82 60 Hotline +33 4 70 03 73 06 • interbiotech@interchim.com