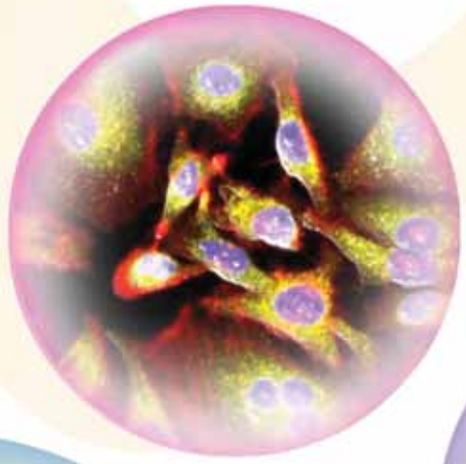
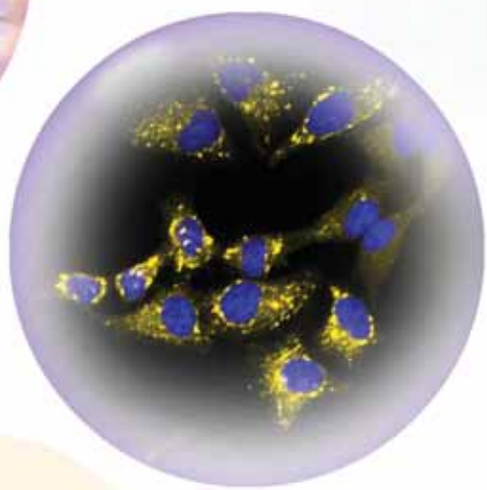
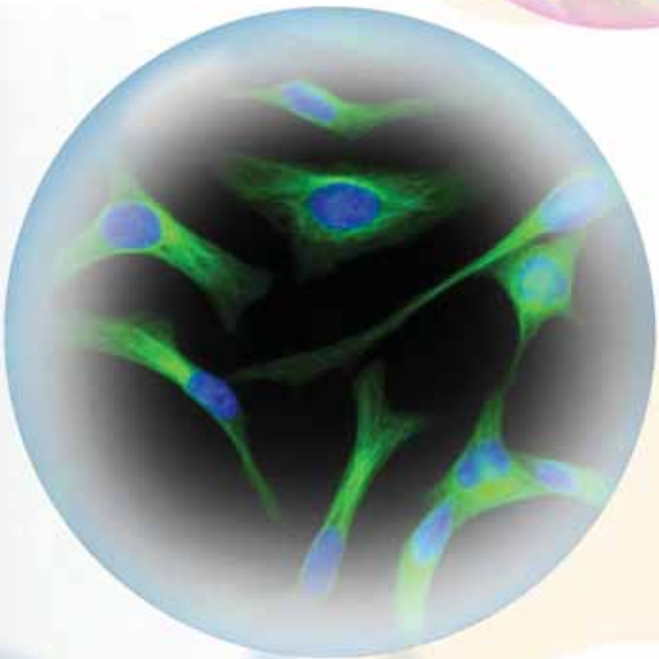
Fluorescent Dyes & Probes

Product Catalog

www.bioacts.com

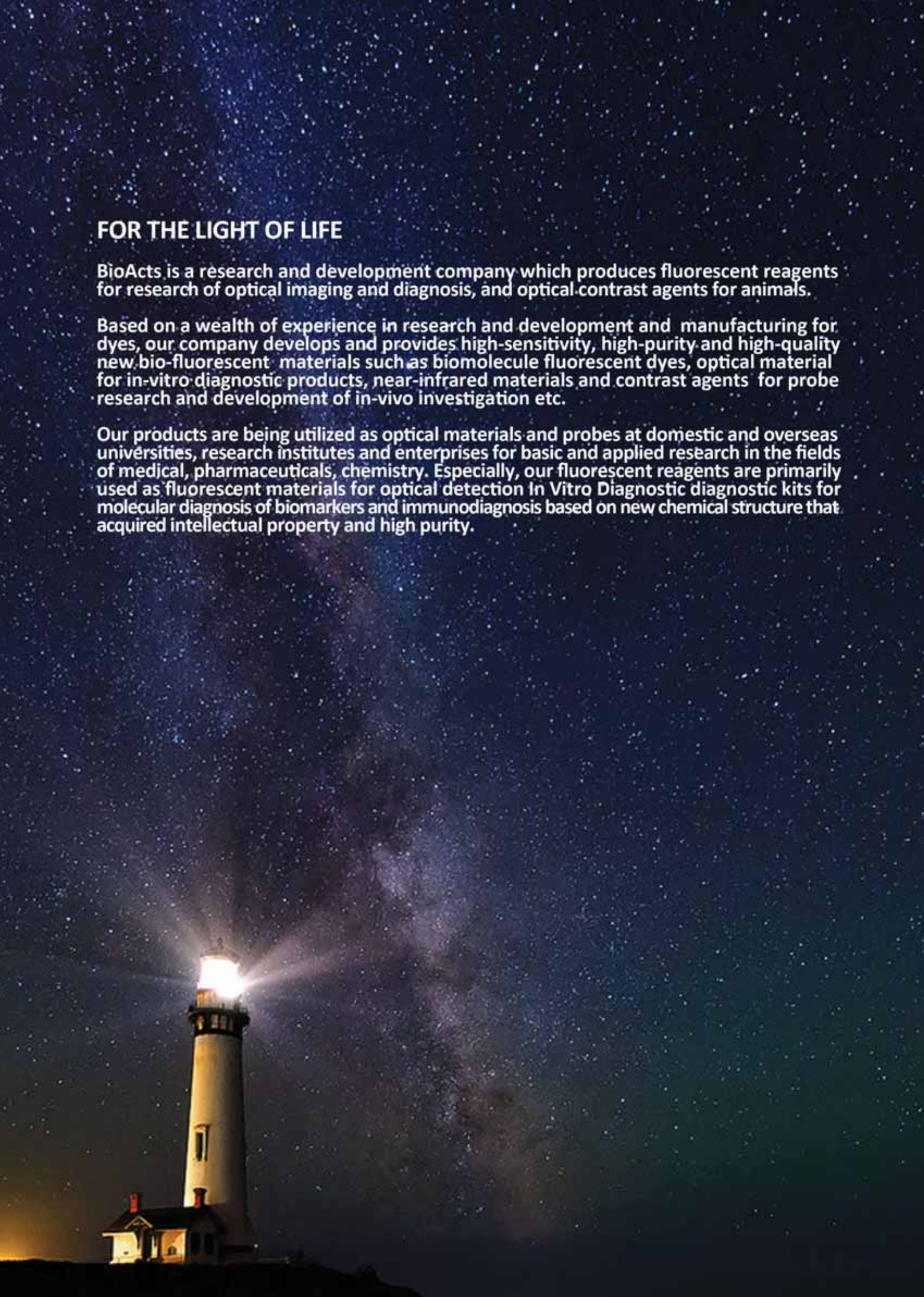






- Biochemical Labeling
- Cell Analysis
- In Vivo Imaging
- Nucleic Acid Labeling
- IVD Materials
- Fluorescent Labeling Service

BioActs



FOR THE LIGHT OF LIFE

BioActs is a research and development company which produces fluorescent reagents for research of optical imaging and diagnosis, and optical contrast agents for animals.

Based on a wealth of experience in research and development and manufacturing for dyes, our company develops and provides high-sensitivity, high-purity and high-quality new bio-fluorescent materials such as biomolecule fluorescent dyes, optical material for in-vitro diagnostic products, near-infrared materials and contrast agents for probe research and development of in-vivo investigation etc.

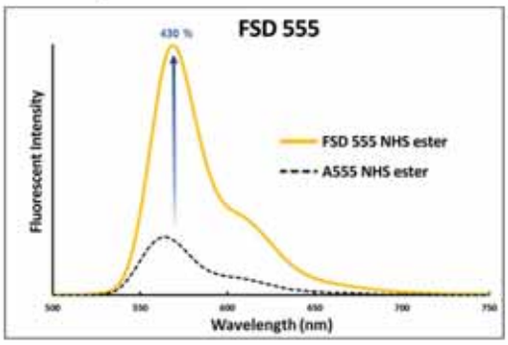
Our products are being utilized as optical materials and probes at domestic and overseas universities, research institutes and enterprises for basic and applied research in the fields of medical, pharmaceuticals, chemistry. Especially, our fluorescent reagents are primarily used as fluorescent materials for optical detection In Vitro Diagnostic diagnostic kits for molecular diagnosis of biomarkers and immunodiagnosis based on new chemical structure that acquired intellectual property and high purity.

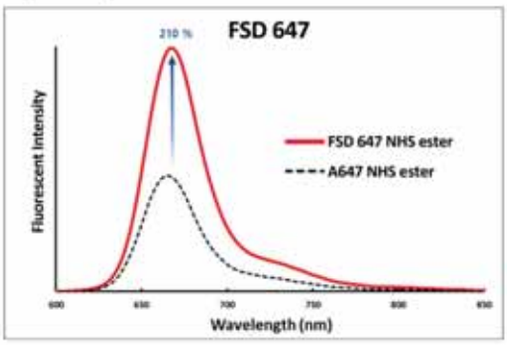
Novel Fluorescent Dyes!
FSD Fluor™ Dyes

- Unparalleled Fluorescent Performance
- Highest Quantum Yield in Life
- Wide Range of Reactive Group

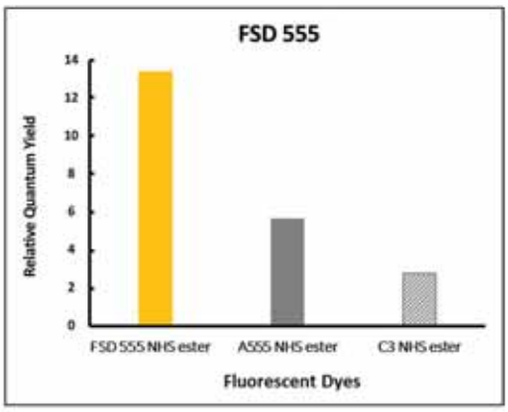
FSD 488 FSD 555 FSD 594 FSD 647 FSD 750 FSD 800
NHS ester/Maleimide/Vinylsulfone
Amine/Thiol/Carboxylate

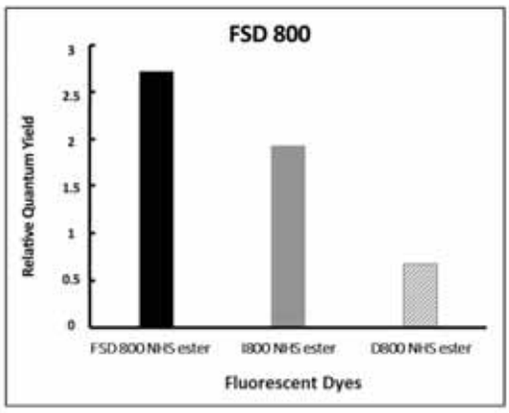
• Comparison of Fluorescent Intensity of Dyes



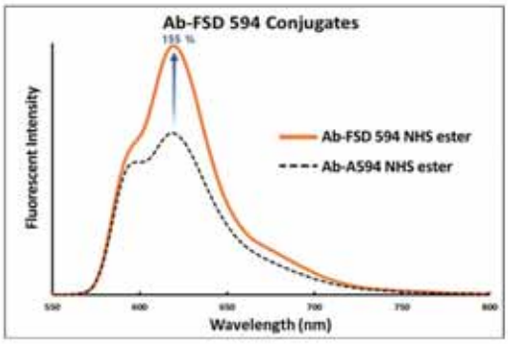


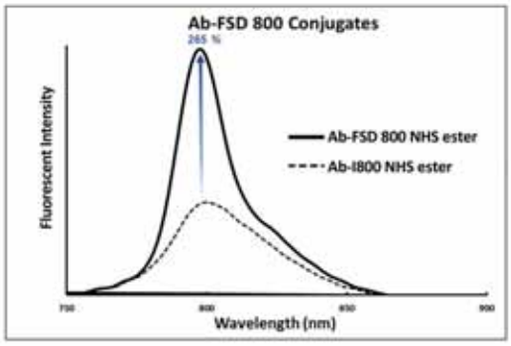
• Comparison of Relative Quantum Yield of Dyes



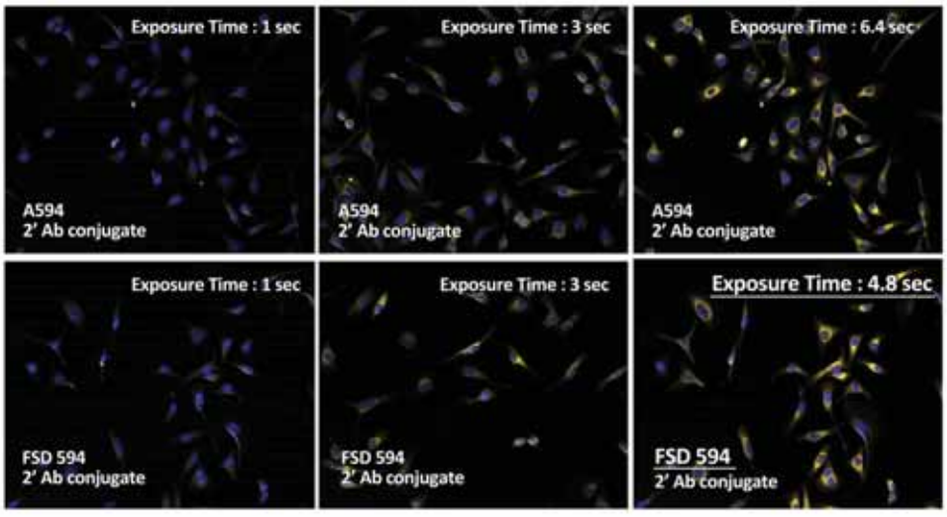


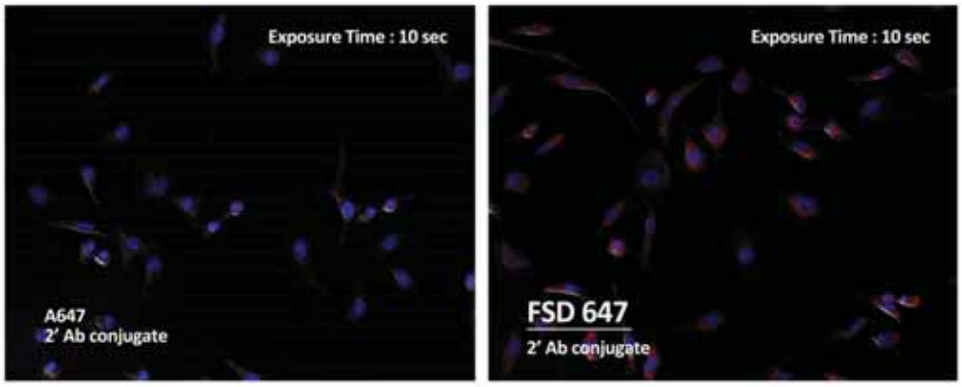
• Comparison of Fluorescent Intensity of Dye-Antibody Conjugates





• Comparison of Immunofluorescent of Dye-Antibody Conjugates





• Full Spectrum

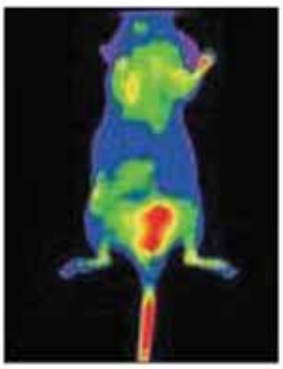
FSD Fluor™	λ_{Ex} (nm)	λ_{Em} (nm)	Excitation Laser Line	Replacement for
FSD 488	495	519	488 nm Laser	A488, C2, D488
FSD 555	552	565	488, 532 nm Laser	A555, C3, D549
FSD 594	593	617	561, 594 nm Laser	A594
FSD 647	650	667	594, 663 nm Laser	A647, C5, D649
FSD 750	749	774	680, 785 nm Laser	A750, C7, D750
FSD 800	774	790	785 nm Laser	A790, D800, I800

• Types of Reactive Groups and Corresponding Targets

Reactive FSD Fluor™	Corresponding Target	Functionalized FSD Fluor™
NHS ester	Amine ($-NH_2$)	Carboxylic acid
Sulfo-NHS ester		Amine
Vinylsulfone		Thiol
Isothiocyanate		**Click-Chemistry FSD Fluor™**
Maleimide	Thiol (-SH)	Alkyne
Hydrazide	Aldehyde (-CHO) Ketone (>C=O) Hydroxyl Group (-OH)	PEG4-Alkyne
Dichlorotriazine		ADIBO

Flamma® NIR Fluors Dyes

Flamma® NIR Fluors series of BioActs are near -infrared fluorescent dyes for animal imaging and these are brighter and have high water solubility and low toxicity. Flamma® NIR fluors series, which consist of various fluorescent substances that have fluorescent wavelength of 700 nm-800 nm, provide many options of reactive group and functional group besides NHS ester and maleimide.



• BioActs' Near InfraRed Fluorescent Products

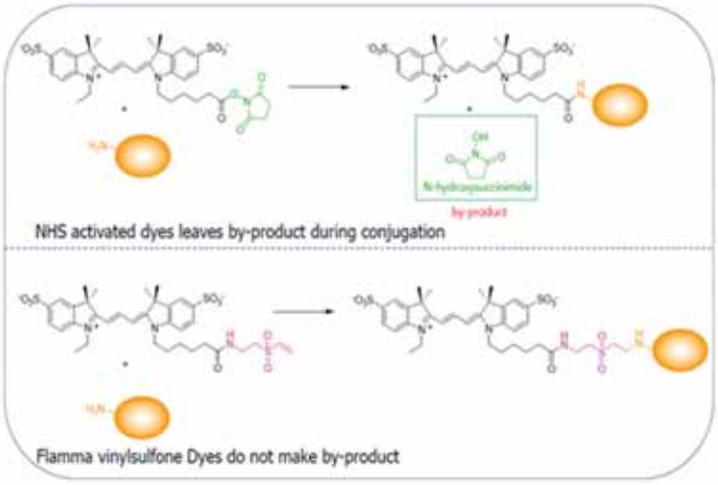
Flamma® Fluors	λ_{Ex} (nm)	λ_{Em} (nm)	Excitation Laser Line	Replacement for
Flamma® 648	648	672	663,635 or 640 nm Laser	A647, C5, D649, C 647, A647N
Flamma® 675	675	698	680 or 685 nm Laser	A680, C5.5, D690, C690, I680LT
Flamma® 749	750	782	680,685 or 750 nm Laser	A750, C7, D750, C750, I750
Flamma® 774	777	802	785 nm Laser	C7.5, C770
Flamma® 800	795	817	785 nm Laser	A790, D800, C790, I800CW

• Flamma®NIR Fluors Application

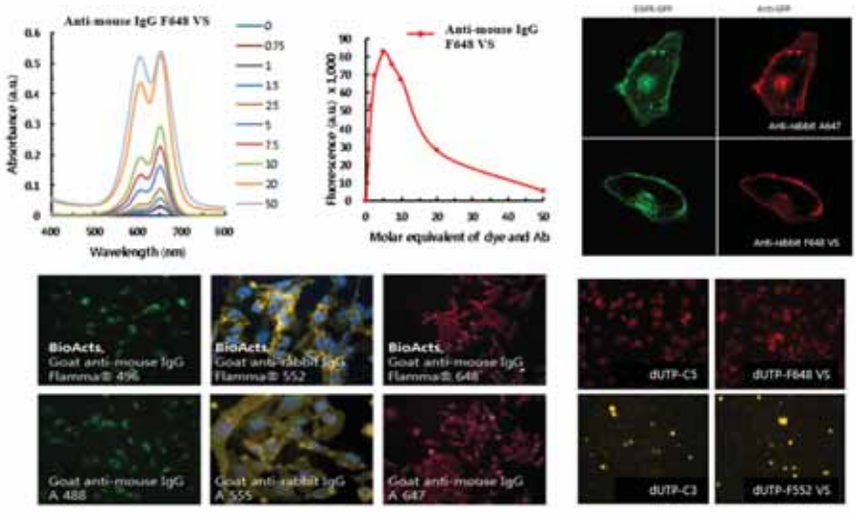
Reactive Flamma® NIR Fluors	Reactive target group	Functionalized Flamma® NIR Fluors
Flamma® NIR Fluors NHS ester	Amine (-NH_2)	Flamma® NIR Fluors Carboxylic acid
Flamma® NIR Fluors Sulfo-NHS ester		Flamma® NIR Fluors Amine
Flamma® NIR Fluors Vinylsulfone		Flamma® NIR Fluors Thiol
Flamma® NIR Isothiocyanate		**Click-Chemistry Flamma® NIR Fluors**
Flamma® NIR Maleimide	Thiol (-SH)	Flamma® NIR Fluors Alkyne
Flamma® NIR Hydrazide	Aldehyde , Ketone & Hydroxyl Group	Flamma® NIR Fluors PEG4-Alkyne
Flamma® NIR Dichlorotriazine		Flamma® NIR Fluors ADIBO

Flamma® Vinylsulfone Dyes

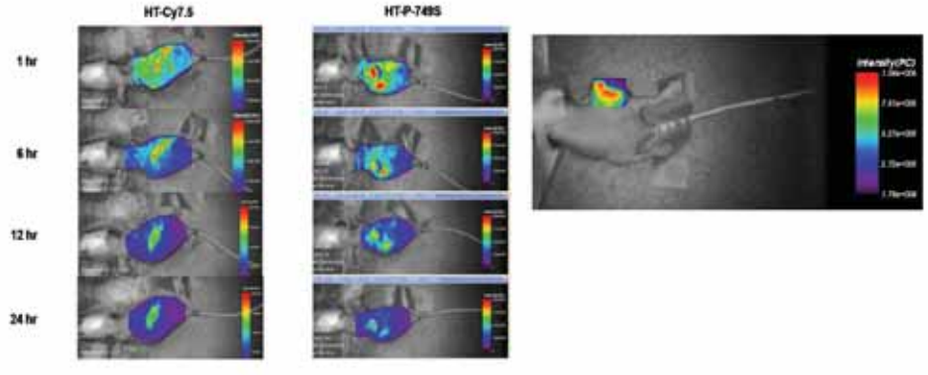
No by-products after conjugation reaction



Protein/Antibody conjugation



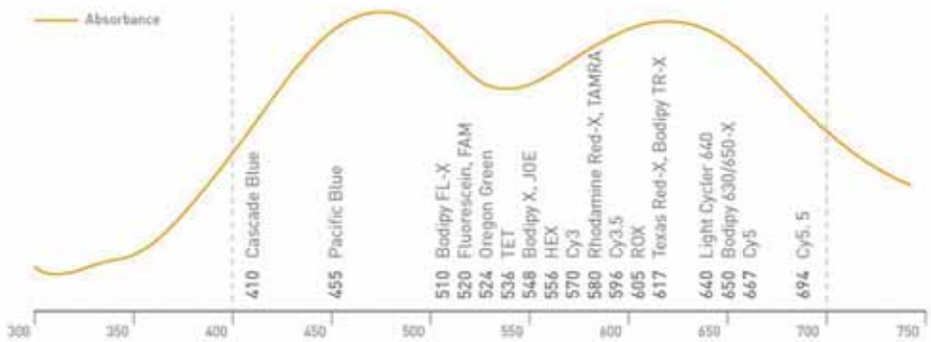
In vivo imaging



qFlamma® Black01

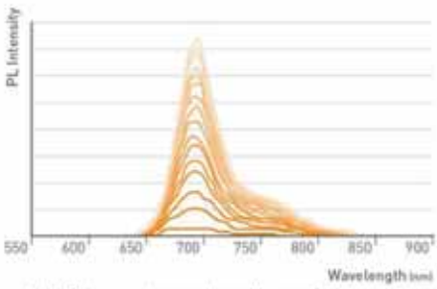
- **Universal water-soluble quenchers**
- **Wide quenchable range : 400 - 700 nm**
- **High molecular absorption coefficient**

- **Absorption spectra of the qFlamma® Black01 dyes**



- **Fluorogenic Enzyme Activity Assays**

Flamma® 675 + MMP* + qFlamma® Black01 Enzyme test



* MMP is a protease cleavable peptide

- **Various Reactive Hands**

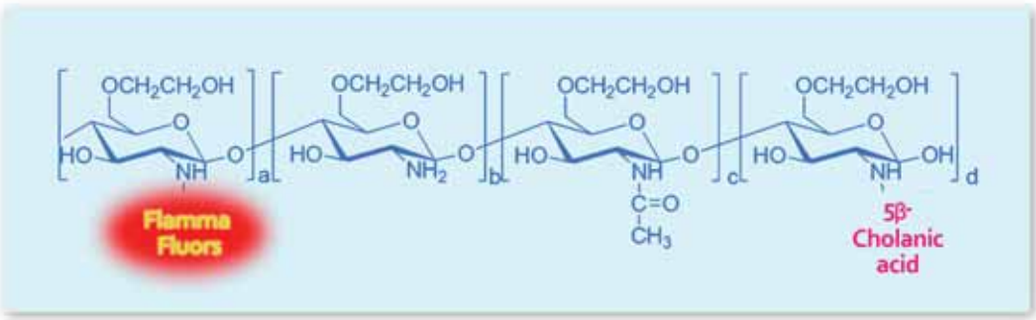
Reactive Hands	Reactive Moieties
Vinylsulfone	NH_2
NHS ester	NH_2
Maleimide	SH
Dichlorotriazine	OH
Isothiocyanate	NH_2
Hydrazide	Aldehyde, Ketone
Carboxylic acid	NH_2
Amine	COOH
Azide, Alkyne	Click chemistry
Cyclooctyne	Click chemistry
Hydrophobic dye	Hydrophobicity
Amidite	5' OH on Nucleotide

NpFlamma® Series

◉ NpFlamma® HGC series

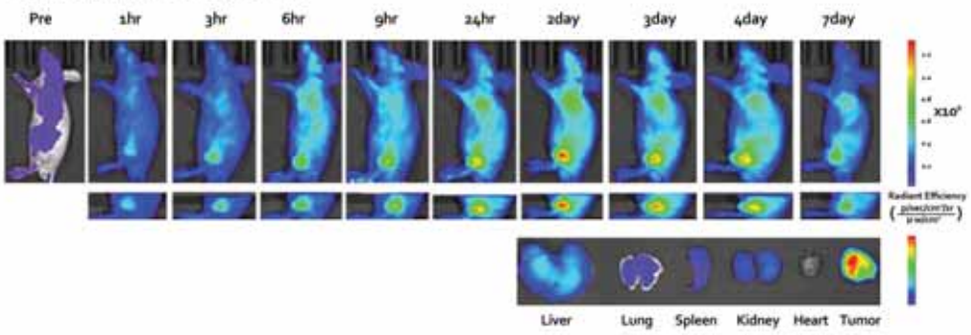
- NIR fluorescent probes for In vivo imaging
- Drug delivery carrier for cancer treatment
- Targets highly vascularized tissue
- Accumulated at tumor tissues much more efficiently than water-soluble linear polymers or polystyrene beads
- Low toxicity, long half-life, high stability

Np Flamma®HGC-675

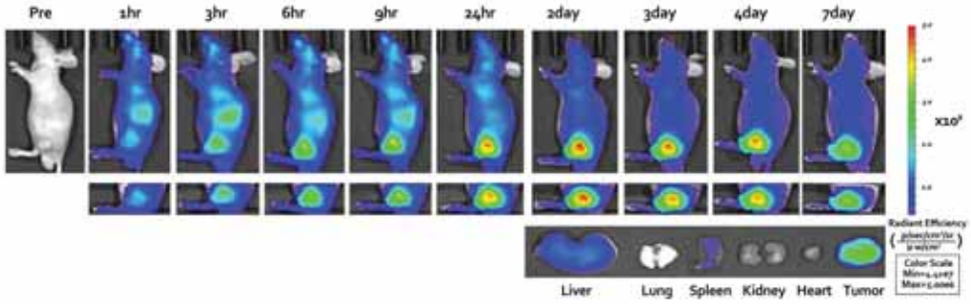


In vivo and *Ex vivo* imaging

NpFlamma® HGC 648



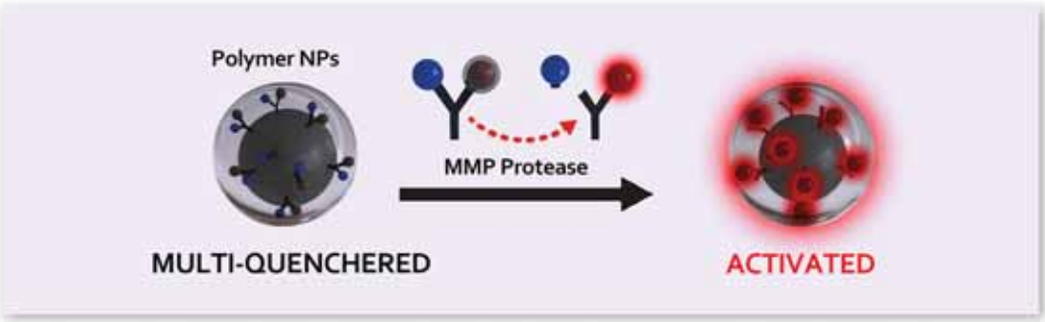
NpFlamma® HGC 749



In vivo imaging using Npflamma®HGC series by IVIS Spectrum

NpFlamma® MMP series

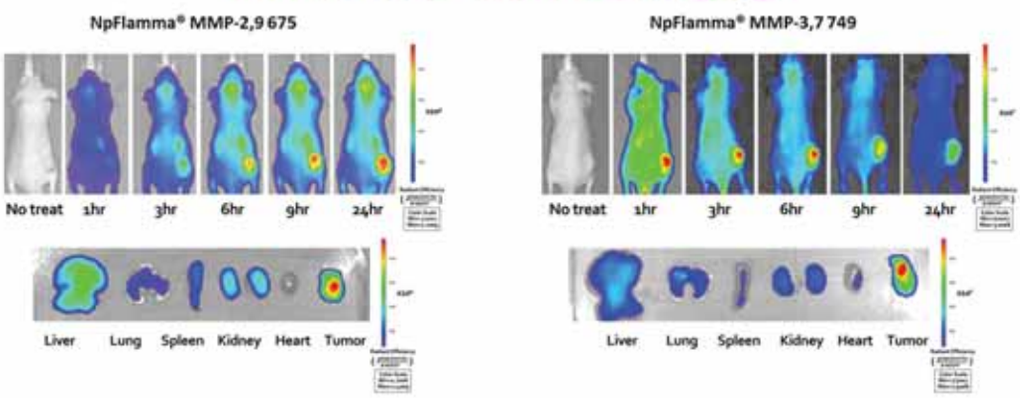
- MMP tracing fluorescent probes which contain MMP specific cleavable peptide, labeled with fluorescent dye and quencher for FRET
- Generates fluorescent according to the absolute volume of MMP
- Optical imaging of the tissues where MMP is over-expressed



Product Information

NpFlamma®MMP series	Ex_{Max}(nm)	Em_{Max}(nm)	Common filter set	Excitation laser line
NpFlamma® MMP-2,9 648	648	663	Cy®5	594, 633 nm
NpFlamma® MMP-2,9 675	675	691	Cy®5.5	680 nm
NpFlamma® MMP-2,9 749	749	774	Cy®7	785 nm
NpFlamma® MMP-2,9 774	774	800	Cy®7.5	785 nm
NpFlamma® MMP-3,7 ICG	785	812	Cy®7.5	785 nm
NpFlamma® MMP-3,7 648	648	663	Cy®5	594, 633 nm
NpFlamma® MMP-3,7 675	675	691	Cy®5.5	680 nm
NpFlamma® MMP-3,7 749	749	774	Cy®7	785 nm
NpFlamma® MMP-3,7 774	774	800	Cy®7.5	785 nm
NpFlamma® MMP-13 ICG	785	812	Cy®7.5	785 nm
NpFlamma® MMP-13 648	648	663	Cy®5	594, 633 nm
NpFlamma® MMP-13 675	675	691	Cy®5.5	680 nm
NpFlamma® MMP-13 749	749	774	Cy®7	785 nm
NpFlamma® MMP-13 774	774	800	Cy®7.5	785 nm
NpFlamma® MMP-2,9 ICG	785	812	Cy®7.5	785 nm

In vivo and *Ex vivo* Imaging



In vivo imaging using Npflamma®MMP series by IVIS Spectrum

ApoFlamma® Series

The ApoFlamma® series are composed of low molecular weight peptides and fluorescent dyes of various wavelengths. Intended for apoptosis detection, the ApoFlamma® series effectively bind to apoptotic cells In vitro and In vivo

- **ApoFlamma® PS series**

Phosphatidyl serine recognizing apoptosis detection probe

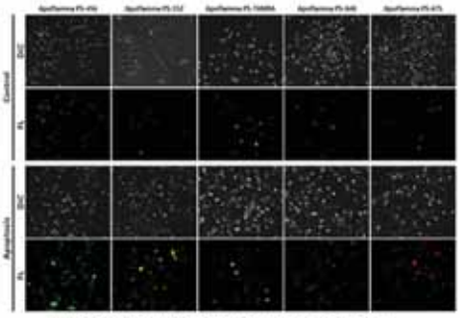
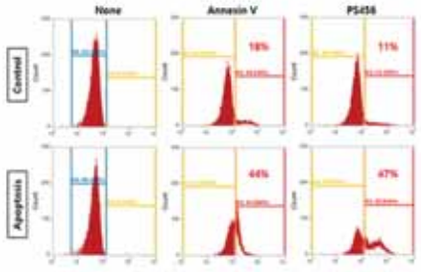


Image observation for inside of ApoFlamma® PS series cell



Analysis and detection of ApoFlamma® PS 456, Annexin V, Flow Cytometry

- **ApoFlamma® H series**

Histone H1 recognizing apoptosis detection probe

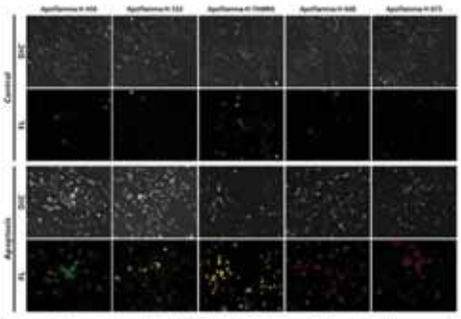
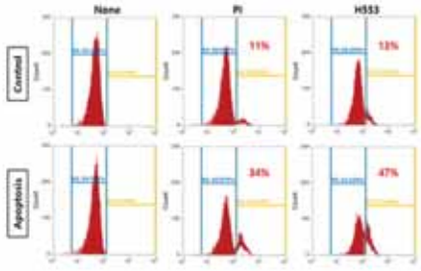
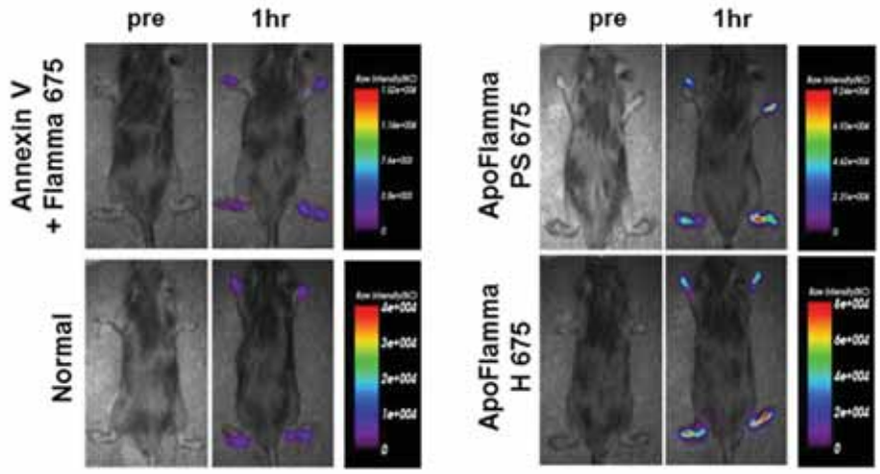


Image observation for inside of ApoFlamma® H series cell



Analysis and detection of ApoFlamma® H 553, PI, Flow Cytometry

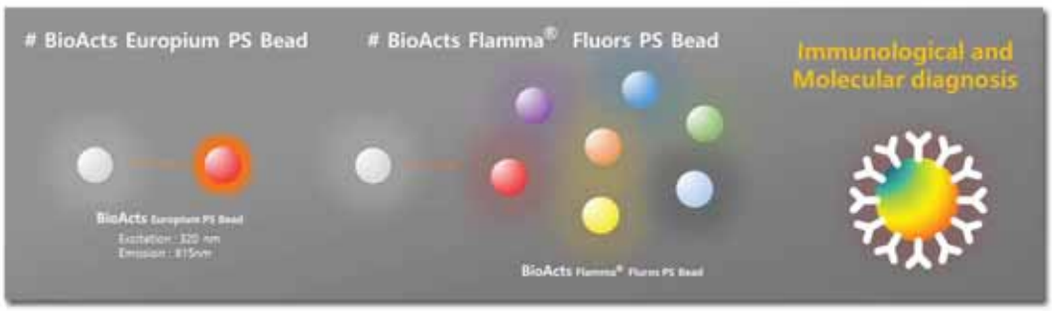
- **In vivo imaging**



Imaging Apoptosis process of rheumatoid using ApoFlamma® product

Flamma® Fluors Bead

- Size standards and count control particles
- Dyes and fluorescent particles
- Clinical diagnostic and special application particles



- Flamma® Fluors PS Bead Series can be easily attached to antibody/ antigen and can be utilized in various researches with its bright light
- Because PS Bead Flamma® Fluors has ample carboxylic acid on the surface of Bead, it can be utilized in various researches by using carbodiimide reagents such as EDC at biomolecules that have protein or amine group

◉ Customizing service

Flamma® Fluor	λ_{Ex} (nm)	λ_{Em} (nm)	Excitation Laser Line (nm)
Flamma® 405	403	455	UV
Flamma® 456	495	522	488 nm Laser
FAM	494	523	488 nm Laser
Flamma® 507	507	532	488 nm Laser
Flamma® 530	530	558	532 nm Laser
Flamma® 552	551	570	532, 543, 546, 555 or 568 nm Laser
Flamma® 553	554	584	532, 543, 546, 555 or 568 nm Laser
TAMRA	560	589	532, 543, 546, 555 or 568 nm Laser
Flamma® 575	578	606	532, 543, 546, 555 or 568 nm Laser
Flamma® 581	578	595	532, 543, 546, 555 or 568 nm Laser
Flamma® 648	648	672	633, 635 or 640 nm Laser

Flamma® Fluor	λ_{Ex} (nm)	λ_{Em} (nm)	Excitation Laser Line (nm)
Flamma® 675	675	698	680 or 685 nm Laser
Flamma® 749	750	782	680 or 685 nm Laser
Flamma® 774	777	802	785 nm Laser
Flamma® 800	795	817	785 nm Laser

#BioActs Full Spectrum Fluorescent Dye

Bead information	Size
PS Bead COOH	100 nm
PS Bead COOH	200nm
PS Bead COOH	300nm
PS Bead COOH	500nm
PS Bead COOH	1um
PS Bead COOH	5um
PS Bead COOH	10um
PS Bead COOH	100um
PS Bead COOH	200um
PS Bead (Calibration)	7um
PS Bead (Calibration)	15um

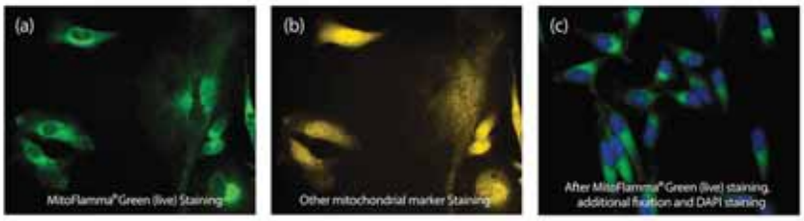
#Bead size

Cell staining probes

◉ Live Cell Imaging

MitoFlamma® Green (Live)

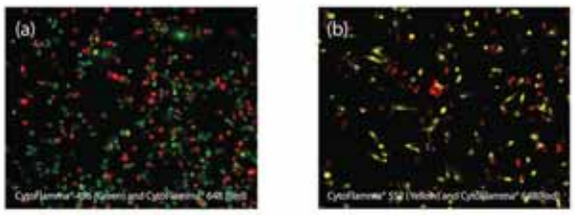
- Specific detection of mitochondria in living cells
- Tracking of mitochondrial alterations
- Persistent fluorescent after cell fixation



Comparison of MitoFlamma® Green (live) with other mitochondrial marker.

CytoFlamma® Cell-membrane (Live)

- Low-toxicity hydrophobic dyes
- Tracking of cell fusion, attachment and migration



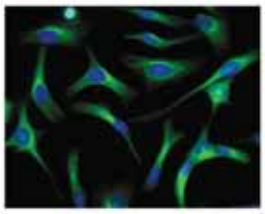
Cell cultivation after staining HeLa cell treated with CytoFlamma® series.

◉ Fluorescent Secondary Antibody

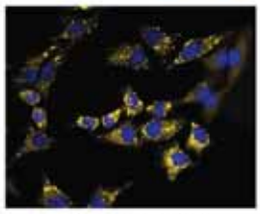
Fluorescent dye Conjugated Secondary Antibodies

- Specific secondary fluorescent antibody
- Wide range of applications
- Brighten fluorescent signal & photostability

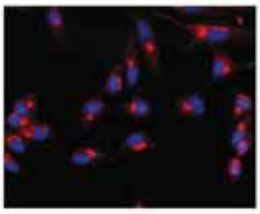
Immunofluorescent Imaging of Cell Organelles



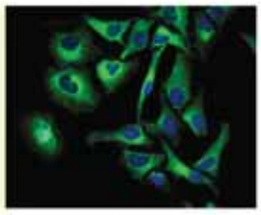
Tubulin



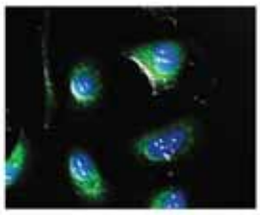
Mitochondria



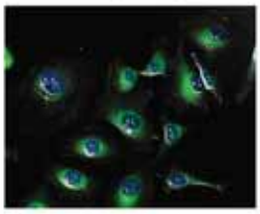
Golgi body



Autophagosome



Peroxisome



Endoplasmic Reticulum

Terms and Conditions of Sales

Price and Sales Tax
The price of the product as indicated in the homepage excludes all shipping and handling costs. The purchaser is solely responsible for any applicable sales, use, or similar tax and agrees to indemnify BioActs for any such tax if not properly paid by it.

Shipping
BioActs reserves the right to select the packaging and shipping method for the order, which will ensure the stability of the product as well as efficient tracing. Any damage during shipment is covered by the warranty provided herein. Title to the goods, as well as the risk of loss of the goods, passes when the goods are placed with the shipper.

Designated use and Prohibition of Resale
The product is sold for laboratory research use only, for the exclusive use of the purchaser and therefore may not be resold.

Returns Policy
Products may be returned by the purchaser within 10 days of receipt, provided that the vial(s) have not been opened, broken or otherwise altered. When the returned product is received by BioActs, the purchaser will be credited for 80% of the product's price. The purchaser should send product's back using his FedEX or etc. courier account and contact BioActs prior to shipping to receive the specific shipping information.

Limited Warranty
The Certificate of Analysis for the product, which is attached to the product, reflects its specifications, applications and conditions for use of the product. BioActs reserves the right to change the content of the Certificate of Analysis without prior notification. All products supplied by BioActs are warranted to meet the published specifications when used under normal conditions in an adequate laboratory.
BioActs does not make any other warranty or representation whatsoever, whether expressed or implied. In particular, BioActs does not make any warranty of suitability, non-infringement, merchantability or fitness for a particular purpose of any product.

Remedies and Limitations
Should any product fail to perform as warranted or for any other claims arising from or related to the purchase of BioActs's products, BioActs's liability and the purchaser's remedy are strictly limited to the purchase price or replacement, at BioActs's sole discretion, of the product.
The above referred remedy shall be the sole and exclusive remedy to the exclusion of any and all other remedies including, without limitation, claims for indirect or consequential damages.

Indemnification
The purchaser agrees to indemnify, defend and hold BioActs, its directors, officers, shareholders, employees, representatives and assignees (collectively, "Affiliates") harmless from and against any and all costs, liabilities, losses, and expenses resulting from any claim, suit action, or proceeding brought by any third party against BioActs or its Affiliates alleging or arising from or related to any breach of these Terms & Conditions by the purchaser.

Choice of Law and Jurisdiction
These Terms and Conditions will be governed by the Korean law. The competent courts in Incheon, Korea, will have exclusive jurisdiction on any dispute regarding the interpretation of these Terms and Conditions or other claims regarding the order.

Miscellaneous
These Terms and Conditions reflect the entire understanding and agreement between BioActs and the purchaser with respect to the purchase of the product(s).

DK Tower 10F, 595beon-gil 9, Cheongneung-daero, Namdong-gu, Incheon, Korea, 21666
Product Support : support@bioacts.com
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Technical Support : technical@bioacts.com
B2B : ivd@bioacts.com

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II. SERVICE

I. PRODUCT

For the Light of Life

Biochemical Labeling

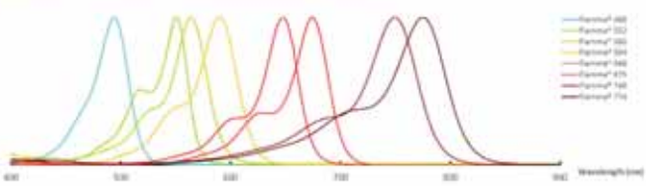
Flamma® Fluors

As Flamma® Fluors, which is a Fluorescent dye products group developed by a leading Fluorescent technology of BioActs, is equipped with fluorescent substance line-up which can cover full spectral range from UV to NIR with its brighter Fluorescent performance, it is compatible with optical conditions of most of fluorescent equipment. Along with this, it also provides a wide range of research applications with a variety of selectable options for reactive group and functional group.

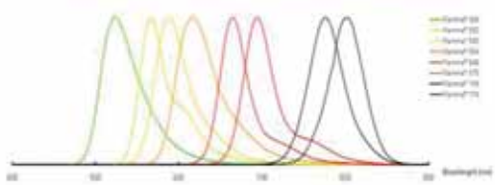
Flamma® Fluorophore

Flamma® Fluor	λ_{Ex} (nm)	λ_{Em} (nm)	Excitation Laser Line	Replacement for
Flamma® 406	401	434	UV	A405, Cascade Blue®, D405, C405, Pacific Blue®
Flamma® 496	496	516	488 nm Laser	FAM, FITC, Fluorescein
Flamma® 488	495	519	488 nm Laser	A488, C2, D488, C488, A488
Flamma® 552	550	565	532, 543, 546, 555 or 568 nm Laser	A555, C3, D549, C488, A488
Flamma® 553	554	584	532, 543, 546, 555 or 568 nm Laser	A546, TRITC
Flamma® 560	560	589	532, 543, 546, 555 or 568 nm Laser	A568, C568, A565, TRITC
Flamma® 648	648	663	663, 635, or 640 nm Laser	A647, C5, D649, C647, A647N
Flamma® 675	675	691	680 or 685 nm Laser	A680, C5.5, D680, C680, I680LT
Flamma® 749	749	774	680, 685, or 750 nm Laser	A750, C7, D750, C750, I750
Flamma® 774	774	806	785 nm Laser	C7.5, C770
Flamma® 800	775	795	785 nm Laser	A790, D800, C790, I800CW

Flamma® Fluors Absorbance Spectra



Flamma® Fluors Emission Spectra



Flamma® Fluors Application

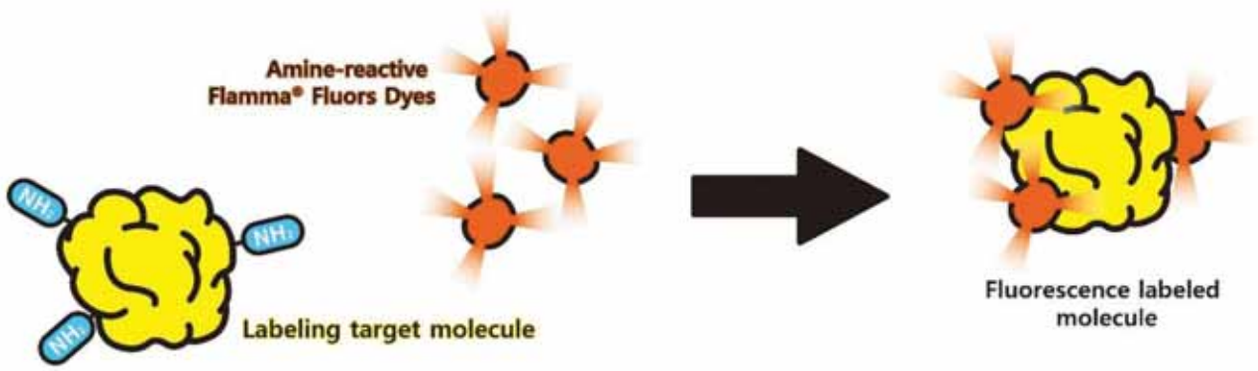
Reactive Flamma® Fluors	Reactive target group
Flamma® Fluors NHS ester	Amine (-NH_2)
Flamma® Fluors Sulfo-NHS ester	
Flamma® Fluors Vinylsulfone	
Flamma® Fluors Isothiocyanate	

Functionalized Flamma® Fluors
Flamma® Fluors Carboxylic acid
Flamma® Fluors Amine
Flamma® Fluors Thiol
Click-chemistry Flamma® Fluors

Flamma® Fluors Maleimide	Thiol (-SH)	Flamma® Fluors Alkyne
Flamma® Fluors Hydrazide	Aldehyde, ketone & hydroxyl group	Flamma® Fluors PEG4-Alkyne
Flamma® Fluors Dichlorotriazine		Flamma® Fluors ADIBO

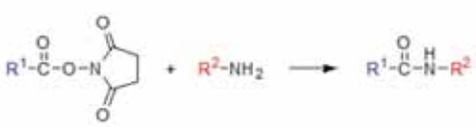
Labeling Amine

Amine-reactive labeling method is the most commonly used method for labeling a variety of biomolecules besides proteins and peptides, and it is utilized in various imaging and production of probes for analysis purpose.
Flamma® Fluors is for labeling amine and offers reactive functional options of NHS ester, Vinylsulfone, and Isothiocyanate, or unreactive functional group option of carboxyl group.



Flamma® Fluors NHS ester/sulfo-NHS ester

NHS ester reactive group is the most typical reactive group for labeling amine, and it reacts to primary amine group rapidly and specifically under the basic environment higher than pH 8.0. Flamma® Fluors NHS ester is required to be dissolved in an organic solvent such as DMSO or DMF prior to be added to aqueous solution. On the other hand, Flamma® Fluors Sulfo-NHS ester can be added directly to the reaction solution due to its higher water solubility than Flamma® Fluors NHS ester's. Because functional groups of NHS ester and Sulfo-NHS ester are unstable in aqueous solution, products of Flamma® Fluors NHS ester and Flamma® Fluors Sulfo-NHS ester should be in a lyophilized form or in the form of dissolution in organic solvent such as DMF or DMSO and stored at -20 °C.

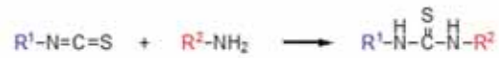


Cat. No.	Product name	Emission color	Ex_{Max} (nm)	Em_{Max} (nm)	Common filter set	Excitation laser line	Size
CWS1001	Flamma® 496 NHS ester	Green	496	516	FITC	488 nm	1mg, 5mg, 25mg
PWS1122	Flamma® 552 NHS ester	Yellow	550	565	TRITC	488, 532 nm	1mg, 5mg, 25mg
PWS1415	Flamma® 581 NHS ester	Orange	581	596	TRITC	532 nm	1mg, 5mg, 25mg
PWS1215	Flamma® 648 NHS ester	Red	648	663	Cy®5	594, 633 nm	1mg, 5mg, 25mg
PWS1515	Flamma® 675 NHS ester	Far red	675	691	Cy®5.5	633, 680 nm	1mg, 5mg, 25mg

PWS1301	Flamma® 749 NHS ester	NIR	749	774	Cy®7	680 nm	1mg, 5mg, 25mg
PWS1603	Flamma® 774 NHS ester	NIR	774	806	Cy®7.5	785 nm	1mg, 5mg, 25mg
CWSN1001	Flamma® 496 Sulfo-NHS ester	Green	496	516	FITC	488 nm	1mg, 5mg, 25mg
PWSN1122	Flamma® 552 Sulfo-NHS ester	Yellow	550	565	TRITC	488, 532 nm	1mg, 5mg, 25mg
PWSN1415	Flamma® 581 Sulfo-NHS ester	Orange	581	596	TRITC	532 nm	1mg, 5mg, 25mg
PWSN1215	Flamma® 648 Sulfo-NHS ester	Red	648	663	Cy®5	594, 633 nm	1mg, 5mg, 25mg
PWSN1515	Flamma® 675 Sulfo-NHS ester	Far red	675	691	Cy®5.5	633, 680 nm	1mg, 5mg, 25mg
PWSN1301	Flamma® 749 Sulfo-NHS ester	NIR	749	774	Cy®7	680 nm	1mg, 5mg, 25mg
PWSN1603	Flamma® 774 Sulfo-NHS ester	NIR	774	806	Cy®7.5	785 nm	1mg, 5mg, 25mg

Flamma® Fluors Isothiocyanate

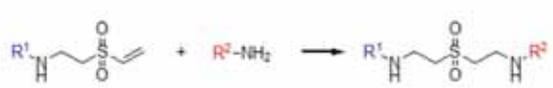
Isothiocyanate reactive group is a widely used reactive group that reacts to amine group or thiol group depending on the conditions.



Cat. No.	Product name	Emission color	Ex_{Max} (nm)	Em_{Max} (nm)	Common filter set	Excitation laser line	Size
PWI1001	Flamma® 496 Isothiocyanate	Green	496	516	FITC	488 nm	1mg, 5mg, 25mg
PWI1122	Flamma® 552 Isothiocyanate	Green	550	565	TRITC	488, 532 nm	1mg, 5mg, 25mg
PWI1415	Flamma® 581 Isothiocyanate	Orange	581	596	TRITC	532 nm	1mg, 5mg, 25mg
KWI1215	Flamma® 648 Isothiocyanate	Red	648	663	Cy®5	594, 633 nm	1mg, 5mg, 25mg
KWI1515	Flamma® 675 Isothiocyanate	Far red	675	691	Cy®5.5	633, 680 nm	1mg, 5mg, 25mg
PWI1308	Flamma® 749 Isothiocyanate	NIR	749	774	Cy®7	680 nm	1mg, 5mg, 25mg
PWI1603	Flamma® 774 Isothiocyanate	NIR	774	806	Cy®7.5	785 nm	1mg, 5mg, 25mg

Flamma® Fluors Vinylsulfone

Flamma® Vinylsulfone Dyes are highly stable and reactive fluorescent dyes in aqueous solution. It's been developed for many



application such as bio-imaging and labeling with various biomolecules. Flamma® Vinylsulfone Dyes have a unique reactor of BioActs, which is based on leading synthesis technology, so it can react quickly to Amine, Hydroxyl, Thiol group of biomolecules (Proteins, Sugars, Antibodies, Nucleotide, etc.). Also, it does not produce byproducts when reacting, so additional refinement procedure is not require. Since product's purity is high, it's stable to light, temperature, pH condition. Since Flamma® Vinylsulfone Dyes has excellent stability and reactivity in aqueous solution, it can be used for long-time research.

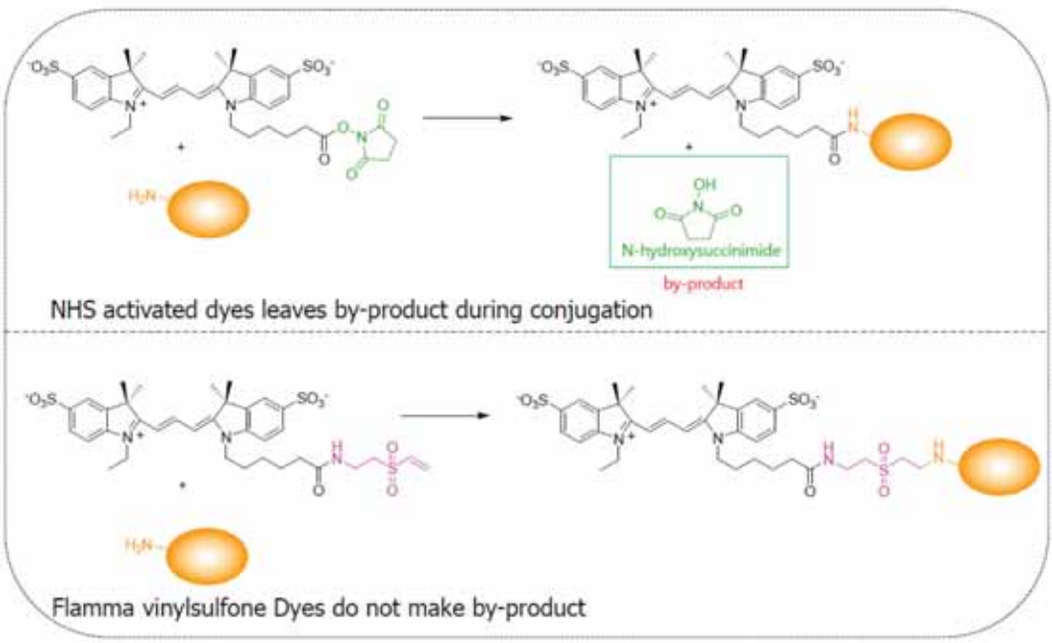
Flamma® Vinylsulfone Dyes has wide range of spectrum, and can be used in most of fluorescent equipment and applied research.

Cat. No.	Product name	Emission color	Ex_{Max} (nm)	Em_{Max} (nm)	Common filter set	Excitation laser line	Size
CWA1002	Flamma® 488 Vinylsulfone	Green	495	519	FITC	488 nm	1mg, 5mg, 25mg
CWA1001	Flamma® 496 Vinylsulfone	Green	496	516	FITC	488 nm	1mg, 5mg, 25mg
PWA1122	Flamma® 552 Vinylsulfone	Yellow	550	565	TRITC	488, 532 nm	1mg, 5mg, 25mg
PWA1415	Flamma® 581 Vinylsulfone	Orange	581	596	TRITC	532 nm	1mg, 5mg, 25mg
KOA1001	Flamma® 594 Vinylsulfone	Orange	590	617	TRITC	532 nm	1mg, 5mg, 25mg
PWA1215	Flamma® 648 Vinylsulfone	Red	648	663	Cy®5	594, 633 nm	1mg, 5mg, 25mg
PWA1515	Flamma® 675 Vinylsulfone	Far red	675	691	Cy®5.5	633, 680 nm	1mg, 5mg, 25mg
PWA1308	Flamma® 749 Vinylsulfone	NIR	749	774	Cy®7	680 nm	1mg, 5mg, 25mg
PWA1603	Flamma® 774 Vinylsulfone	NIR	774	806	Cy®7.5	785 nm	1mg, 5mg, 25mg
PWA1803	Flamma® 800 Vinylsulfone	NIR	775	795	Cy®7.5	785 nm	1mg, 5mg, 25mg

Flamma® Vinylsulfone Dyes characteristics

① Flamma® Vinylsulfone Dyes do not produce any by-products after the reaction.

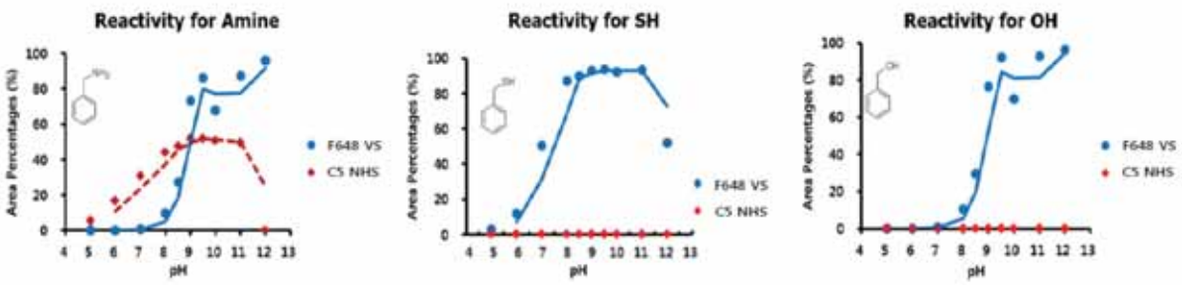
The Vinylsulfone reactor of the Flamma® Vinylsulfone dye reacts specifically with the primary amine groups in the biomolecule on alkaline aqueous solutions above pH 8.0. Conventional dyes generate by-products after labeling process, because they are labeled as a substitution reaction with NHS (N-hydroxy succinimide); However, Flamma® Vinylsulfone Dyes react with biomolecule by Michael addition reaction, so it does not generate by-products.



Comparison of reaction mechanisms of Flamma® Vinylsulfone Dyes and those of other companies' products

② Flamma® Vinylsulfone Dyes can conjugate with various biomolecules.

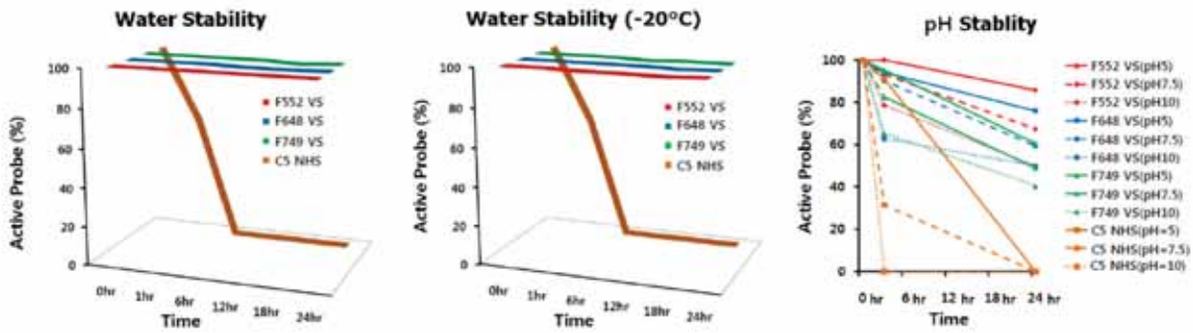
Vinylsulfone of Flamma® Vinylsulfone Dyes can react to not only Amine(-NH2), but also Thiol(-SH) and Alcohol(-OH) based on labeling protocol. So it can react to most of biomolecules such as protein, sugars, antibodies and nucleotide, etc., which can applied to various research application.



Combining ability of Flamma® Vinylsulfone Dyes

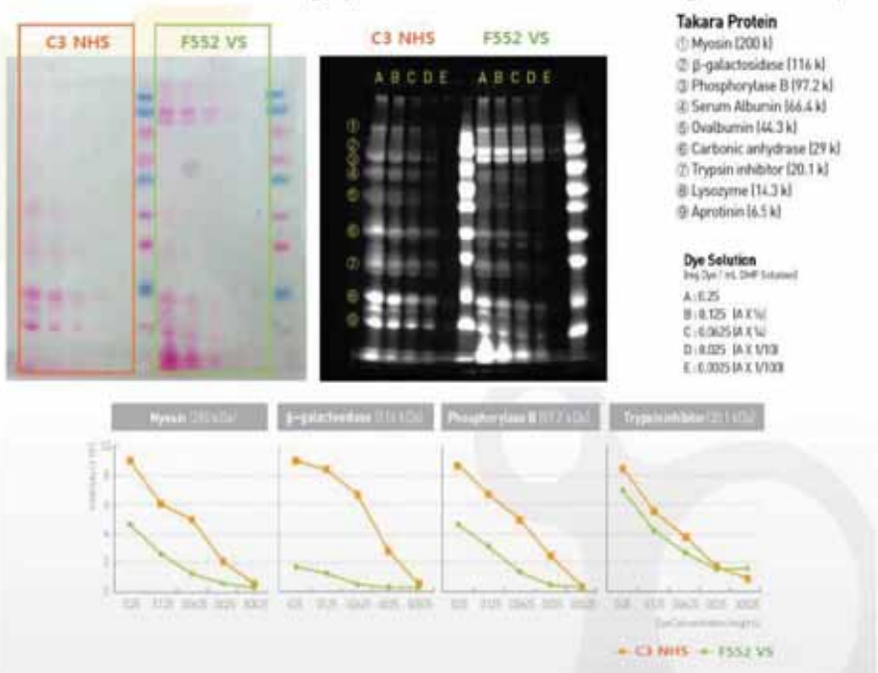
③ Flamma® Vinylsulfone Dyes is very stable in aqueous solution.

Unique rector of Flamma® Vinylsulfone Dyes is very soluble in aqueous solution and stable. Conventional dyes for labeling biomolecule rapidly degrade in water, even if product is stored in -20℃. However, Flamma® Vinylsulfone Dyes shows great stability over long period (more than 24hours). In addition, it's stable in acidic or alkaline (base) conditions, and can be used for under various conditions.



Aqueous solution stability and pH stability

④ Flamma® Vinylsulfone Dyes have high fluorescent intensity even after labeling.Flamma® Vinylsulfone Dyes maintain high fluorescent intensity both before and after labeling. Therefore, it is possible to maximize the research effect even with a small amount of use. Also, it is highly reactive with both low and high molecular proteins.



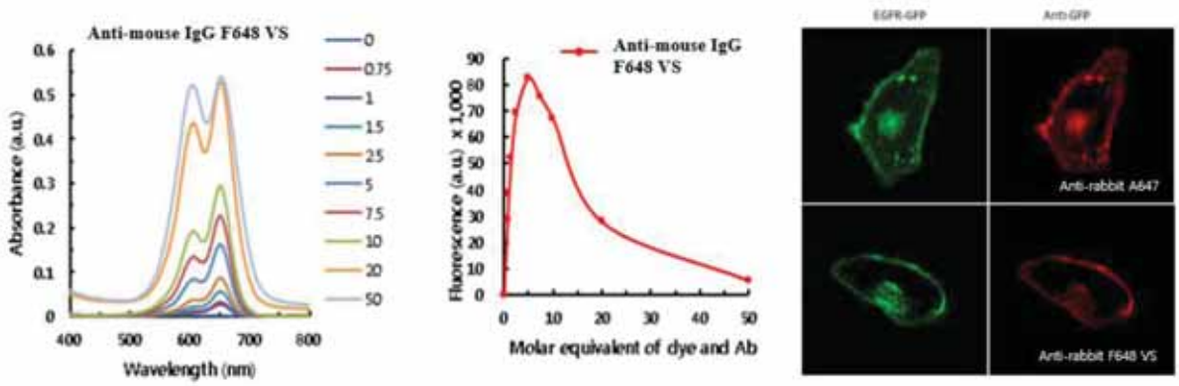
Comparative experiment on Flamma® Vinylsulfone Dyes and dye C of another company.

Application of Flamma® Vinylsulfone Dyes

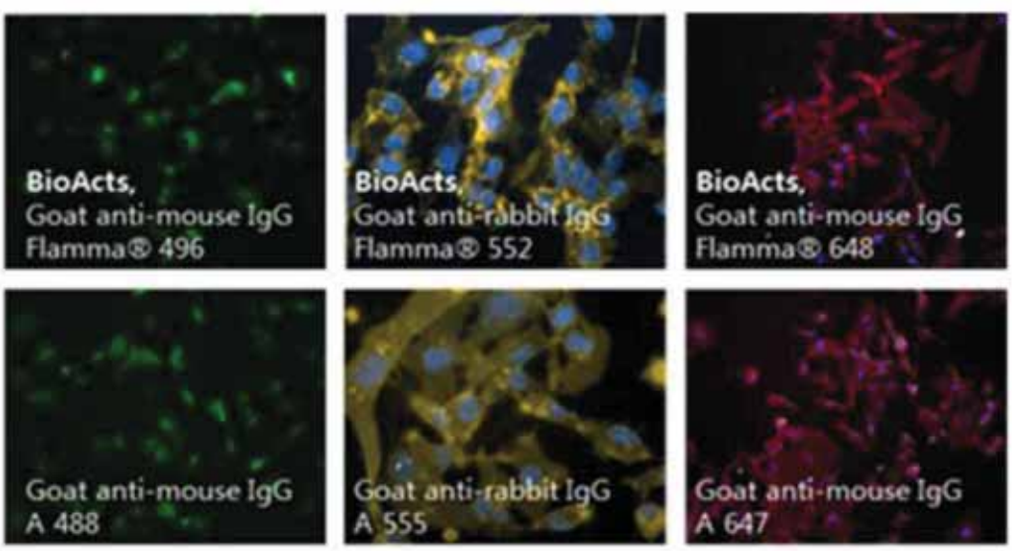
① Various labeling is possible by using Flamma® Vinylsulfone Dyes.

- Application with secondary antibody

BioActs developed a fluorescent antibody to detect the target protein by applying various fluorescent to an antibody that specifically binds to a specific protein and using it as a primary or secondary antibody for an optical method. Also, BioActs conducted a labeling protocol to obtain optimal fluorescent intensity by combining anti-mouse IgG, anti-rabbit IgG, anti-rat IgG, anti-human IgG and anti-goat IgG with Flamma® Vinylsulfone Dyes.



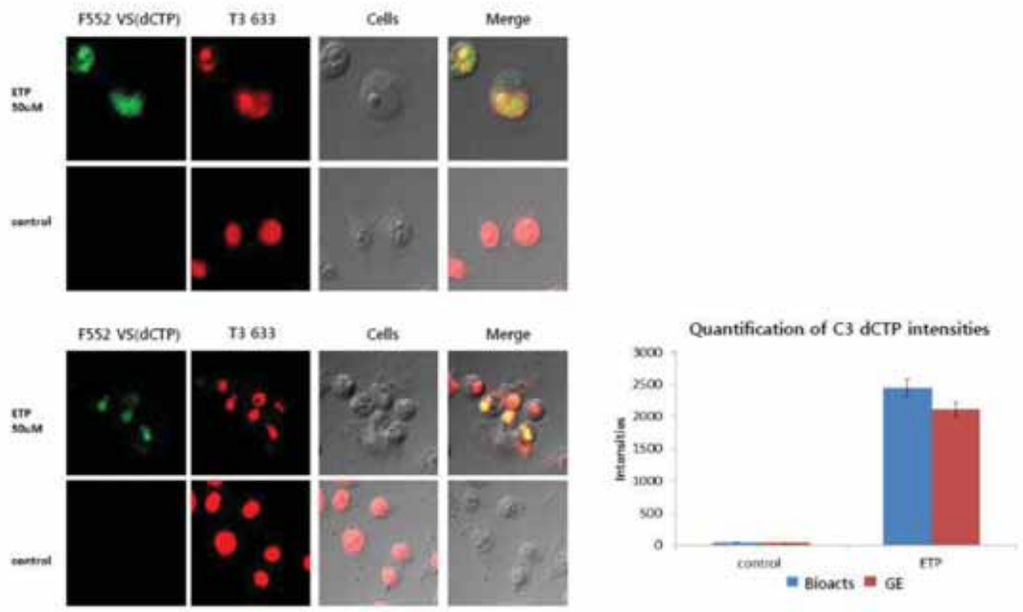
Identification of optimum fluorescent condition and antigen-antibody complex about fluorescent secondary antibody



Comparison with other companies' fluorescent secondary antibody through fluorescent microscope

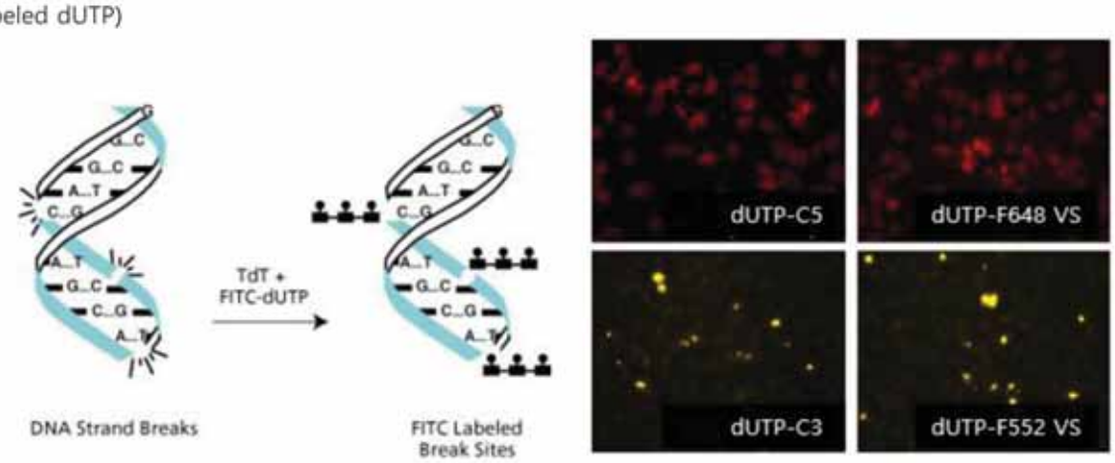
- Development of fluorescent probe for nucleic acid labeling

Intracellular DNA Fragmentation by Apoptosis is confirmed by performing INST Assay (labeling cleaved DNA by using enzyme) using Flamma® Vinylsulfone-dCTP. As a result, it showed superior fluorescent intensities compares to other companies products.



Confirmation of DNA fragmentation by using Flamma® 552 Vinylsulfone/C3-dCTP in Apoptotic cell

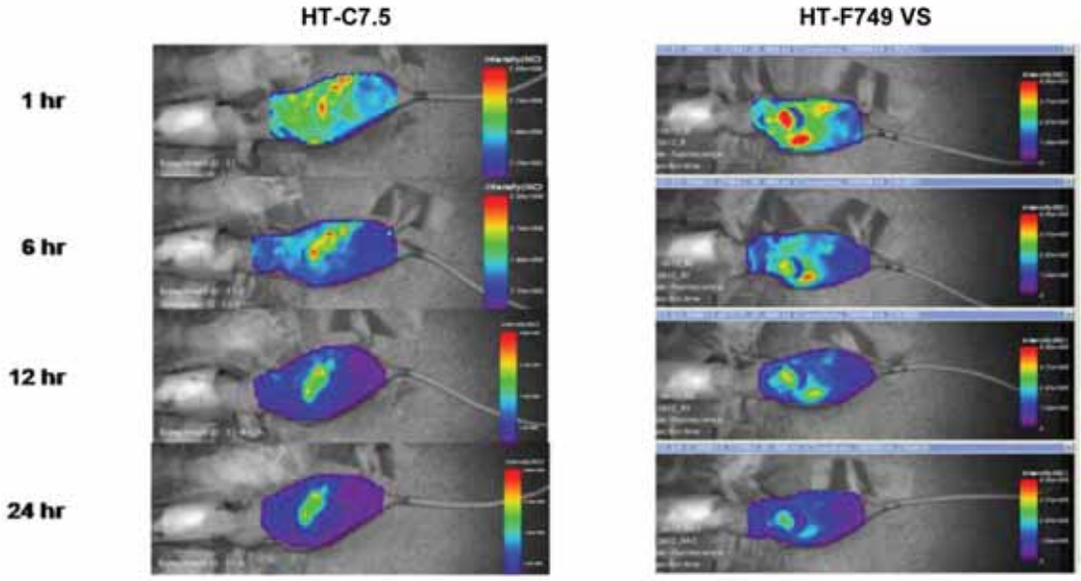
The evaluation was conducted by using Direct Tunel assay (DNA cleavage occurs at the 3'-OH end of the DNA at the beginning of apoptosis. TdT is used to measure the degree of apoptosis of the DNA cleavage with fluorescent labeled dUTP)



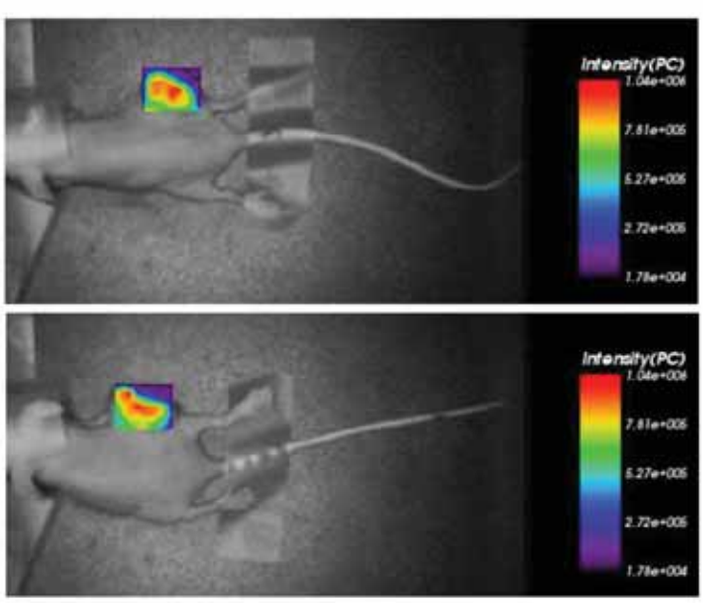
Comparative evaluation of TUNEL assay using MDA-MB-231 cell line

- Flamma® Vinylsulfone is also applicable to animal experiments.

  Flamma® Vinylsulfone has a product lineup that covers the near infrared spectrum range. Since Near-infrared wavelength products have low absorption rate at the visible light region, it's applicable to animal experiments because of low noise due to low autofluorescence. Therefore, distribution is confirmed, cancer-targeting peptide can be labeled and applied.



Distribution of Flamma® 749 Vinylsulfone and other companies' products



Comparison of animal testing of the applied products ApoFlamma® 774 and other companies' products

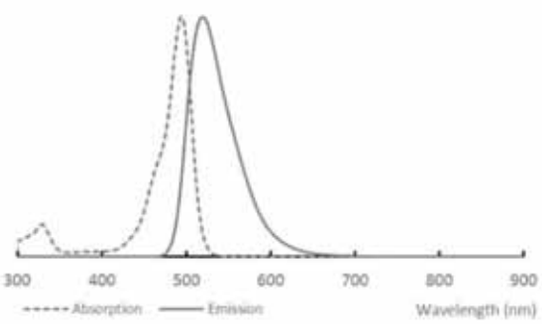
Product line of Flamma® Vinylsulfone Dyes

Flamma® Vinylsulfone Dyes is an independent cover functional group of BioActs. It responds very stably to aqueous solution with the first amine (-NH_2) according to Vinylsulfone's features. Thus, it can stably mark protein or peptide, etc. in aqueous solution, and depending on the marking method of the researcher, it is easy to control the marking rate of the reactant. Also, this product can be kept refrigerated or in fridge as dissolved in water.

Flamma® Vinylsulfone Dyes is unique labeling functional group of BioActs. Due to characteristic of Vinylslfone, it reacts very stably with primary amine(-NH_2) in aqueous solution; therefore, it's possible to label the protein or peptide in aqueous solution. Also it's easy to control labeling rate of the reactant according to researcher's labeling method. In addition, this product can be store at 4℃ or -20℃ in aqueous solution.

① Flamma® 496 Vinylsulfone

Flamma® 496 Vinylsulfone is a fluorescent dye derived from a Fluorescein structure, and has maximum value of Ex/Em at 496 / 520nm. It is optically similar to FAM, but is more photo stable and brighter than FAM.



Specifications

Fluorophore label: Flamma® 496

Reactive group: Vinylsulfone

Reactive toward: primary amine on proteins and ligands, amine-modified oligonucleotides

Excitation/Emission (nm): 496±3/520±4 nm

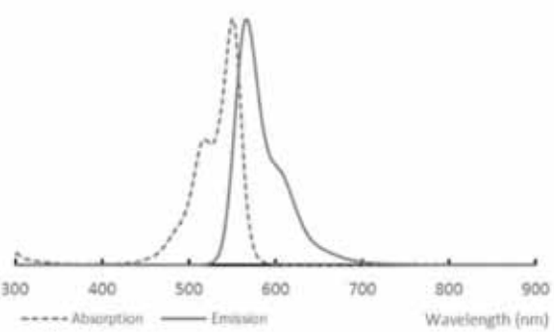
Spectrally similar dyes: FAM, FITC, Fluorescein

Extinction coefficient: 82,000±7,000 $^{-1}M^{-1}$

Storage condition: 4℃ protect from light

② Flamma® 552 Vinylsulfone

Flamma® 552 Vinylsulfone is an orange fluorescent dye derived from a cyanine structure that has an Ex/Em maximum of 550 / 565 nm. Flamma® 552 shows an optical spectrum similar to A555, C3.



Specifications

Fluorophore label: Flamma® 552

Reactive group: Vinylsulfone

Reactive toward: primary amine on proteins and ligands, amine-modified oligonucleotides

Excitation/Emission (nm): 550±3/565±4 nm

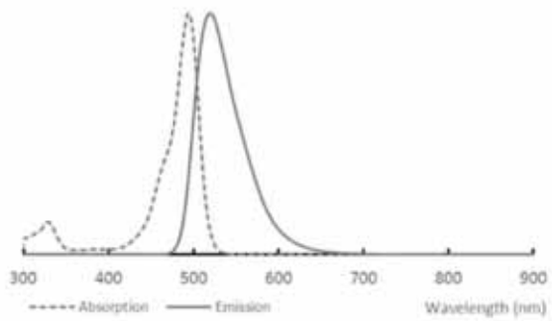
Spectrally similar dyes: A555, CY3, D549, ATTO550, CF555

Extinction coefficient: 150,000±14,000 $^{-1}M^{-1}$

Storage condition: 4℃ protect from light

③ Flamma® 648 Vinylsulfone

Flamma® 648 Vinylsulfone is a red fluorescent dye derived from cyanine structure, and has maximum Ex/EM value at 648nm/ 663nm. It is bright and photo stable, and has similar optical spectrum to A647, C5.



Specifications

Fluorophore label: Flamma® 648

Reactive group: Vinylsulfone

Reactive toward: primary amine on proteins and ligands, amine-modified oligonucleotides

Excitation/Emission (nm): 648±3/663±4 nm

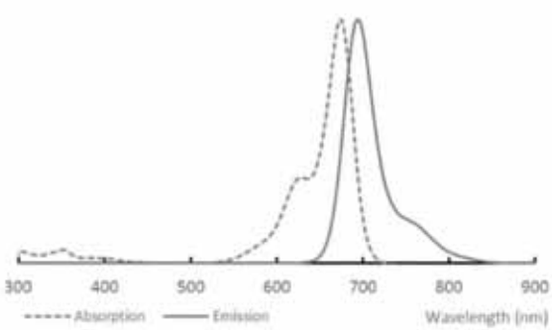
Spectrally similar dyes: A647, CY5, D649, ATTO647N, CF647

Extinction coefficient: 250,000±23,000 $^{-1}M^{-1}$

Storage condition: 4℃ protect from light

④ Flamma® 675 Vinylsulfone

Flamma® 675 Vinylsulfone is a red fluorescent dye derived from benzocyanine structure that has Ex/Em maximum at 675 / 691nm. It has high water solubility and low toxicity and it shows an optical spectrum similar to A680, C 5.5, D680, I680.



Specifications

Fluorophore label: Flamma® 675

Reactive group: Vinylsulfone

Reactive toward: primary amine on proteins and ligands, amine-modified oligonucleotides

Excitation/Emission (nm): 675±3/691±4 nm

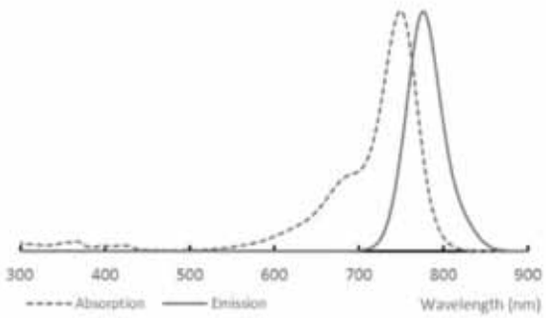
Spectrally similar dyes: A680, CY5.5, D680, I680LT, CF680

Extinction coefficient: 220,000±22,000 $^{-1}M^{-1}$

Storage condition: 4℃ protect from light

⑤ Flamma® 749 Vinylsulfone

Flamma® 749 Vinylsulfone is a near-infrared fluorescent dye derived from cyanine structure, and has maximum Ex/Em value at 749 / 774nm. It has similar optical spectrum to A680, C5.5, D680, I680.



Specifications

Fluorophore label: Flamma® 749

Reactive group: Vinylsulfone

Reactive toward: primary amine on proteins and ligands, amine-modified oligonucleotides

Excitation/Emission (nm): 749±3/774±4 nm

Spectrally similar dyes: A750, CY7, D750, I750, CF750

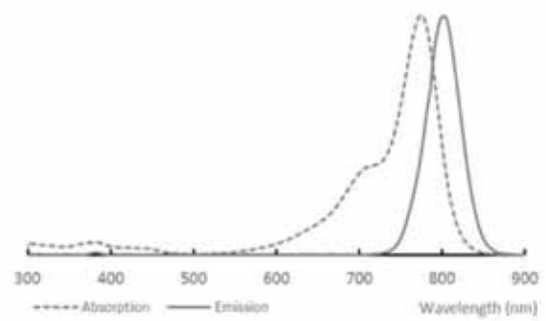
Extinction coefficient: 220,000±20,000^{-1}M^{-1}

Storage condition: 4℃ protect from light

Solubility: DMF, DMSO

⑥ Flamma® 774 Vinylsulfone

Flamma® 774 Vinylsulfone is a near-infrared fluorescent dye derived from benzocyanine structure, and releases the longest range of fluorescent among Flamma® Fluors products. It has similar optical spectrum to A790, I800.



Specifications

Fluorophore label: Flamma® 774

Reactive group: Vinylsulfone

Reactive toward: primary amine on proteins and ligands, amine-modified oligonucleotides

Excitation/Emission (nm): 774±3/798±4 nm

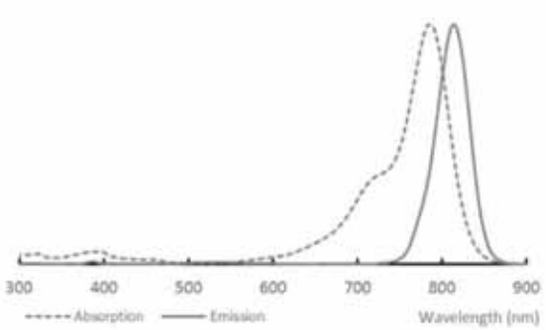
Spectrally similar dyes: CY7.5, CF770

Extinction coefficient: 200,000±18,000^{-1}M^{-1}

Storage condition: 4℃ protect from light

⑦ ICG Vinylsulfone

ICG (indocyanine green) Vinylsulfone is a NIR phosphor that is approved for clinical use in US FDA (Food and Drug administration) along with methylene blue. It is used in ophthalmologic angiography, liver function tests, solid tumor detection, and angiography in surgeries. ICG Vinylsulfone has low noise due to autofluorescence because it effectively absorbs near infrared wavelength with low absorption around visible light region.



Specifications

Fluorophore label: ICG

Reactive group: Vinylsulfone

Reactive toward: primary amine on proteins and ligands, amine-modified oligonucleotides

Excitation/Emission (nm): 785±3/814±4 nm

Spectrally similar dyes:

Extinction coefficient: 240,000±22,000^{-1}M^{-1}

Storage condition: 4℃ protect from light

Citation & Reference

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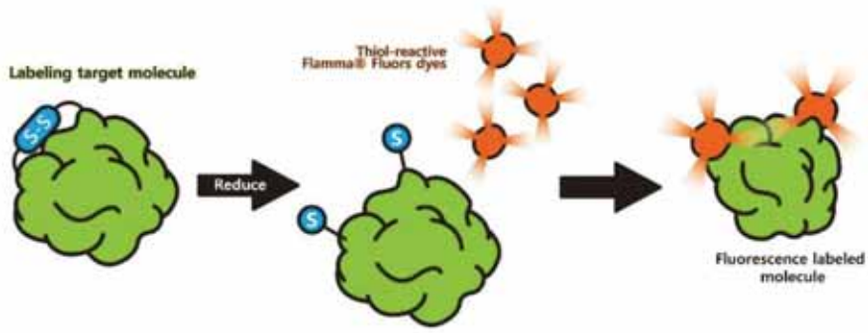
Labeling Thiol

Thiol-reactive labeling is a widely used method for labeling biomolecules besides Amine-reactive labeling, and it is extensively utilized in labeling proteomics, peptide, and ligand with amine labeling. Flamma® Fluors Maleimide high specifically binds to thiol group, and corresponded labeling to Thiol group of proteome or peptide uses Thiol group of cysteine. By using a reducing agent such as DTT, TCEP or 2-mercaptoethanol, pretreatment process should be undergone to reduce disulfide bond in protein. Reducing pretreatment process may deform tertiary structure of protein.



Flamma® Fluors Maleimide

Cat. No.	Product name	Emission color	Ex_{Max} (nm)	Em_{Max} (nm)	Common filter set	Excitation laser line	Size
CWM1001	Flamma® 496 maleimide	Green	496	516	FITC	488 nm	1mg, 5mg, 25mg
CWM1058	Flamma® 552 maleimide	Yellow	550	565	TRITC	488, 532 nm	1mg, 5mg, 25mg
KWM1415	Flamma® 581 maleimide	Orange	581	596	TRITC	488, 532 nm	1mg, 5mg, 25mg
KWM1042	Flamma® 648 maleimide	Red	648	663	Cy®5	594, 633 nm	1mg, 5mg, 25mg
PWM1415	Flamma® 675 maleimide	Far red	675	691	Cy®5.5	633, 680 nm	1mg, 5mg, 25mg
PWM1215	Flamma® 749 maleimide	NIR	749	774	Cy®7	680 nm	1mg, 5mg, 25mg
PWM1515	Flamma® 774 maleimide	NIR	774	806	Cy®7.5	785 nm	1mg, 5mg, 25mg

Labeling Aldehyde, Ketone & Hydroxyl group

Flamma® Fluors Hydrazide, which is for labeling Aldehyde and Ketone, and Flamma® Fluors Dichlorotriazine, which is for labeling Hydroxyl group, are utilized in fluorescent labeling of small compounds such as hormone and saccharide. To label Flamma® Fluors Hydrazide on polysaccharide and glycoprotein, oxidation process that oxidizes saccharide to Aldehyde is required prior to reaction. In general, method of using Sodium periodate-mediate oxidation of vicinal diol is utilized.

Flamma® Fluors Hydrazide

Cat. No.	Product name	Emission color	Ex_{Max} (nm)	Em_{Max} (nm)	Common filter set	Excitation laser line	Size
CWH1001	Flamma® 496 hydrazide	Green	496	516	FITC	488 nm	1mg, 5mg, 25mg
PWH1122	Flamma® 552 hydrazide	Yellow	550	565	TRITC	488, 532 nm	1mg, 5mg, 25mg
KWH1415	Flamma® 581 hydrazide	Orange	581	596	TRITC	488, 532 nm	1mg, 5mg, 25mg
PWH1215	Flamma® 648 hydrazide	Red	648	663	Cy®5	594, 633 nm	1mg, 5mg, 25mg
PWH1515	Flamma® 675 hydrazide	Far red	675	691	Cy®5.5	633, 680 nm	1mg, 5mg, 25mg
PWH1301	Flamma® 749 hydrazide	NIR	749	774	Cy®7	680 nm	1mg, 5mg, 25mg
PWH1603	Flamma® 774 hydrazide	NIR	774	806	Cy®7.5	785 nm	1mg, 5mg, 25mg

Flamma® Fluors Dichlorotriazine

Cat. No.	Product name	Emission color	Ex_{Max} (nm)	Em_{Max} (nm)	Common filter set	Excitation laser line	Size
CWR1001	Flamma® 496 dichlorotriazine	Green	496	516	FITC	488 nm	1mg, 5mg, 25mg
PWR2112	Flamma® 552 dichlorotriazine	Yellow	550	565	TRITC	488, 532 nm	1mg, 5mg, 25mg
KWR2415	Flamma® 581 dichlorotriazine	Orange	581	596	TRITC	488, 532 nm	1mg, 5mg, 25mg
PWR2215	Flamma® 648 dichlorotriazine	Red	648	663	Cy®5	594, 633 nm	1mg, 5mg, 25mg
PWR2515	Flamma® 675 dichlorotriazine	Far red	675	691	Cy®5.5	633, 680 nm	1mg, 5mg, 25mg
PWR2301	Flamma® 749 dichlorotriazine	NIR	749	774	Cy®7	680 nm	1mg, 5mg, 25mg
PWR2603	Flamma® 774 dichlorotriazine	NIR	774	806	Cy®7.5	785 nm	1mg, 5mg, 25mg

O Click-Chemistry

Click chemistry is the most accurate and the fastest method of binding organic molecules, and it can be utilized in a variety of labeling method or cell analysis connected with bio orthogonal reaction of Click chemistry. To utilize Flamma® Fluors for click chemical bonding in various directions, BioActs has introduced Flamma® Fluors ADIBO products group that doesn't require copper catalyst, besides Flamma® Fluors Azide and Flamma® Fluors Alkyne products group.

Flamma® Fluors Alkyne / PEG4-Alkyne

Cat. No.	Product name	Emission color	Ex_{Max} (nm)	Em_{Max} (nm)	Common filter set	Excitation laser line	Size
CWK1001	Flamma® 496 alkyne	Green	496	516	FITC	488 nm	1mg, 5mg, 25mg
PWK1122	Flamma® 552 alkyne	Yellow	550	565	TRITC	488, 532 nm	1mg, 5mg, 25mg
KWK1415	Flamma® 581 alkyne	Orange	581	596	TRITC	488, 532 nm	1mg, 5mg, 25mg
PWK1215	Flamma® 648 alkyne	Red	648	663	Cy®5	594, 633 nm	1mg, 5mg, 25mg
PWK1515	Flamma® 675 alkyne	Far red	675	691	Cy®5.5	633, 680 nm	1mg, 5mg, 25mg
PWK1301	Flamma® 749 alkyne	NIR	749	774	Cy®7	680 nm	1mg, 5mg, 25mg
PWK1603	Flamma® 774 alkyne	NIR	774	806	Cy®7.5	785 nm	1mg, 5mg, 25mg
CWG1001	Flamma® 496 PEG4-alkyne	Green	496	516	FITC	488 nm	1mg, 5mg, 25mg
PWG1122	Flamma® 552 PEG4-alkyne	Yellow	550	565	TRITC	488, 532 nm	1mg, 5mg, 25mg
KWG1415	Flamma® 581 PEG4-alkyne	Orange	581	596	TRITC	488, 532 nm	1mg, 5mg, 25mg
PWG1215	Flamma® 648 PEG4-alkyne	Red	648	663	Cy®5	594, 633 nm	1mg, 5mg, 25mg
PWG1515	Flamma® 675 PEG4-alkyne	Far red	675	691	Cy®5.5	633, 680 nm	1mg, 5mg, 25mg
PWG1301	Flamma® 749 PEG4-alkyne	NIR	749	774	Cy®7	680 nm	1mg, 5mg, 25mg
PWG1603	Flamma® 774 PEG4-alkyne	NIR	774	806	Cy®7.5	785 nm	1mg, 5mg, 25mg

Flamma® Fluors Azide

Cat. No.	Product name	Emission color	Ex_{Max} (nm)	Em_{Max} (nm)	Common filter set	Excitation laser line	Size
CWZ1001	Flamma® 496 Azide	Green	496	516	FITC	488 nm	1mg, 5mg, 25mg
PWZ1122	Flamma® 552 Azide	Yellow	550	565	TRITC	488, 532 nm	1mg, 5mg, 25mg
KWZ1415	Flamma® 581 Azide	Orange	581	596	TRITC	488, 532 nm	1mg, 5mg, 25mg
PWZ1215	Flamma® 648 Azide	Red	648	663	Cy®5	594, 633 nm	1mg, 5mg, 25mg
PWZ1515	Flamma® 675 Azide	Far red	675	691	Cy®5.5	633, 680 nm	1mg, 5mg, 25mg
PWZ1301	Flamma® 749 Azide	NIR	749	774	Cy®7	680 nm	1mg, 5mg, 25mg
PWZ1603	Flamma® 774 Azide	NIR	774	806	Cy®7.5	785 nm	1mg, 5mg, 25mg

Flamma® Fluors ADIBO

Cat. No.	Product name	Emission color	Ex_{Max} (nm)	Em_{Max} (nm)	Common filter set	Excitation laser line	Size
DWC1001	Flamma® 496 ADIBO	Green	496	516	FITC	488 nm	1mg, 5mg, 25mg
DWC1011	Flamma® 552 ADIBO	Yellow	550	565	TRITC	488, 532 nm	1mg, 5mg, 25mg
DWC1415	Flamma® 581DIBO	Orange	581	596	TRITC	488, 532 nm	25mg
DWC1021	Flamma® 648 ADIBO	Red	648	663	Cy®5	594, 633 nm	1mg, 5mg, 25mg
DWC1051	Flamma® 675 ADIBO	Far red	675	691	Cy®5.5	633, 680 nm	1mg, 5mg, 25mg
DWC1031	Flamma® 749 ADIBO	NIR	749	774	Cy®7	680 nm	1mg, 5mg, 25mg
DWC1061	Flamma® 774 ADIBO	NIR	774	806	Cy®7.5	785 nm	1mg, 5mg, 25mg

O Unreactive Functional Group

Flamma® Fluors Carboxylic acid

Flamma® Fluors Carboxylic acid is unreactive functional group that induces amide bond with amine through appropriate catalytic reaction.

Cat. No.	Product name	Emission color	Ex_{Max} (nm)	Em_{Max} (nm)	Common filter set	Excitation laser line	Size
PWC1101	Flamma® 552 Carboxylic acid	Yellow	550	565	TRITC	488, 532 nm	1mg, 5mg, 25mg
PWC1201	Flamma® 648 Carboxylic acid	Red	648	663	Cy®5	594, 633 nm	1mg, 5mg, 25mg
PWC1501	Flamma® 675 Carboxylic acid	Far red	675	691	Cy®5.5	633, 680 nm	1mg, 5mg, 25mg
PWC1308	Flamma® 749 Carboxylic acid	NIR	749	774	Cy®7	680 nm	1mg, 5mg, 25mg
PWC1603	Flamma® 774 Carboxylic acid	NIR	774	806	Cy®7.5	785 nm	1mg, 5mg, 25mg

Flamma® Fluors Amine

Flamma® Fluors Amine is an unreactive functional group and can induce amide bond with carboxyl group within the substrate of labeling target through appropriate catalytic reaction.

Cat. No.	Product name	Emission color	Ex_{Max} (nm)	Em_{Max} (nm)	Common filter set	Excitation laser line	Size
CWE1001	Flamma® 496 amine	Green	496	516	FITC	488 nm	1mg, 5mg, 25mg
PWE1122	Flamma® 552 amine	Green	550	565	TRITC	488, 532 nm	1mg, 5mg, 25mg
KWE1415	Flamma® 581 amine	Orange	581	596	TRITC	488, 532 nm	1mg, 5mg, 25mg
PWE1215	Flamma® 648 amine	Red	648	663	Cy®5	594, 633 nm	1mg, 5mg, 25mg
PWE1515	Flamma® 675 amine	NIR	675	691	Cy®5.5	633, 680 nm	1mg, 5mg, 25mg
PWE1301	Flamma® 749 amine	NIR	749	774	Cy®7	680 nm	1mg, 5mg, 25mg
PWE1603	Flamma® 774 amine	NIR	774	806	Cy®7.5	785 nm	1mg, 5mg, 25mg

Flamma® Fluors Thiol

Flamma® Fluors Thiol is an unreactive functional group and –SH is applied at terminal of Flamma® Fluors.

Cat. No.	Product name	Emission color	Ex_{Max} (nm)	Em_{Max} (nm)	Common filter set	Excitation laser line	Size
CWT1001	Flamma® 496 thiol	Green	496	516	FITC	488 nm	1mg, 5mg, 25mg
CWT1058	Flamma® 552 thiol	Yellow	550	565	TRITC	488, 532 nm	1mg, 5mg, 25mg
KWT1415	Flamma® 581 thiol	Orange	581	596	TRITC	488, 532 nm	1mg, 5mg, 25mg
KWT1042	Flamma® 648 thiol	Red	648	663	Cy®5	594, 633 nm	1mg, 5mg, 25mg
PWT1415	Flamma® 675 thiol	Far red	675	691	Cy®5.5	633, 680 nm	1mg, 5mg, 25mg
PWT1215	Flamma® 749 thiol	NIR	749	774	Cy®7	680 nm	1mg, 5mg, 25mg
PWT1515	Flamma® 774 thiol	NIR	774	806	Cy®7.5	785 nm	1mg, 5mg, 25mg

Hydrophobic

Flamma® Fluors hydrophobic is in the form that embed hydrophobic chemical structure, and it is offered with various options available including functional group such as carboxylic acid, amine or thiol as well as reactive group such as NHS ester and maleimide.

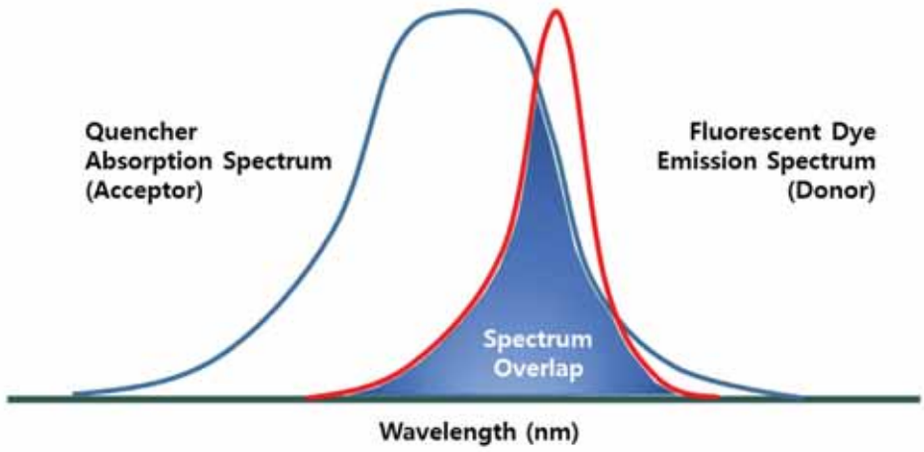
Flamma® Fluors C18

Cat. No.	Product name	Emission color	Ex_{Max} (nm)	Em_{Max} (nm)	Common filter set	Excitation laser line	Size
COL1001	Flamma® 496 Hydrophobic (C18)	Green	496	516	FITC	488 nm	1mg
POL1101	Flamma® 552 Hydrophobic (C18)	Yellow	550	565	TRITC	488, 532 nm	1mg
KOR1001	Flamma® 560 Hydrophobic (C18)	Orange	560	589	TRITC	488, 532 nm	1mg
POL1201	Flamma® 648 Hydrophobic (C18)	Red	648	663	Cy®5	594, 633 nm	1mg
POL1501	Flamma® 675 Hydrophobic (C18)	Far red	675	691	Cy®5.5	633, 680 nm	1mg
POL1301	Flamma® 749 Hydrophobic (C18)	NIR	749	774	Cy®7	680 nm	1mg
POL1601	Flamma® 774 Hydrophobic (C18)	NIR	774	806	Cy®7.5	785 nm	1mg

qFlamma®, Quencher

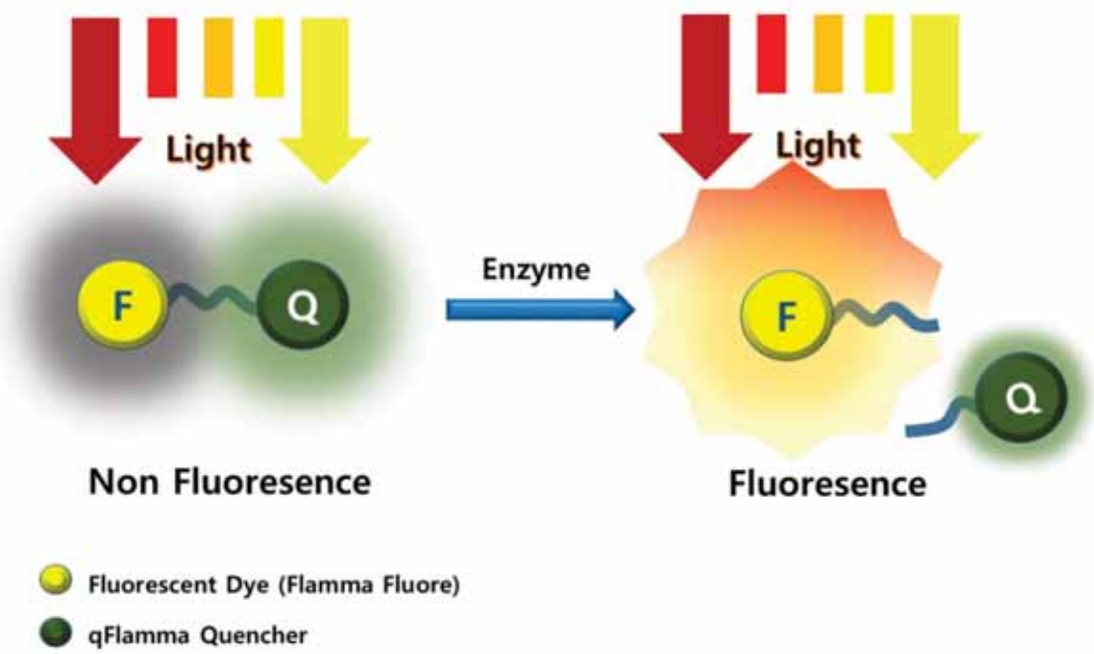
Quencher is a dye that can quench the fluorescent from fluorescence molecule and usually a material that can absorbing lights are used as quencher dye. Mechanisms of quenching are known as a result of Fluorescent resonance energy transfer (FRET), photo-induced electron transfer and cohesion of dyes such as formation of H-polymer.

When choosing a quencher in order to control or remove fluorescent, it is most important to check whether quencher can absorb all or at least most of the fluorescent spectrum of the fluorescent dye.

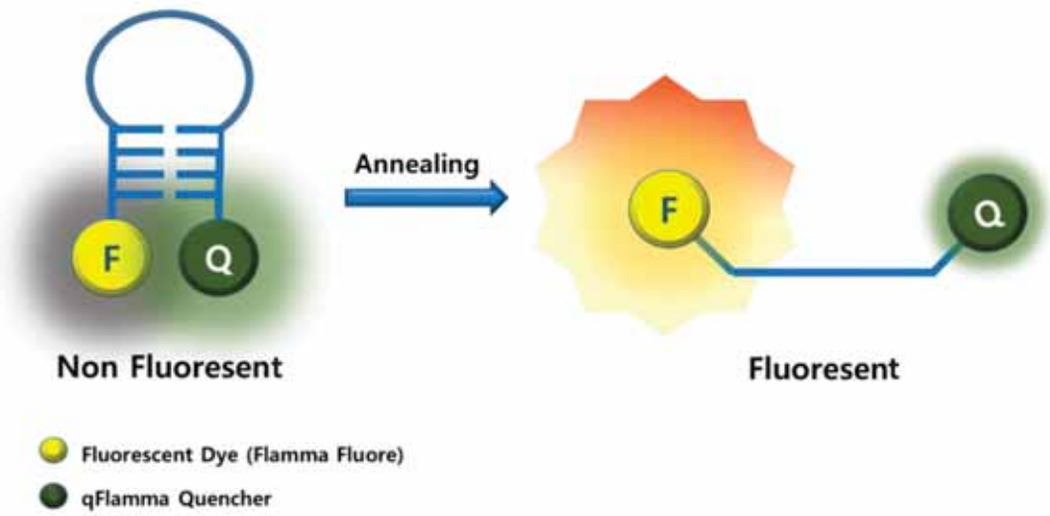


Selection conditions of Quencher dyes according to fluorescence wavelength

In the bio industry, quenching dyes are paired with fluorescent dyes, and generally quenching dyes have a structure that can only absorb light. Since fluorescence is recovered or enhanced depends on distance, combined fluorescent-quenching dyes are capable of give on/off function. Considering these characteristics, it's widely used to design biosensors and activation probes that can respond to biomarkers such as specific proteins and enzymes.



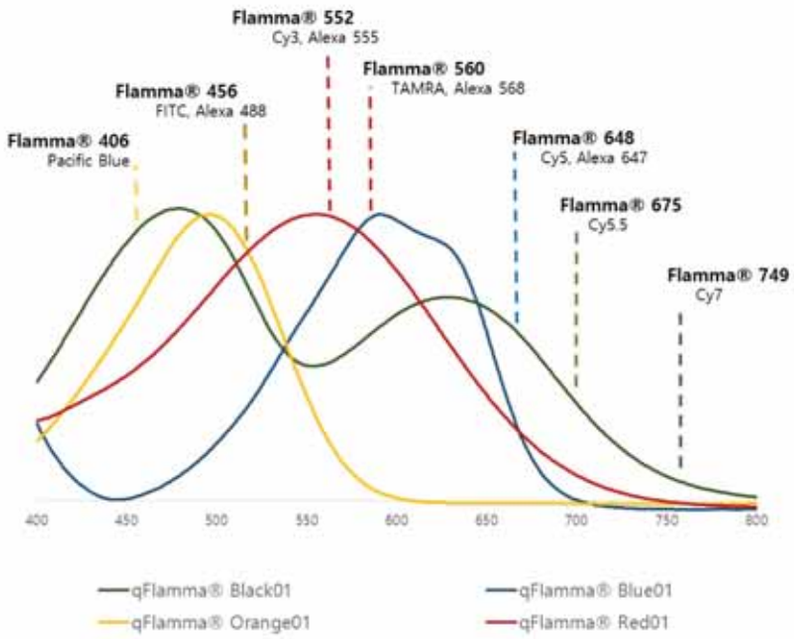
Mechanism of quenching on peptide



Mechanism of quenching on oligonucleotide

Introduction of qFlamma® Quencher

BioAct's qFlamma® Quencher has been developed in order to provide superior spectral overlap across the full spectrum of commonly used fluorescent dyes. It has a wide absorption spectrum from 400nm to 800nm, and can be paired with a reporter dye that emits in this spectrum to increase flexibility of FRET analysis. In addition, it's possible to combine phosphor and the quencher and use probe-based application such as qPCR.

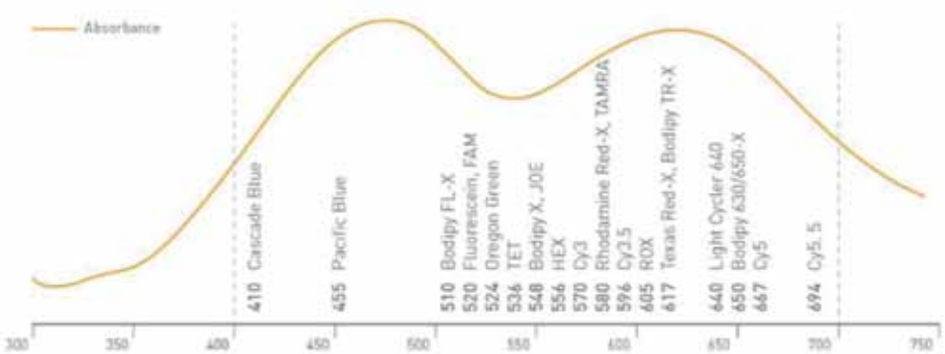


Absorption spectrum of qFlamma® Quencher Series and range of extinguishable fluorescent products

Fluorescent Dye (BioActs)	Fluorescent Dye (Common)	Quencher (Common)	Quencher (BioActs qFlamma)
Flamma® 406	Pacific Blue	BHQ-0	qFlamma® Orange01
Flamma® 488	Alexa Fluor® 488	BHQ-1	qFlamma® Orange01 qFlamma® Black01
Flamma® 496	FAM, FITC	BHQ-1	qFlamma® Redk01 qFlamma® Black01
Flamma® 552	Alexa Fluor® 555 Cy3	BHQ-2	qFlamma® Redk01 qFlamma® Black01
Flamma® 560	RITC	BGQ-2	qFlamma® Redk01 qFlamma® Black01
Flamma® 581	Cy3.5	BHQ-2	qFlamma® Blue01 qFlamma® Black01
Flamma® 648	Alexa Fluor® 647 Cy5	BHQ-3	qFlamma® Blue01 qFlamma® Black01
Flamma® 675	Alexa Fluor® 680 Cy5.5	BHQ-3	qFlamma® Black01
Flamma® 749	Alexa Fluor® 750 Cy7	-	qFlamma® Black01
Flamma® 774	Cy7.5	-	qFlamma® Black01

Comparison of fluorescent products that can be used with qFlamma® Quencher Series

BioActs has a quencher products with various absorption spectrum that can quench not only all fluorescent dyes that are currently sold, but also has fluorescent dyes from other companies. Especially qFlamma® Black01 is a unique product of BioActs, that can quench fluorescent from 400nm to NIR range, which can't be used with conventional Quencher Dye. And it is designed to be used with all fluorescent dyes in the market.



qFlamma® Black01 Quencher absorption spectrum and extinguishable quenching dyes

qFlamma® Black01 Series

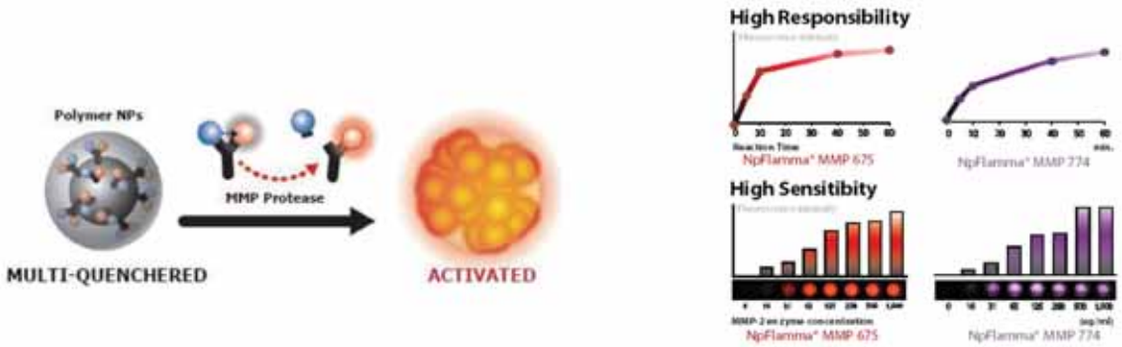
qFlamma® Black01 Quencher has high water solubility and it contains various reactors such as NHS ester, Sulfo-NHS Ester, vinylsulfone and maleimide, so it can be widely used with various target compound such as Amine and Thiol.

Reactive target	Product Group	Catalog No.			
		qFlamma® Orange	qFlamma® Red	qFlamma® Blue	qFlamma® Black
Amine, -NH_2	NHS ester	QWS2001	QWS3001	QWS4001	QWS1001
	Sulfo-NHS ester	QWSN2001	QWSN3001	QWSN4001	QWSN1001
	Vinylsulfone	QWA2001	QWA3001	QWA4001	QWA1001
Thiol, -SH	Maleimide	QWM2001	QWM3001	QWM4001	QWM1001
Aldehyde, -CHO, Ketone, >C=O	Hydrazide	QWH2001	QWH3001	QWH4001	QWH1001
Hydroxyl group, -OH	Dichlorotriazine	QWR2001	QWR3001	QWR4001	QWR1001
Click chemistry	PEG4-alkyn	QWG2001	QWG3001	QWG4001	QWG1001
Cu-free click chemistry	ADIBO	QWD2001	QWD3001	QWD4001	QWD1001
Avidin, Streptavidin	Biotin	QWB2001	QWB3001	QWB4001	QWB1001
Terminated group	**Product Group**	**Catalog No.**			
		qFlamma® Orange	**qFlamma® Red**	**qFlamma® Blue**	**qFlamma® Black**
Unreactive functional group	Carboxylic acid	QWC2001	QWC3001	QWC4001	QWC1001
	Amine	QWE2001	QWE3001	QWE4001	QWE1001
	Thiol	QWT2001	QWT3001	QWT4001	QWT1001

Application of qFlamma® Quencher(NpFlamma® MMP Series)

Comparison of recovery function and fluorescent - quenching ability with other products

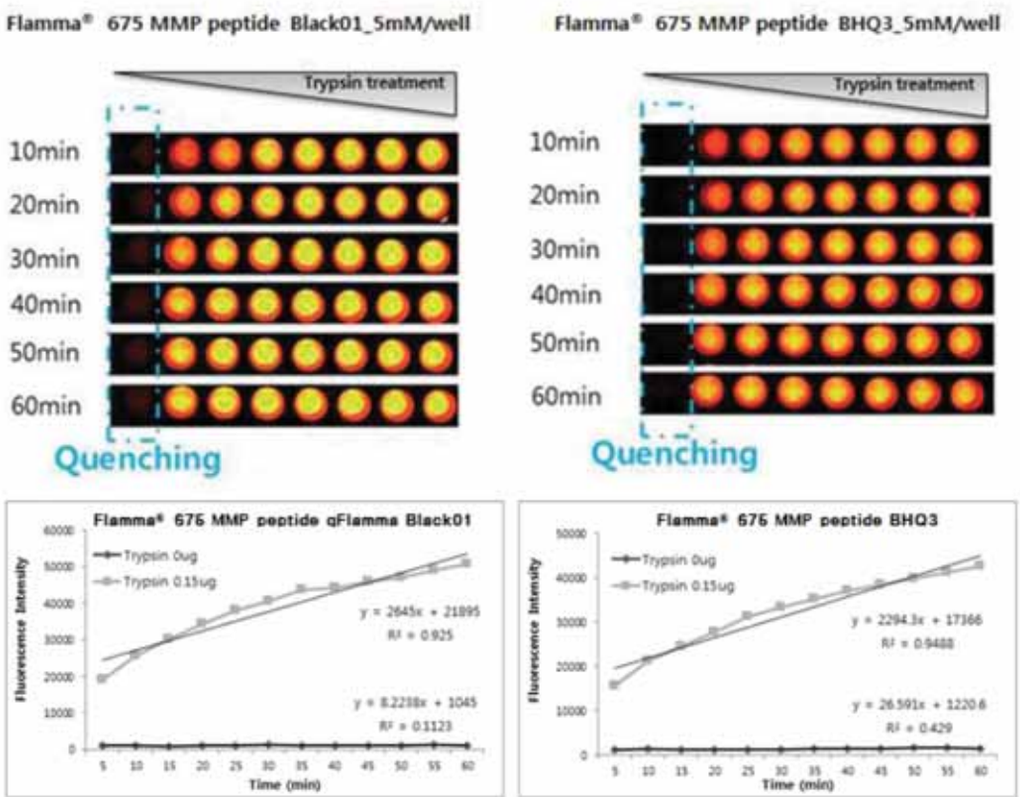
To confirm possibility of replacing the existing quencher product with BioActs' qFlamma® Black01, which is patent compound quenching dye, synthesis of Flamma® 675+(MMP-2,9 peptide)+ qFlamma® Black01 and Flamma® 675+(MMP-2,9 peptide)+BHQ3 has been proceed and compared by chemical and optical analysis. As result, same fluorescent quenching and restoring ability has been confirmed with other companies' products.



Operation principle of NpFlamma MMP Seires and quenching effect by Enzyme

Experiment method:

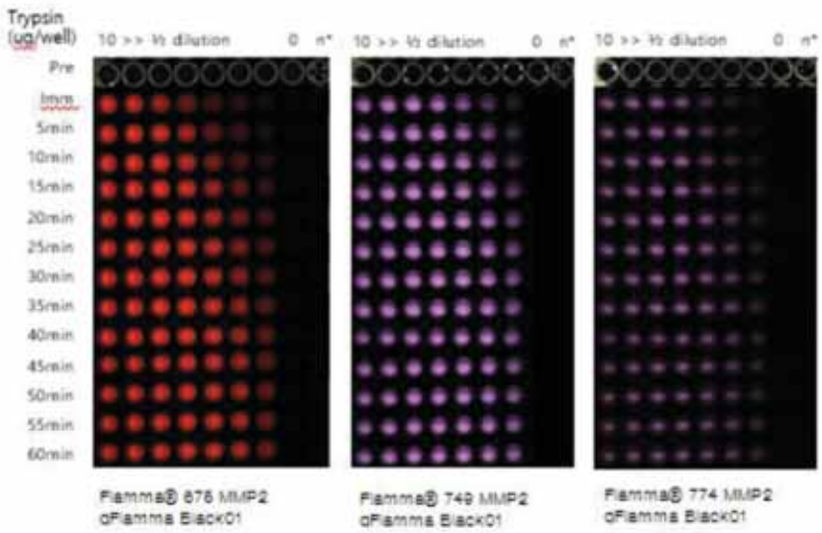
To check quenching effect of MMP 2,9 Probe using qFlamma® Black01, Trypsin_EDTA (Sigma, St.Louis, Mo, USA) was centrifuged to Vivaspin 20 (10,000 MWCO, Sartorius, Goettingen, Germany) at 5,000g for 10 min, and manufactured to 25ug/mL Stock. Flamma® 675+(MMP-2,9 peptide)+BHQ3 and Flamma® 675+(MMP-2,9 peptide)+ qFlamma® Black01 are divided in black 96 well plate by 100uL (10uM of MMP probe) and started ½ Serial dilution, starting from 100uL of manufactured Trypsin Stock solution. FOBI (Neoscience, Seoul, Korea) and Plate reader (Enspire 2300, PerkinElmer, USA) were used for fluorescent detection using Trypsin. When three fluorescence dyes (Flamma® 675, Flamma® 749, Flamma® 774) are put into qFlamma® Black01 using Trypsin, quenching and recovery ability were similar.



Comparison of fluorescent strength depending on compound enzyme reaction of Flamma® 675 MMP+ qFlamma® Black01 (left) and Flamma 675 MMP + BHQ-3 (right)

Comparison of quenching and recovery ability after combining with near-infrared fluorescent dyes

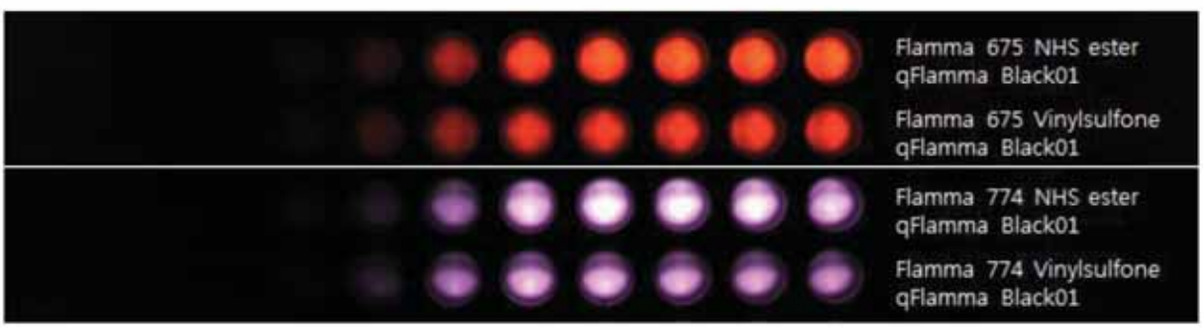
When three fluorescent dyes (Flamma® 675, Flamma® 749, Flamma® 774) are applied in qFlamma® Black01 using Trypsin, it's quenching and recovery ability is similar to BHQ3, which is another company's product.



Confirmation of fluorescent restoring ability by trypsin.

Quenching ability depending on difference in reactor and fluorescent dyes that are combined with peptide.

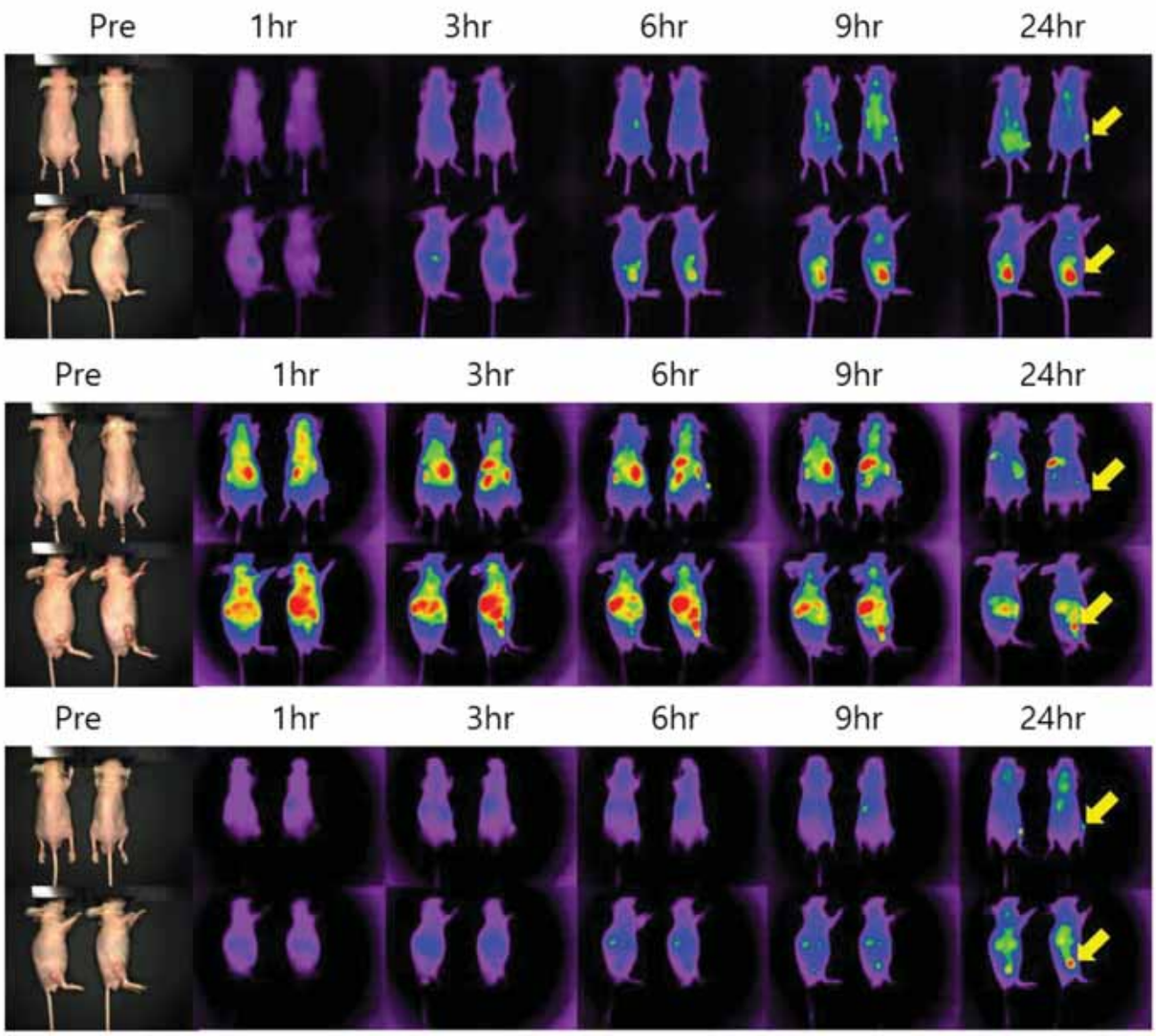
BioActs patented compounds Flamma® 675 Vinylsulfone , Flamma® 774 NHS ester, Flamma® 774 Vinylsulfone were applied to confirm the ability of fluorescent dye to react with the peptide and extinction ability of reactor. As result, similar fluorescent-extinction intensity by reactor were confirmed.



Fluorescent recovery performance by increase in MMP-9 enzyme density of (Flamma® 675, Flamma® 774 (NHS ester or vinylsulfone))+((MMP2,9 peptide)+quenching compound). (The concentration of MMP-9 enzyme increases from left to right)

Various applications of qFlamma® Quencher: imaging within living organism

NpFlamma® HGC + Flamma® (675, 749 or 774)-MMP2,9- qFlamma® Black01 and three nanoparticles were synthesized by BioActs, which are proteolytic enzyme near-infrared nanoparticle, and in vivo imaging was conducted.



In vivo imaging of (NpFlamma® HGC+ Flamma® 675 + MMP 2,9 + qFlamma® Black01), (NpFlamma® HGC+ Flamma® 749 + MMP2,9 + qFlamma® Black01) and (NpFlamma® HGC+ Flamma® 774 + MMP2,9 + qFlamma® Black01) under SCC7 mouse cancer model. (Top to bottom)

Phosphor-peptide and quencher compound is applied and it has been confirmed that the fluorescent does not emit due to quenching ability of the quencher; however, when prptide substrate is decomposed by a specific protease, it emit strong specific fluorescent.

Cat. No.	Product name	Emission color	Ex_{Max} (nm)	Em_{Max} (nm)	Common filter set	Excitation laser line	Size
PNM0101	NpFlamma® MMP-2,9 ICG	NIR	785	812	Cy®7.5	785 nm	10 dose, 50 dose, 100 dose
PNM0103	NpFlamma® MMP-2,9 648	Red	648	663	Cy®5	594, 633 nm	10 dose, 50 dose, 100 dose
PNM0104	NpFlamma® MMP-2,9 675	Far red	675	691	Cy®5.5	680 nm	10 dose, 50 dose, 100 dose
PNM0105	NpFlamma® MMP-2,9 749	NIR	749	774	Cy®7	785 nm	10 dose, 50 dose, 100 dose
PNM0106	NpFlamma® MMP-2,9 774	NIR	774	800	Cy®7.5	785 nm	10 dose, 50 dose, 100 dose
PNM0201	NpFlamma® MMP-3,7 ICG	NIR	785	812	Cy®7.5	785 nm	10 dose, 50 dose, 100 dose
PNM0203	NpFlamma® MMP-3,7 648	Red	648	663	Cy®5	594, 633 nm	10 dose, 50 dose, 100 dose
PNM0204	NpFlamma® MMP-3,7 675	Far red	675	691	Cy®5.5	680 nm	10 dose, 50 dose, 100 dose
PNM0205	NpFlamma® MMP-3,7 749	NIR	749	774	Cy®7	785 nm	10 dose, 50 dose, 100 dose
PNM0206	NpFlamma® MMP-3,7 774	NIR	774	800	Cy®7.5	786 nm	10 dose, 50 dose, 100 dose
PNM0301	NpFlamma® MMP-13 ICG	NIR	785	812	Cy®7.5	785 nm	10 dose, 50 dose, 100 dose
PNM0303	NpFlamma® MMP-13 648	Red	648	663	Cy®5	594, 633 nm	10 dose, 50 dose, 100 dose
PNM0304	NpFlamma® MMP-13 675	Far red	675	691	Cy®5.5	680 nm	10 dose, 50 dose, 100 dose
PNM0305	NpFlamma® MMP-13 749	NIR	749	774	Cy®7	785 nm	10 dose, 50 dose, 100 dose
PNM0306	NpFlamma® MMP-13 774	NIR	774	800	Cy®7.5	787 nm	10 dose, 50 dose, 100 dose

qFlamma® BLACK01 Quencher

Cat. No.	Product name	Size
QWS1001	qFlamma® Black01 NHS ester	1mg, 5mg, 25mg
QWSN1001	qFlamma® Black01 Sulfo-NHS ester	1mg, 5mg, 25mg
QWA1001	qFlamma® Black01 Vinylsulfone	1mg, 5mg, 25mg
QWC1001	qFlamma® Black01 Carboxylic acid	1mg, 5mg, 25mg
QWM1001	qFlamma® Black01 Maleimide	1mg, 5mg, 25mg
QWE1001	qFlamma® Black01 Amine	1mg, 5mg, 25mg
QWT1001	qFlamma® Black01 Thiol	1mg, 5mg, 25mg
QWR1001	qFlamma® Black01 Dichlorotriazine	1mg, 5mg, 25mg
QWG1001	qFlamma® Black01 PEG4-alkyne	1mg, 5mg, 25mg
QWD1001	qFlamma® Black01 ADIBO	1mg, 5mg, 25mg
QWB1001	qFlamma® Black01 Biotin	1mg, 5mg, 25mg

qFlamma® Blue Quencher

Cat. No.	Product name	Size
QWS4001	qFlamma® Blue NHS ester	5mg, 25mg
QWSN4001	qFlamma® Blue Sulfo-NHS ester	5mg, 25mg
QWA4001	qFlamma® Blue Vinylsulfone	5mg, 25mg
QWC4001	qFlamma® Blue Carboxlaic acid	5mg, 25mg
QWM4001	qFlamma® Blue Maleimide	5mg, 25mg
QWE4001	qFlamma® Blue Amine	5mg, 25mg
QWT4001	qFlamma® Blue Thiol	5mg, 25mg
QWR4001	qFlamma® Blue Dichlorotriazine	5mg, 25mg
QWG4001	qFlamma® Blue PEG4-alkyne	5mg, 25mg
QWD4001	qFlamma® Blue ADIBO	5mg, 25mg
QWB4001	qFlamma® Blue Biotin	5mg, 25mg

qFlamma® Orange Quencher

Cat. No.	Product name	Size
QWS2001	qFlamma® Orange NHS ester	5mg, 25mg
QWSN2001	qFlamma® Orange Sulfo-NHS ester	5mg, 25mg
QWA2001	qFlamma® Orange Vinylsulfone	5mg, 25mg
QWC2001	qFlamma® Orange Carboxlaic acid	5mg, 25mg
QWM2001	qFlamma® Orange Maleimide	5mg, 25mg
QWE2001	qFlamma® Orange Amine	5mg, 25mg
QWT2001	qFlamma® Orange Thiol	5mg, 25mg
QWR2001	qFlamma® Orange Dichlorotriazine	5mg, 25mg
QWG2001	qFlamma® Orange PEG4-alkyne	5mg, 25mg
QWD2001	qFlamma® Orange ADIBO	5mg, 25mg
QWB2001	qFlamma® Orange Biotin	5mg, 25mg

qFlamma® Red Quencher

Cat. No.	Product name	Size
QWS3001	qFlamma® Red NHS ester	5mg, 25mg
QWSN3001	qFlamma® Red Sulfo-NHS ester	5mg, 25mg
QWA3001	qFlamma® Red Vinylsulfone	5mg, 25mg
QWC3001	qFlamma® Red Carboxlaic acid	5mg, 25mg
QWM3001	qFlamma® Red Maleimide	5mg, 25mg
QWE3001	qFlamma® Red Amine	5mg, 25mg
QWT3001	qFlamma® Red Thiol	5mg, 25mg
QWR3001	qFlamma® Red Dichlorotriazine	5mg, 25mg
QWG3001	qFlamma® Red PEG4-alkyne	5mg, 25mg
QWD3001	qFlamma® Red ADIBO	5mg, 25mg
QWB3001	qFlamma® Red Biotin	5mg, 25mg

Citation & Reference

1. Optical Antisense Tumor Targeting in Vivo with an Improved Fluorescent DNA Duplex Probe, Donald J. Hnatowich, *Bioconjugate Chem.* **2009,** *20,* 1223–1227
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4. Prediction of Antiarthritic Drug Efficacies by Monitoring Active Matrix Metalloproteinase-3 (MMP-3) Levels in Collagen-Induced Arthritic Mice Using the MMP-3 Probe, Inchan Youn, *Mol. Pharmaceutics,* **2014**, *11*, 1450−1458
5. Polymeric Nanoparticle-Based Activatable Near-Infrared Nanosensor for Protease Determination In Vivo, Kwangmeyung Kim, *Nano Lett.,* Vol. 9, No. 12, **2009**
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7. Dark Quenched Matrix Metalloproteinase Fluorogenic Probe for Imaging Osteoarthritis Development in Vivo (Seulki Lee, Kyeongsoon Park, Seung-Young Lee, Ju Hee Ryu, Jong Woong Park, Hyung Jun Ahn, Ick Chan Kwon, In-Chan Youn, Kwangmeyung Kim, Kuiwon Choi, *Bioconjugate Chem.,* **2008**, 19 (9), pp 1743–1747)

◉ Crosslinker

Crosslinking is the method for chemically joining two or more molecules by a covalent bond. As crosslinkers (or crosslinking agents) have one or two types of either functional group such as amine group, carboxyl group or thiol group, or reactive group such as NHS ester or maleimide at its terminal, other drugs besides proteins, peptides and even modified nucleic acid are able to connect a variety of molecules.

With a variety of options of functional groups, reactive groups and spacers produced by unique and sophisticated organic chemistry techniques, Crosslinker products of BioActs have been launched to correspond to any requests. Crosslinker products line-up of BioActs continues to expand in accordance with requests from researchers or clients.

Cat. No.	Product name	Size
LCC1111	COOH-PEG2-COOH	25mg
LCC1112	COOH-PEG3-COOH	25mg
LCC1113	COOH-PEG4-COOH	25mg
LCC1114	COOH-PEG5-COOH	25mg
LCC1115	COOH-PEG6-COOH	25mg
LCC1116	COOH-PEG7-COOH	25mg
LCC1117	COOH-PEG8-COOH	25mg
LCC1211	COOH-PEG2B-COOH	25mg
LCC1212	COOH-PEG3B-COOH	25mg
LCC1213	COOH-PEG4B-COOH	25mg
LCC1214	COOH-PEG5B-COOH	25mg
LCC1215	COOH-PEG6B-COOH	25mg
LCC1216	COOH-PEG7B-COOH	25mg
LCC1217	COOH-PEG8B-COOH	25mg
LPA1111	NHS-PEG2-COOH	25mg
LPA1112	NHS-PEG3-COOH	25mg
LPA1113	NHS-PEG4-COOH	25mg
LPA1114	NHS-PEG5-COOH	25mg
LPA1115	NHS-PEG6-COOH	25mg
LPA1116	NHS-PEG7-COOH	25mg
LPA1117	NHS-PEG8-COOH	25mg
LPA1211	NHS-PEG2B-COOH	25mg
LPA1212	NHS-PEG3B-COOH	25mg
LPA1213	NHS-PEG4B-COOH	25mg
LPA1214	NHS-PEG5B-COOH	25mg
LPA1215	NHS-PEG6B-COOH	25mg
LPA1216	NHS-PEG7B-COOH	25mg
LPA1217	NHS-PEG8B-COOH	25mg
LPA1411	Vinylsulfone-PEG2-COOH	25mg
LPA1412	Vinylsulfone-PEG3-COOH	25mg
LPA1413	Vinylsulfone-PEG4-COOH	25mg
LPA1414	Vinylsulfone-PEG5-COOH	25mg
LPA1415	Vinylsulfone-PEG6-COOH	25mg
LPA1416	Vinylsulfone-PEG7-COOH	25mg
LPA1417	Vinylsulfone-PEG8-COOH	25mg
LPA1421	Vinylsulfone-PEG2B-COOH	25mg
LPA1422	Vinylsulfone-PEG3B-COOH	25mg
LPA1423	Vinylsulfone-PEG4B-COOH	25mg

LPA1424	Vinylsulfone-PEG5B-COOH	25mg
LPA1425	Vinylsulfone-PEG6B-COOH	25mg
LPA1426	Vinylsulfone-PEG7B-COOH	25mg
LPA1427	Vinylsulfone-PEG8B-COOH	25mg
LPA1611	Dichlorotriazine-PEG2-COOH	25mg
LPA1612	Dichlorotriazine-PEG3-COOH	25mg
LPA1613	Dichlorotriazine-PEG4-COOH	25mg
LPA1614	Dichlorotriazine-PEG5-COOH	25mg
LPA1615	Dichlorotriazine-PEG6-COOH	25mg
LPA1616	Dichlorotriazine-PEG7-COOH	25mg
LPA1617	Dichlorotriazine-PEG8-COOH	25mg
LPA1621	Dichlorotriazine-PEG2B-COOH	25mg
LPA1622	Dichlorotriazine-PEG3B-COOH	25mg
LPA1623	Dichlorotriazine-PEG4B-COOH	25mg
LPA1624	Dichlorotriazine-PEG5B-COOH	25mg
LPA1625	Dichlorotriazine-PEG6B-COOH	25mg
LPA1626	Dichlorotriazine-PEG7B-COOH	25mg
LPA1627	Dichlorotriazine-PEG8B-COOH	25mg

O PEG linker Introduction

The product information provides it to be biochemically used in the area where PEG can be used.

What is PEG?

As an abbreviation of polyethylene glycol, it is a chemical compound of repetitive single ethylene glycol.

Ethylene glycol Polyethylene glycol (PEG)n

Such polyethylene glycol has a chemical characteristic which allows its use in various areas of biological, chemical, and medicinal environments.

- With no toxicity and immunological limitation, it does not interfere with the cell function or the immunity, and attaches itself to the surface.
- To be able to use as a biological substance, it has to show hydrophilicity. With a high hydrophilic characteristic, polyethylene glycol combines with protein and other biologic molecules to increase solubility.
- The high flexibility allows polyethylene glycol to attach to the surface without structural disturbance.

① PEG Reagent

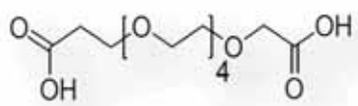
Size can be controlled for polyethylene glycol which can be indicated in the number or molecular weight of ethylene glycol, which is current sold in the industry. BioActs Inc. have produced Crosslinker which enables attachments of protein and other molecules according to length of PEG.

② **Crosslinkers with PEG spacers**

Although protein, peptide and other low & high molecular materials which are frequently used in biochemistry field may often be used in their own forms, sometimes conjugation or tracer between target material need to be attached. In order to solve this matter, we can adopt responsive functional group to the end of PEG polymer and give Homo- or Hetero- functions, so it can play a role as a middle makeshift bridge. Crosslinker (bifunctional cross-linking reagent) is consist of two reactive groups, enabling it to connect to both target group by covalent bonds. Succinimidyl esters, maleimides and iodoacetamides are widely used as functional groups.

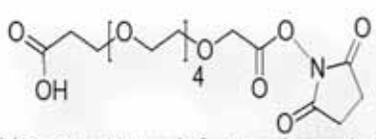
③ **Homobifuctional Crosslinkers**

Homobifunctional cross-linking reagent's functional groups are the same. Such cross-linkers connects functional groups such as two thiols, two amines, two acids or two alcohols. Most are used to form polymers from monomers or intramolecular crosslinks.



㈜BioActs Homobifuctional crosslinker
Flamma® COOH_PEG4_COOH

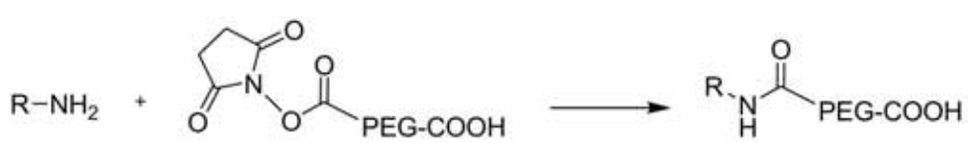
④ **Heterobifuctional Crosslinkers**



㈜BioActs Heterobifuctional crosslinker
Flamma® COOH_PEG4_COOH

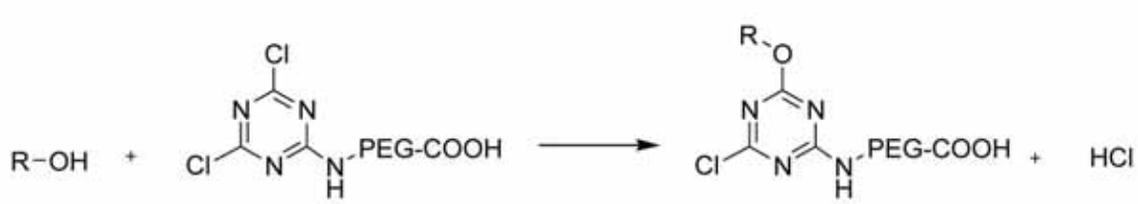
Heterobifunctional crosslinking reagent is constituted differently so that it can create crosslink between different functional groups. Heterobifunctional crosslinker facilitates conjugation between two different biomolecules by creating multiple intermolecular crosslink. As an additional modified form, there is a "zero-length" cross-linking reagent.

- **NHS ester – $(PEG)_n$ – Acetic acid**



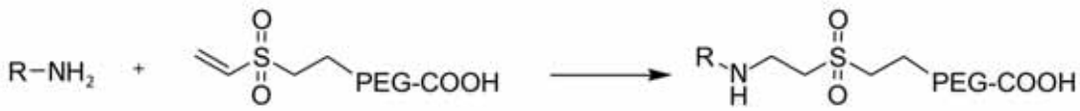
Target site Amine ($-NH_2$)

- **Dichlorotriazine – $(PEG)_n$ – Acetic acid**



Target site Hydroxy (-OH)

- **Vinylsulfone– $(PEG)_n$ – Acetic acid**



Target site Amine ($-NH_2$)

⑤ **Properties**

It melts in not only most of organic solvents, but also in aqueous solution.

⑥ **Transportation**

It is sensitive to light, and prone to moisture. Keep it frozen.

⑦ **Application**

It can be applied in medical researches, drug release, nanotechnology, new material study and cell cultivation. It can also be used in ligand, polypeptide synthetic supporter and new material compound.

O Other crosslinker synthesis

Other than Linker Series, we are also able to adopt more varieties of reactive group to utilize Polyethylene to product service. If the user asks for a specific chemical compound, we synthesize and provide requested Crosslinker. For more information, please contact Order@bioacts.com

ADIBO Amine Azide Biotin Hydrazide Hydroxyl (OH) Maleimide Silane Thiol (SH) Etc. **Fluorescent dye**	$(PEG)_n$	COOH

◉ Classic Labeling Dye

BioActs offers a variety of options of reactive groups and functional groups for traditional fluorescent dyes that has been used consistently.

Cat. No.	Product name	Emission color	Ex_{Max} (nm)	Em_{Max} (nm)	Common filter set	Excitation laser line	Size
CWS1025	FAM NHS ester	Green	492	519	FITC	488 nm	25mg
CWSN1025	FAM Sulfo-NHS ester	Green	492	519	FITC	488 nm	25mg
CWA1020	FAM Vinylsulfone	Green	492	519	FITC	488 nm	25mg
CWI1003	FAM Isothiocyanate	Green	492	519	FITC	488 nm	25mg
CWM1003	FAM Maleimide	Green	492	519	FITC	488 nm	25mg
CWZ1003	FAM Azide	Green	492	519	FITC	488 nm	25mg
CWH1003	FAM Hydrazide	Green	492	519	FITC	488 nm	25mg
CWR2003	FAM Dichlorotriazine	Green	492	519	FITC	488 nm	25mg
CWK1003	FAM Alkyne	Green	492	519	FITC	488 nm	25mg
PWK1701	FAM PEG4-Alkyne	Green	492	519	FITC	488 nm	25mg
DWF1001	FAM ADIBO	Green	492	519	FITC	488 nm	25mg
CWE1003	FAM Amine	Green	492	519	FITC	488 nm	25mg
CWT1003	FAM Thiol	Green	492	519	FITC	488 nm	25mg
KWS1025	TAMRA NHS ester	Orange	543	575	TRITC	488, 532 nm	25mg
KWSN1025	TAMRA Sulfo-NHS ester	Orange	543	575	TRITC	488, 532 nm	25mg
KWA1020	TAMRA Vinylsulfone	Orange	543	575	TRITC	488, 532 nm	25mg
KWI1020	TAMRA Isothiocyanate	Orange	543	575	TRITC	488, 532 nm	25mg
KWM1057	TAMRA Maleimide	Orange	543	575	TRITC	488, 532 nm	25mg
KWZ1025	TAMRA Azide	Orange	543	575	TRITC	488, 532 nm	25mg
KWH1025	TAMRA Hydrazide	Orange	543	575	TRITC	488, 532 nm	25mg
KWR2025	TAMRA Dichlorotriazine	Orange	543	575	TRITC	488, 532 nm	25mg
KWK1025	TAMRA Alkyne	Orange	543	575	TRITC	488, 532 nm	25mg
KWG1025	TAMRA PEG4-Alkyne	Orange	543	575	TRITC	488, 532 nm	25mg
DWR1001	TAMRA ADIBO	Orange	543	575	TRITC	488, 532 nm	25mg
KWE1025	TAMRA Amine	Orange	543	575	TRITC	488, 532 nm	25mg
KWT1057	TAMRA Thiol	Orange	543	575	TRITC	488, 532 nm	25mg
RFP0815	ICG	NIR	785	821	Cy®7.5	785 nm	25mg, 100mg
POS1604	ICG NHS ester	NIR	785	821	Cy®7.5	785 nm	1mg, 5mg, 25mg
POA1616	ICG Vinylsulfone	NIR	785	821	Cy®7.5	785 nm	1mg, 5mg, 25mg
POSN1604	ICG Sulfo-NHS ester	NIR	785	821	Cy®7.5	785 nm	1mg, 5mg, 25mg
POI1616	ICG Isothiocyanate	NIR	785	821	Cy®7.5	785 nm	1mg, 5mg, 25mg
POC1616	ICG Carboxylic acid	NIR	785	821	Cy®7.5	785 nm	1mg, 5mg, 25mg
PWM1301	ICG Maleimide	NIR	785	821	Cy®7.5	785 nm	1mg, 5mg, 25mg
POE1616	ICG Amine	NIR	785	821	Cy®7.5	785 nm	1mg, 5mg, 25mg
PWT1301	ICG Thiol	NIR	785	821	Cy®7.5	785 nm	1mg, 5mg, 25mg
POR2616	ICG Dichlorotriazine	NIR	785	821	Cy®7.5	785 nm	1mg, 5mg, 25mg
POH1616	ICG Hydrazide	NIR	785	821	Cy®7.5	785 nm	1mg, 5mg, 25mg
POK1616	ICG Alkyne	NIR	785	821	Cy®7.5	785 nm	1mg, 5mg, 25mg
POG1616	ICG PEG4-Alkyne	NIR	785	821	Cy®7.5	785 nm	1mg, 5mg, 25mg
DOC1061	ICG ADIBO	NIR	785	821	Cy®7.5	785 nm	1mg, 5mg, 25mg
POZ1616	ICG Azide	NIR	785	821	Cy®7.5	785 nm	1mg, 5mg, 25mg

◉ Avidin,Streptavidin & Biotin Fluorescent Dye

Biotin binds to avidin and streptavidin in a very powerful, fast, and highly specific way. In addition, as biotins bound to streptavidin and avidin are very strong even in high temperature, various acidities and proteolytic activity, this interaction is widely used and applied in biotechnology sector.

Fluorescent substances bound to streptavidin or avidin are widely used for secondary detection in histochemistry, FISH, flow cytometry, microarray and blot analysis, and BioActs offers avidin or streptavidin bound to Flamma® Fluors developed by powerful fluorescent technology with a wide range of line-up.

Cat. No.	Product name	Emission color	Ex_{Max} (nm)	Em_{Max} (nm)	Common filter set	Excitation laser line	Size
RFP0501	Avidin FITC	Green	495	522	FITC	488 nm	5mg, 25mg
RFP0516	Avidin Flamma® 496	Green	496	516	FITC	488 nm	1mg, 5mg, 25mg
RFP0505	Avidin Flamma® 552	Yellow	550	565	TRITC	488, 532 nm	1mg, 5mg, 25mg
RFP0507	Avidin TAMRA	Orange	543	575	TRITC	488, 532 nm	5mg, 25mg
RFP0511	Avidin Flamma® 648	Red	648	663	Cy®5	594, 633 nm	1mg, 5mg, 25mg
RFP0512	Avidin Flamma® 675	Far red	675	691	Cy®5.5	633, 680 nm	1mg, 5mg, 25mg
RFP0513	Avidin Flamma® 749	NIR	749	774	Cy®7	680 nm	1mg, 5mg, 25mg
RFP0514	Avidin Flamma® 774	NIR	774	806	Cy®7.5	785 nm	1mg, 5mg, 25mg
RFP0515	Avidin ICG	NIR	785	821	Cy®7.5	785 nm	1mg, 5mg, 25mg
RFP0601	Biotin FITC	Green	495	522	FITC	488 nm	5mg, 25mg
RFP0616	Biotin Flamma® 496	Green	496	516	FITC	488 nm	1mg, 5mg, 25mg
RFP0605	Biotin Flamma® 552	Yellow	550	565	TRITC	488, 532 nm	1mg, 5mg, 25mg
RFP0607	Biotin TAMRA	Orange	543	575	TRITC	488, 532 nm	5mg, 25mg
RFP0611	Biotin Flamma® 648	Red	648	663	Cy®5	594, 633 nm	1mg, 5mg, 25mg
RFP0612	Biotin Flamma® 675	Far red	675	691	Cy®5.5	633, 680 nm	1mg, 5mg, 25mg
RFP0613	Biotin Flamma® 749	NIR	749	774	Cy®7	680 nm	1mg, 5mg, 25mg
RFP0614	Biotin Flamma® 774	NIR	774	806	Cy®7.5	785 nm	1mg, 5mg, 25mg
RFP0615	Biotin ICG	NIR	785	821	Cy®7.5	785 nm	1mg, 5mg, 25mg
RFP0701	Streptavidin FITC	Green	495	522	FITC	488 nm	5mg, 25mg
RFP0716	Streptavidin Flamma® 496	Green	496	516	FITC	488 nm	1mg, 5mg, 25mg
RFP0705	Streptavidin Flamma® 552	Yellow	550	565	TRITC	488, 532 nm	1mg, 5mg, 25mg
RFP0707	Streptavidin TAMRA	Orange	543	575	TRITC	488, 532 nm	5mg, 25mg
RFP0711	Streptavidin Flamma® 648	Red	648	663	Cy®5	594, 633 nm	1mg, 5mg, 25mg
RFP0712	Streptavidin Flamma® 675	Far red	675	691	Cy®5.5	633, 680 nm	1mg, 5mg, 25mg
RFP0713	Streptavidin Flamma® 749	NIR	749	774	Cy®7	680 nm	1mg, 5mg, 25mg
RFP0714	Streptavidin Flamma® 774	NIR	774	806	Cy®7.5	785 nm	1mg, 5mg, 25mg
RFP0715	Streptavidin ICG	NIR	785	821	Cy®7.5	785 nm	1mg, 5mg, 25mg

Protein Labeling Kit

Flamma® Fluors Protein Labeling Kit of BioActs is a product designed to easily label antibody or protein with various fluorescent substances of Flamma® Fluors. Flamma® Fluors Protein Labeling Kit has been prepared to proceed entire process from labeling reaction to filtration. Flamma® Fluors dye in the product is a reactive dye in which vinylsulfone reactive group that effectively bonds with primary amines of protein is applied and it can create efficient protein-dye conjugates.

Cat. No.	Product name	Emission color	Ex_{Max} (nm)	Em_{Max} (nm)	Common filter set	Excitation laser line	Size
XPL1104	Flamma® 552 Protein labeling kit	Yellow	550	565	TRITC	488, 532 nm	1 kit (1mg x 3rxn)
XPL2104	Flamma® 648 Protein labeling kit	Red	648	663	Cy®5	594, 633 nm	1 kit (1mg x 3rxn)
XPL3104	Flamma® 675 Protein labeling kit	Far red	675	691	Cy®5.5	633, 680 nm	1 kit (1mg x 3rxn)
XPL4104	Flamma® 749 Protein labeling kit	NIR	749	774	Cy®7	680 nm	1 kit (1mg x 3rxn)
XPL5104	Flamma® 774 Protein labeling kit	NIR	774	806	Cy®7.5	785 nm	1 kit (1mg x 3rxn)

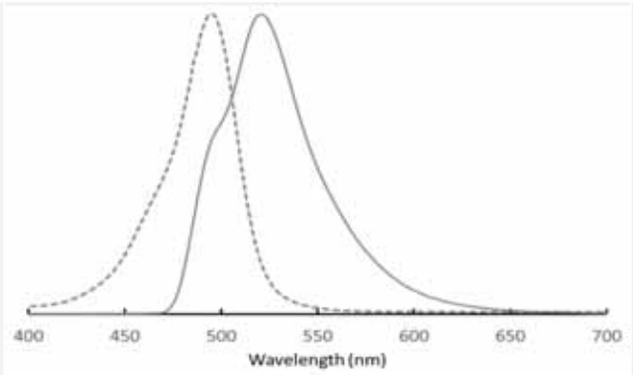
FSD™ Fluors

FSD™ Fluors is new fluorescent dye with superb fluorescent intensity and higher quantum yield than existing fluorescent dyes. The fluorescent intensity of FSD™ Fluors is very great even after combining with biomolecule, such as antibody, peptide, protein, etc., so it can maximize the research result even at a low rate of use. Also with various spectrums of product line, FSD™ Fluors can be used in most of fluorescent equipment, and application research. Since various reactive group selection is available, FSD™ Fluors can provide you more appropriate products for your research.

- ✓ Bright fluorescent Intensity
- ✓ Excellent fluorescent even after combining with biomolecule
- ✓ High quantum yield
- ✓ Able to choose reactive group
- ✓ Fluorescent cover service

Cat. No.	Product name	Emission color	Ex_{Max} (nm)	Em_{Max} (nm)	Common filter set	Excitation laser line	Size
KOSC1002	FSD™ 488 NHS ester	Green	495	519	FITC	488 nm	1mg, 5mg, 25mg
KOSC1003	FSD™ 555 NHS ester	Yellow	552	565	TRITC	488, 532 nm	1mg, 5mg, 25mg
KOSC1001	FSD™ 594 NHS ester	Orange	593	617	TRITC	488, 532 nm	1mg, 5mg, 25mg
KOSC1315	FSD™ 647 NHS ester	Red	650	667	Cy®5	594, 633 nm	1mg, 5mg, 25mg
KOSC1702	FSD™ 750 NHS ester	Far Red	749	774	Cy®7.5	680 nm	1mg, 5mg, 25mg
POSC1803	FSD™ 800 NHS ester	NIR	774	790	Cy®7.5	785 nm	1mg, 5mg, 25mg

① FSD™ 488



Specification

Ex $_{Max}$ / Em $_{Max}$: 495 / 519 nm

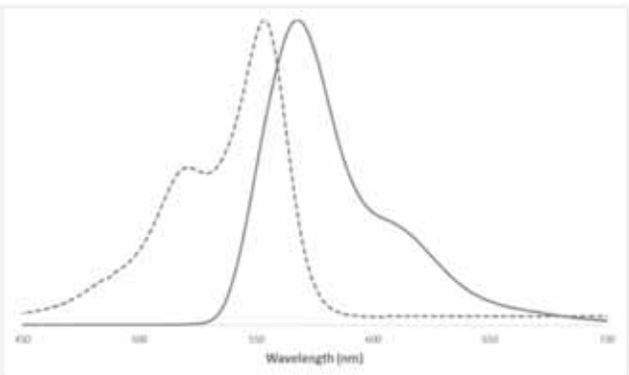
Common filter set : FITC

Laser line: 488 nm Laser

Extinction Coefficient : 71,000 /cm·M in PBS

Excitation-Emission spectrum of FSD™ 488 product

② FSD™ 555



Specification

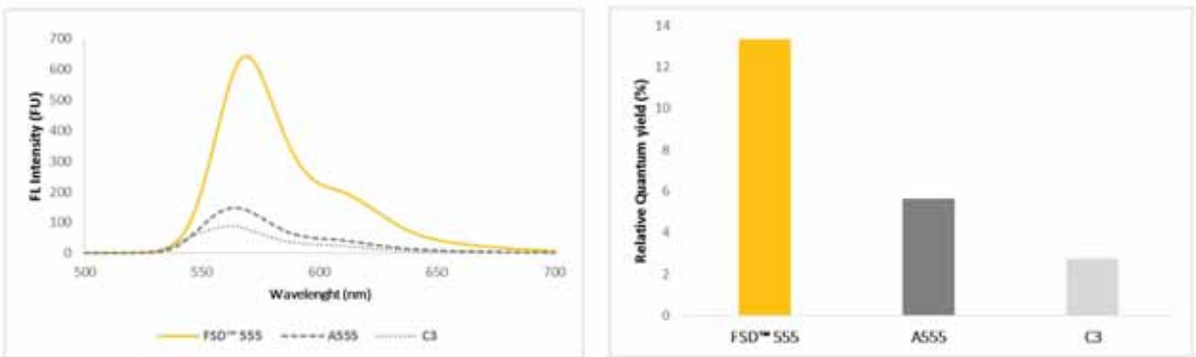
Ex $_{Max}$ / Em $_{Max}$: 552 / 565 nm

Common filter set : TRITC

Laser line: 488, 532 nm Laser

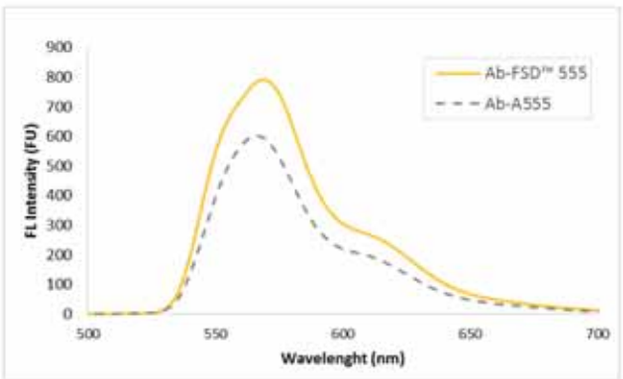
Extinction Coefficient : 155,000 /cm·M in PBS

Excitation-Emission spectrum of FSD™ 555 product



Fluorescent intensity (left) and relative quantum yield (right) comparison of FSD™ 555 with other product -same concentration for each sample

FSD™ 555 has 400% stronger fluorescent intensity and 200% higher quantum yield than other comparison (commercialized) products.



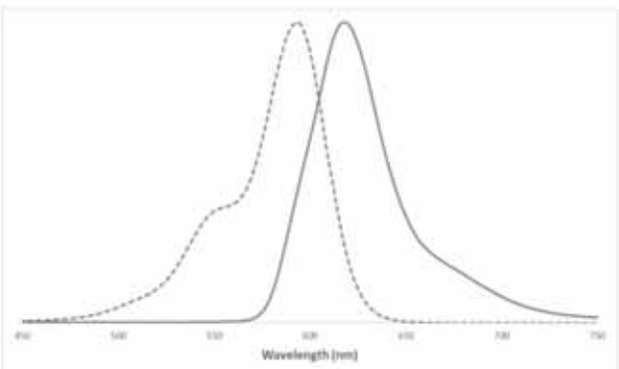
(FL spectrometer)

(FOBI, Light source Green channel)

Comparison of fluorescent intensity after labeling with antibody FSD™ 555 and other product -same antibody concentration

After labeling 25 fold (mole fraction applied) of FSD™ 555 and comparison product to 0.5 mg of antibody (Goat anti-Ms IgG H+L Secondary Ab), higher fluorescent intensity of Ab-FSD™ 555 was confirmed.

③ FSD™ 594



Specification

Ex_{Max} / Em_{Max} : 593 / 617 nm

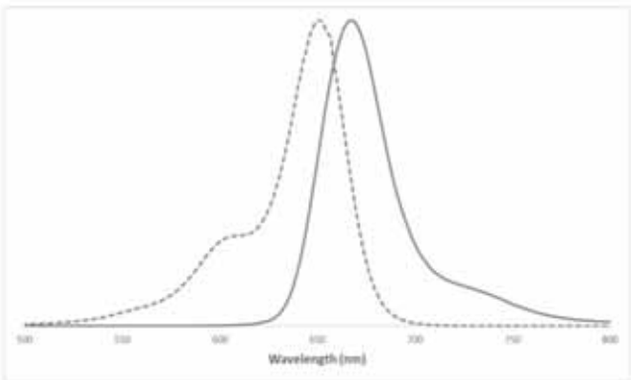
Common filter set : TRITC

Laser line: 561, 594 nm Laser

Extinction Coefficient : 90,000 /cm·M in PBS

Excitation-Emission spectrum of FSD™ 594 product

④ FSD™ 647



Specification

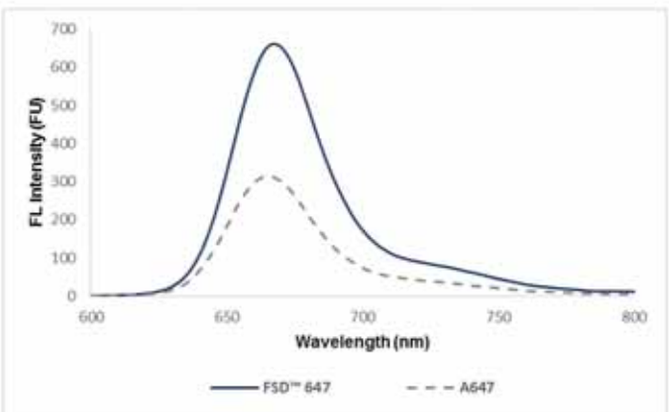
Ex $_{Max}$ / Em $_{Max}$: 650 / 667 nm

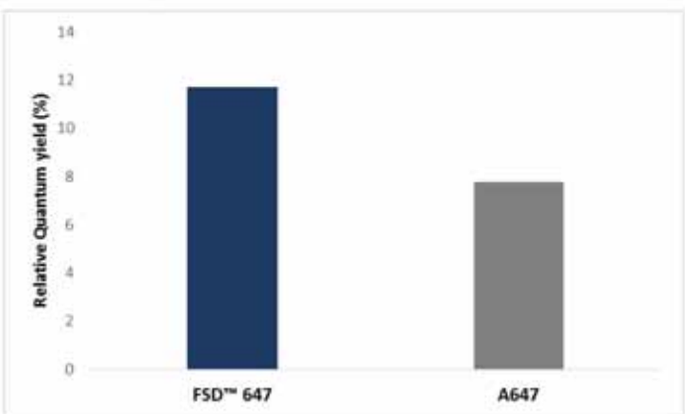
Common filter set : TRITC

Laser line: 594, 663 nm Laser

Extinction Coefficient : 239,000 /cm·M in PBS

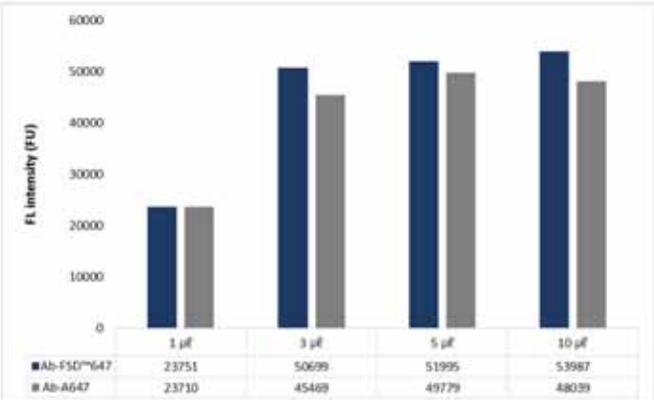
Excitation-Emission spectrum of FSD™ 647 product



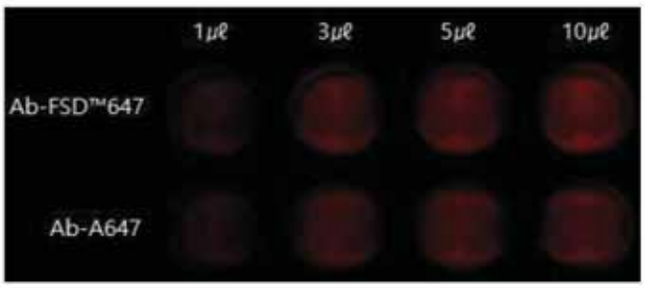


Fluorescent intensity (left) and relative quantum yield (right) comparsin of FSD™ 647 with other product -same concentration for each sample

FSD™ 647 has 150% improved fluorescent intensity and 130% higher quantum yield compared to other companies' products.



(FL - Plate reader)

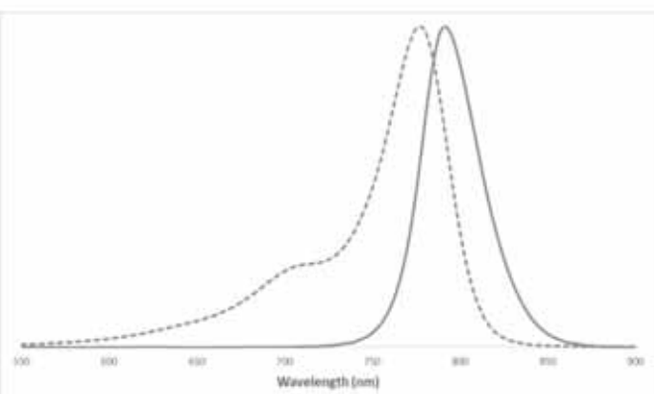


(FOBI, Light source Red channel)

Comparsion of fluorescent intensity after antibody labeling with FSD™ 647 with other product -same antibody concentration

Fluorescent intensity of reactant after labeling FSD™ 647 and A647 were compared and confirmed that the fluorescent intensity of Ab-FSD™ 647 reactant was higher in every dye reactant condition. The molecular weight of FSD™ 647 is about 30% larger than A647. This means that FSD™ 647 reaction (equal weight) show the similar or better intensity, when same molar ratio is applied to both of products. FOBI material is the result that enables us to compare the fluorescent intensity with eyes after mixing the Plate reader measurement sample 1/10.

⑤ FSD™ 800



Specification

Ex $_{Max}$ / Em $_{Max}$: 774 / 790 nm

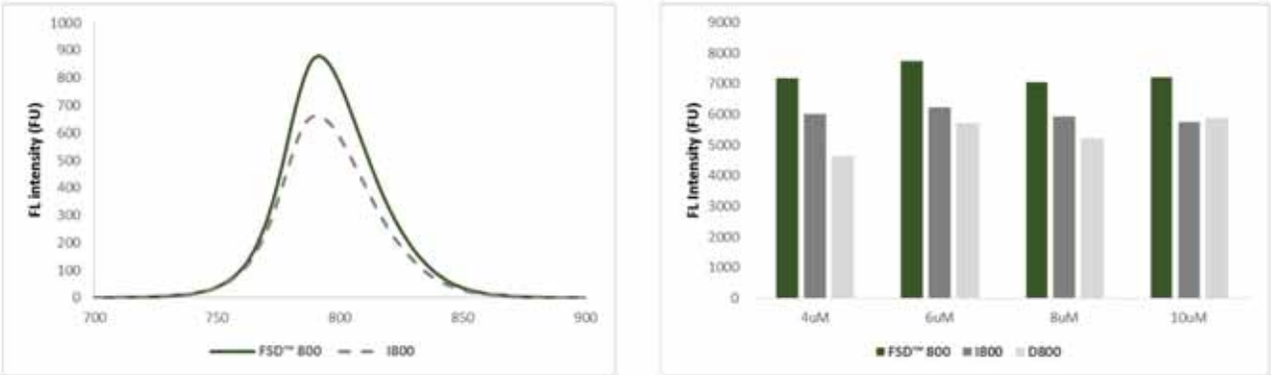
Common filter set : Cy 7.5

Laser line: 785 nm Laser

Extinction Coefficient : 240,000 /cm·M in PBS

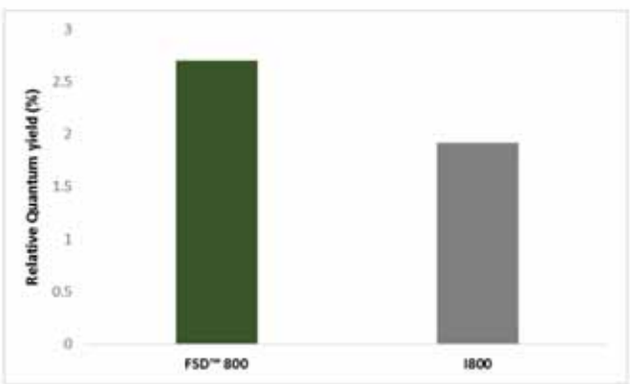
Fluorescent intensity spectrum of FSD™ 800 product

FSD™ 800 is near-infrared fluorescent dye and suitable for *in vivo imaging*, because it is not interfered by auto fluorescent of living organism.



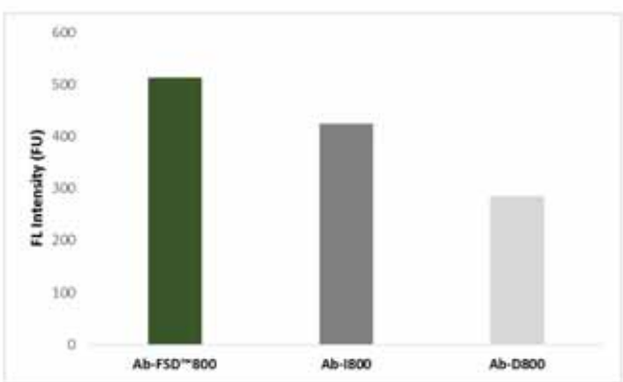
Fluorescent intensity comparison between FSD™ 800 and other product (left) and fluorescent intensity comparison (same concentration) of FSD™ 800 to other product (right)
-same concentration for each sample

When fluorescent intensity of FSD™ 800 and comparison product are compared under the same mole concentration condition, the fluorescent intensity of FSD™ 800 was 130 % higher than other products. When products are measured with various mole concentration, the fluorescent intensity of FSD™ 800 was the strongest in all conditions.



Comparison of relative quantum yield FSD™ 800 with comparison product

FSD™ 800 has a relative quantum yield of over 130% compared to the comparable product I800.



Comparison of fluorescent intensity of FSD™ 800 and other commercialized product after antibody labeling
-same antibody concentration

After labeling 25 fold (mole fraction applied) of FSD™ 800 and two comparison products to 0.5mg of antibody (Goat anti-Ms IgG H+L Secondary Ab), Ab-FSD™ 800 has highest fluorescent intensity of the reactant.

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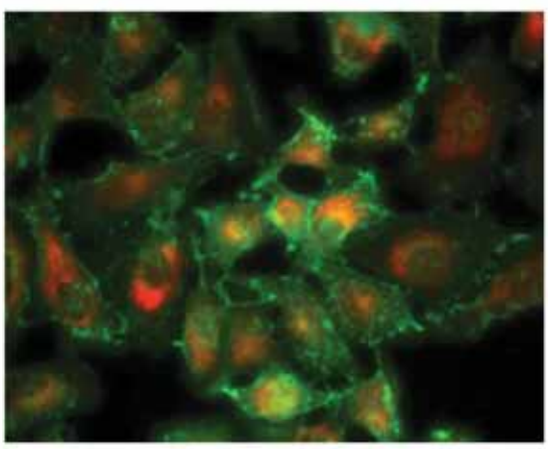
Cell Analysis

A variety of cell studies including organelle detection and studies on function and proliferation of cells can be done using BioActs' bright fluorescent probes and fluorescent antibodies.

◉ Cell Structure



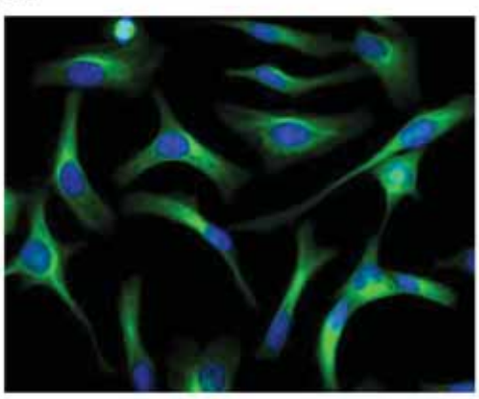
Since organelles have their own unique features, organelle-specific image tracking and analysis are very important research tools in cell biology. In order to conduct selective image tracking of organelles, a probe in which trackable imaging substances are fused is required along with a substance that has a specific reaction to organelles or that bond to organelles.

Along with our advanced fluorescent techniques, BioActs provides its range of services from specifically-bound fluorescent probe which bonds to high specific antibody, drugs and biomolecule to on-off type fluorescent probe area such as appropriate pH and ion concentration and compatible structure environment. BioActs' fluorescent probes for cell analysis purposes can be applied to the products developed to dye live cells based on imaging probes of immobilized cells, as well as to fluorescent microscopy and flow cytometry.

O Cytoskeleton

Alpha tubulin Antibody

Tubulin is a major protein which consists of micro coronary structure which exists in almost every cell. The product recognize 426-450nm epitope of amino acid alpha tubulin. You can make fluorescent images of any waves that you choose for the secondary antibodies with the mark of various fluorescent waves.



- Dilution factor
  - Flow Cytometry (Flow) 3-5 µg/10^6 cells
  - Immunocytochemistry (ICC) Assay Dependent
  - Immunofluorescence (IF) 2 µg/mL
  - Immunohistochemistry (Paraffin) (IHC (P)) 1:400
  - Immunomicroscopy (IM) Assay Dependent
  - Immunoprecipitation (IP) 2 ug/mg
  - Western Blot (WB) 1 µg/ml

Cat. No.	Product name	Host	Target Species reactivity	Application	Size
RPA5414	Alpha tubulin Antibody	Mouse	Human, Mouse, Rat	FACS, ICC, IF, IHC, IP, WB	100 uL

- List of Secondary antibodies available as an option

Host	Target	Fluorephore	Cat. No.	Emission color	Ex_{Max} (nm)	Em_{Max} (nm)	Application	Size
Goat	anti-Mouse IgG	Flamma® 488	RSA1141a	Green	495	519	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 552	RSA1151a	Yellow	550	565	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 594	RSA1191a	Red	590	617	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 648	RSA1161a	Red	648	663	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 675	RSA1171a	Far Red	675	691	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 749	RSA1101a	NIR	749	774	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		ICG	RSA1181a	NIR	785	821	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		HRP	RSA1122a	-	-	-	ICC, IP, ELISA, IHC, WB	0.5mg, 1mg, 2mg

Citation & Reference

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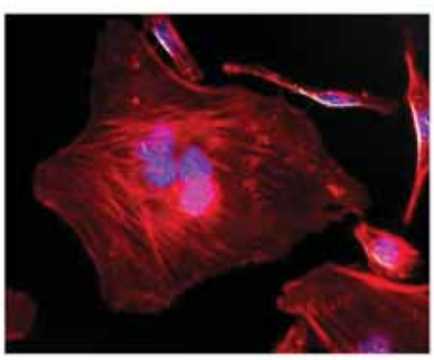
Flamma® Phalloidin



Flamma® Phalloidin is a probe that specific dyes F-actin of cells. Phalloidin selectively combines with F-actin, and is a toxin type that is found at Amanita phalloides that prevents disassembly by stabilization.

Phalloidin is smaller than antibodies, is more specific with F-actin, and is useful in visualizing distribution of F-actin in cells by combining in high-density. By combining Palloidin, which is a selective Maker of F-actin, excellent fluorescent, and Flamma® Fluors dyes that includes the whole spectrum range from UV to NIR, it can be used as an effective imaging tool. Flamma® Phalloidin is optimized for labeling F-actin on fixed or penetrable sample. Its design which enables additional process through stabilized continuity of dying makes available multi-imaging, designing & analyzing various experiments according to their purposes. The probe could be observed with fluorescent microscopes or it could be applied on flow cytometry or micro plate based analysis.

Cat. No.	Product name	Emission color	Ex_{Max} (nm)	Em_{Max} (nm)	Available for	Size
RCS1214	Flamma® 496 Phalloidin	Green	496	516	Fixed cell application	300 assay
RCS2014	Flamma® 553 Phalloidin	Orange	554	584	Fixed cell application	300 assay
RCS1914	Flamma® 594 Phalloidin	Yellow	590	617	Fixed cell application	300 assay
RCS1414	Flamma® 648 Phalloidin	Red	648	663	Fixed cell application	300 assay
RCS1514	Flamma® 675 Phalloidin	Far red	675	691	Fixed cell application	300 assay

Citation & Reference

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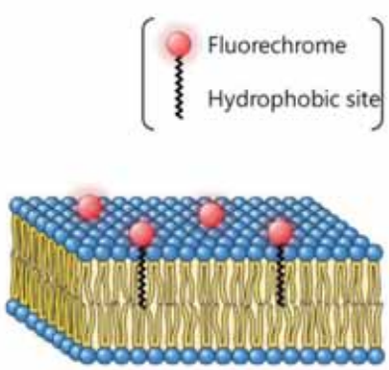
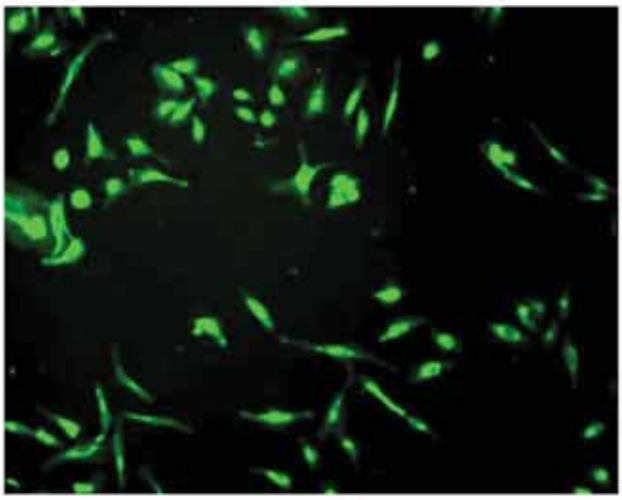
Plasma membrane Cytoskeleton

CytoFlamma® Cell membrane

Cell membrane builds boundary between outside and cells and maintains internal structure. Membrane composed of phospholipids and proteins forms a double layer by properties of phospholipids. Phospholipids are amphiphilic molecules with hydrophobic 'tail' and hydrophilic 'head'. Its hydrophobic portion is located inside and hydrophilic portion is located outside to form a double-layer structure. Using this feature called lipid bilayer, CytoFlamma® Fluors, which is hydrophobic dyes, dyes cell membranes by directly penetrating into cell membranes. Because of its low cytotoxicity and ability to penetrate into cell membranes, it also can be used in live cells.

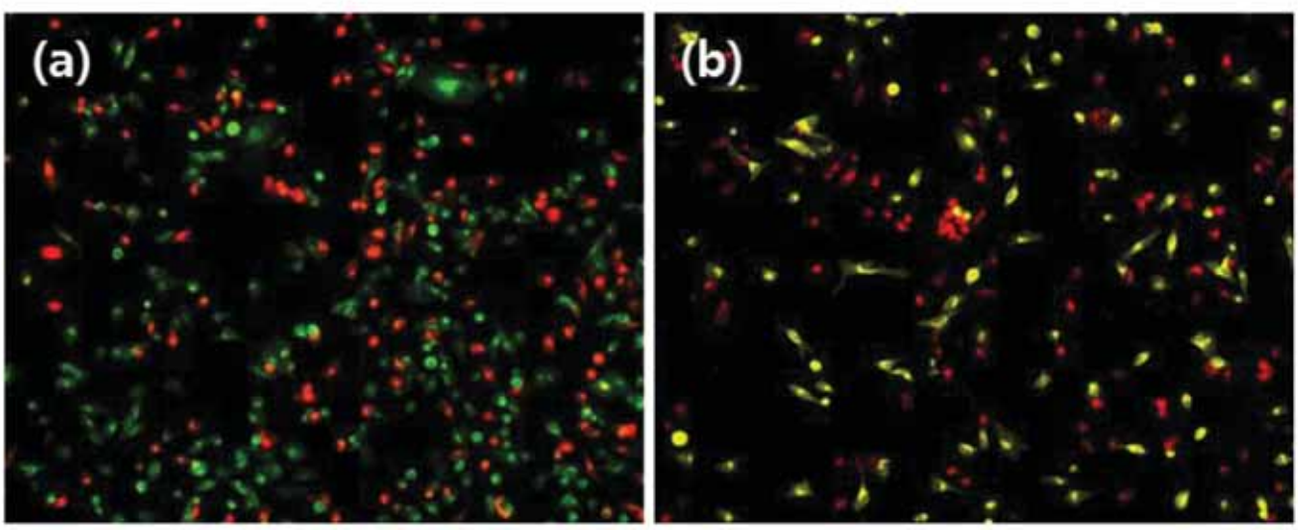


Outer and inner formation of cell and mimetic diagram for principle



CytoFlamma® 488 cell membrane staining

Detaching HeLa cell from plate and treating CytoFlamma® 488 cell membrane and after 5 min staining, dividing to plate again and after 24hr cultivating, got image with FITC filter.



Culture CytoFlamma® Cell membrane after staining

Result from cell cultivation after staining HeLa cell treated with CytoFlamma® series. (a) CytoFlamma® 496 (green) and CytoFlamma® 648 (red) (b) CytoFlamma® 552 (yellow) and CytoFlamma® 648 (red)

Cat. No.	Product name	Emission color	Ex_{Max} (nm)	Em_{Max} (nm)	Available for	Size
RCS1211	CytoFlamma® 496 Cell membrane	Green	496	516	Fixed/Live cell application	0.1mg, 0.5mg, 1mg
RCS1311	CytoFlamma® 552 Cell membrane	Yellow	550	565	Fixed/Live cell application	0.1mg, 0.5mg, 1mg
RCS1411	CytoFlamma® 648 Cell membrane	Red	648	663	Fixed/Live cell application	0.1mg, 0.5mg, 1mg
RCS1511	CytoFlamma® 675 Cell membrane	Far red	675	698	Fixed/Live cell application	0.1mg, 0.5mg, 1mg

Citation & Reference

1. Wheat Germ Agglutinin Staining as a Suitable Method for Detection and Quantification of Fibrosis in Cardiac Tissue after Myocardial Infarction. B. Emde. Eur J Histochem. 2014 Oct 22; 58(4): 2448.

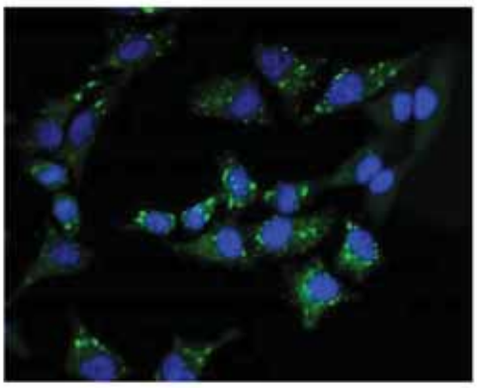
2. Labeling membrane glycoproteins or glycolipids with fluorescent wheat germ agglutinin. Chazotte B. Cold Spring Harb Protoc. 2011 May 1;2011(5)

Mitochondria

COX4 Antibody

Mitochondria are important organelles in the cells of eukaryotes, which produce the adenosine triphosphate(ATP) needed for life activities through oxidative phosphorylation of the energy stored in various organic materials.

Mitochondria occupy 25% of the cytoplasm of cells, have their own DNA, and have a bilayer structure. This mitochondria has considerable influence on cell metabolism and is related with various human disease study such as schizophrenia, bipolar disorder, dementia, Alzheimer's disease, Parkinson's disease, epilepsy, stroke, cardiovascular ailments, chronic fatigue syndrome, retinitis pigmentosa, diabetes, myopathic, polyadenopathy, General disease and etc.



- **Dilution factor**
  - Flow Cytometry (Flow) 1:200
  - Immunocytochemistry (ICC) 1:125
  - Immunofluorescent (IF) 1:125
  - Immunohistochemistry (Frozen) (IHC (F)) 1:1000
  - Immunohistochemistry (Paraffin) (IHC (P)) 1:2000
  - Immunoprecipitation (IP) 1:100
  - Western Blot (WB) 1:1000

Cat. No.	Product name	Host	Target Species reactivity	Application	Size
RPA4111	COX4 Antibody	Rabbit	Human, Rat	FACS, ICC, IF, IHC, IP, WB	100 uL

- List of Secondary antibodies available as an option

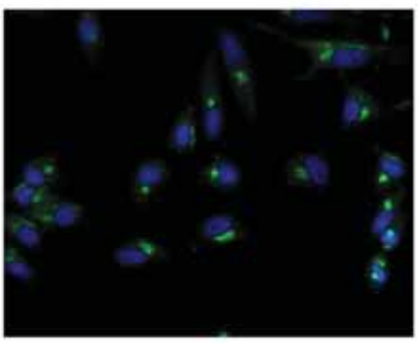
Host	Target	Fluorephore	Cat. No.	Emission color	Ex_{Max} (nm)	Em_{Max} (nm)	Application	Size
Goat	anti-Rabbit IgG	Flamma® 488	RSA1241a	Green	495	519	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 552	RSA1251a	Yellow	550	565	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 594	RSA1291a	Red	590	617	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 648	RSA1261a	Red	648	663	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 675	RSA1271a	Far Red	675	691	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 749	RSA1201a	NIR	749	774	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		ICG	RSA1281a	NIR	785	821	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		HRP	RSA1221a	-	-	-	ICC, IP, ELISA, IHC, WB	0.5mg, 1mg, 2mg

Citation & Reference

1. Agustina, Lia. Visualization of the physical and functional interaction between hMYH and hRad9 by Dronpa bimolecular fluorescence complementation. BMC molecular biology 15.1 (2014): 1.
2. Lee, Cheol-Jung. Magnolin inhibits cell migration and invasion by targeting the ERKs/RSK2 signaling pathway. BMC cancer 15.1 (2015): 1.

Golgi

Golgin-97 Antibody



Golgi body, a cytoplasmic organelle in the cell, which can be found in both plant and animal cells, is responsible for the secretion. Secretory proteins synthesized in the endoplasmic reticulum are transported to the Golgi body, concentrated, and then secreted out of the cell.

In secretory epithelium cell which shows polarity, a Golgi apparatus exist the cell apex of the nuclear periphery locally, in neuron many Golgi apparatuses scattered around the entire cytoplasm, forms net-shape structure. Many disolated Golgi bodies exist in the cytoplasm of Germ cells, the invertebrate, and plant cells. They are called dictyosome. The basic structure of it is Golgi stack layered with multiple flat sacks of Golgi bodies. Three elements of Golgi body is Golgi vesicle, a 50nm diameter vesicle, and Golgi vacuole which is large vacuole. All these things together form a complex system in charge of generating cell walls and the outer skin of cells and the secretion of mucopolysaccharide and enzymes.

Cat. No.	Product name	Host	Target Species reactivity	Application	Size
RPA5212	Golgin-97 Antibody	Mouse	Human	FACS, ICC, IF, IHC, IP, WB	100 ug

- List of Secondary antibodies available as an option

Host	Target	Fluorephore	Cat. No.	Emission color	Ex_{Max} (nm)	Em_{Max} (nm)	Application	Size
Goat	anti-Mouse IgG	Flamma® 488	RSA1141a	Green	495	519	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 552	RSA1151a	Yellow	550	565	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 594	RSA1191a	Red	590	617	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 648	RSA1161a	Red	648	663	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 675	RSA1171a	Far Red	675	691	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 749	RSA1101a	NIR	749	774	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		ICG	RSA1181a	NIR	785	821	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		HRP	RSA1122a	-	-	-	ICC, IP, ELISA, IHC, WB	0.5mg, 1mg, 2mg

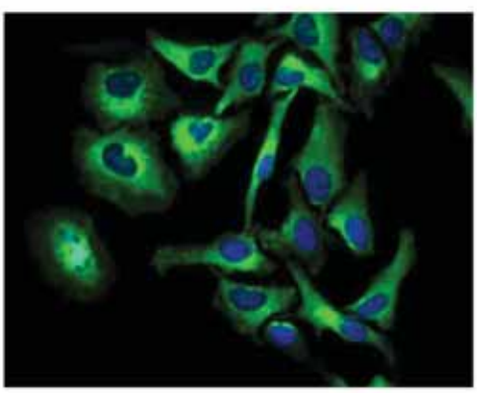
Citation & Reference

1. Agustina, Lia. Visualization of the physical and functional interaction between hMYH and hRad9 by Dronpa bimolecular fluorescence complementation. BMC molecular biology 15.1 (2014): 1.
2. Lee, Cheol-Jung. Magnolin inhibits cell migration and invasion by targeting the ERKs/RSK2 signaling pathway. BMC cancer 15.1 (2015): 1.

Autophagosome

LC3B Antibody

Autophagy is the digesting phenomenon, including cell apparatus, oneself's metabolite and part of the cytoplasm. In Macroautophage, one of the Autophagy, first, there appears isolation membrane structure and forms Autophagosome which is about 1㎛ diameter. Autophagy is double layered membranes and can be digested into closed cytosol in the innermembrane, combined with lysosome which have digestive enzyme. LC3 Protein which is conjugated protein of Autophagy can be useful as a marker for Autophagosome.



- Dilution factor
- Flow Cytometry (Flow) 1:200
- Immunocytochemistry (ICC) 0.1-2 μg/ml
- Immunofluorescent (IF) 0.1-2 μg/ml
- Immunohistochemistry (Frozen) (IHC (F)) 1:400
- Immunohistochemistry (Paraffin) (IHC (P)) 1:200-1:400
- Immunomicroscopy (IM) Assay-Dependent
- Western Blot (WB) 1:1000

Cat. No.	Product name	Host	Target Species reactivity	Application	Size
RPA4313	LC3B Antibody	Rabbit	Human, Mouse, Rat	FACS, ICC, IF, IHC, IP, WB	100 uL

- List of Secondary antibodies available as an option

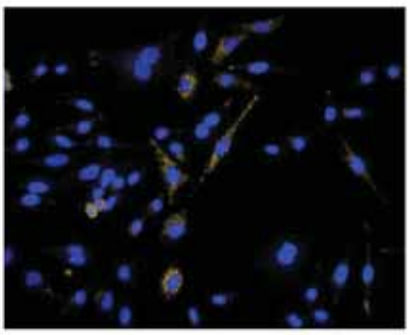
Host	Target	Fluorephore	Cat. No.	Emission color	Ex_{Max} (nm)	Em_{Max} (nm)	Application	Size
Goat	anti-Rabbit IgG	Flamma® 488	RSA1241a	Green	495	519	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 552	RSA1251a	Yellow	550	565	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 594	RSA1291a	Red	590	617	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 648	RSA1261a	Red	648	663	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 675	RSA1271a	Far Red	675	691	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 749	RSA1201a	NIR	749	774	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		ICG	RSA1281a	NIR	785	821	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		HRP	RSA1221a	-	-	-	ICC, IP, ELISA, IHC, WB	0.5mg, 1mg, 2mg

Citation & Reference

1. Agustina, Lia. Visualization of the physical and functional interaction between hMYH and hRad9 by Dronpa bimolecular fluorescence complementation. BMC molecular biology 15.1 (2014): 1.
2. Lee, Cheol-Jung. Magnolin inhibits cell migration and invasion by targeting the ERKs/RSK2 signaling pathway. BMC cancer 15.1 (2015): 1.

Peroxisome

PMP70 Antibody



Peroxisome is one of the granular structures (microbodies) in a cell, and it is an membranous organelle in the cytoplasm with the diameter between 0.4-1.3 μm. It contains oxidative enzymes and catalase to disassemble peroxides or oxides into water and oxygen by reductive cleavage.

Peroxisomal membrane protein 70(PMP70) Polyclonal Antibody is originated from the mouse tissue, and it is suitable for the visualization and tagging of peroxisomes by specifically detecting the peroxisomal membrane proteins.

Using PMP70 Polyclonal Antibody, you can detect peroxisomes and select the secondary antibodies labelled with fluorescent tags of various wavelengths to perform the fluorescent imaging with the selected wavelength.

Cat. No.	Product name	Host	Target Species reactivity	Application	Size
RPA4515	PMP70 Antibody	Rabbit	Human, Mouse, Rat	FACS, ICC, IF, IHC, IP, WB	100 ug

- List of Secondary antibodies available as an option

Host	Target	Fluorephore	Cat. No.	Emission color	Ex_{Max} (nm)	Em_{Max} (nm)	Application	Size
Goat	anti-Rabbit IgG	Flamma® 488	RSA1241a	Green	495	519	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 552	RSA1251a	Yellow	550	565	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 594	RSA1291a	Red	590	617	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 648	RSA1261a	Red	648	663	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 675	RSA1271a	Far Red	675	691	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 749	RSA1201a	NIR	749	774	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		ICG	RSA1281a	NIR	785	821	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		HRP	RSA1221a	-	-	-	ICC, IP, ELISA, IHC, WB	0.5mg, 1mg, 2mg

Citation & Reference

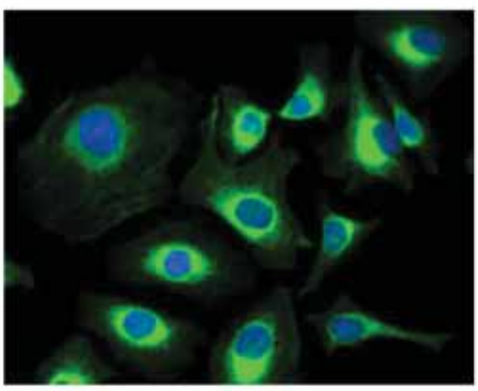
1. Agustina, Lia. Visualization of the physical and functional interaction between hMYH and hRad9 by Dronpa bimolecular fluorescence complementation. BMC molecular biology 15.1 (2014): 1.
2. Lee, Cheol-Jung. Magnolin inhibits cell migration and invasion by targeting the ERKs/RSK2 signaling pathway. BMC cancer 15.1 (2015): 1.

Endoplasmic Reticulum

PDI Antibody

Endoplasmic reticulum is a cell organelle found in all eukaryotic cells, and it functions by producing protein and delivering it to other places in the cell.

Protein disulfide isomerase forms disulfide bonds in newly synthesized protein, reduces, or isomerizes and induces the correct folding of the protein. It's a protein existing in the lumen of the endoplasmic reticulum. Thus, PDI Monoclonal Antibody is suitable to visualize endoplasmic reticulum and to mark. After marking endoplasmic reticulum by using PDI Monoclonal Antibody, we can choose the second antibody marked the fluorescent of the various wavelength and image the fluorescent of wavelength we want.



- Dilution
  - Flow Cytometry (Flow) 0.5-1 ug/test
  - Immunocytochemistry (ICC) 1:100
  - Immunofluorescent (IF) 1:100
  - Immunohistochemistry (Frozen) (IHC (F)) 1:100
  - Immunohistochemistry (Paraffin) (IHC (P)) 1:100
  - Immunomicroscopy (IM) Assay Dependent
  - Immunoprecipitation (IP) Assay dependent
  - Western Blot (WB) 1:200-1:2000

Cat. No.	Product name	Host	Target Species reactivity	Application	Size
RPA5616	PDI Antibody	Mouse	Human, Mouse, Rat	FACS, ICC, IF, IHC, IP, WB	100 ug

- List of Secondary antibodies available as an option

Host	Target	Fluorephore	Cat. No.	Emission color	Ex_{Max} (nm)	Em_{Max} (nm)	Application	Size
Goat	anti-Mouse IgG	Flamma® 488	RSA1141a	Green	495	519	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 552	RSA1151a	Yellow	550	565	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 594	RSA1191a	Red	590	617	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 648	RSA1161a	Red	648	663	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 675	RSA1171a	Far Red	675	691	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 749	RSA1101a	NIR	749	774	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		ICG	RSA1181a	NIR	785	821	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		HRP	RSA1122a	-	-	-	ICC, IP, ELISA, IHC, WB	0.5mg, 1mg, 2mg

Citation & Reference

1. Agustina, Lia. Visualization of the physical and functional interaction between hMYH and hRad9 by Dronpa bimolecular fluorescence complementation. BMC molecular biology 15.1 (2014): 1.
2. Lee, Cheol-Jung. Magnolin inhibits cell migration and invasion by targeting the ERKs/RSK2 signaling pathway. BMC cancer 15.1 (2015): 1.

◉ Cell Viability & Function

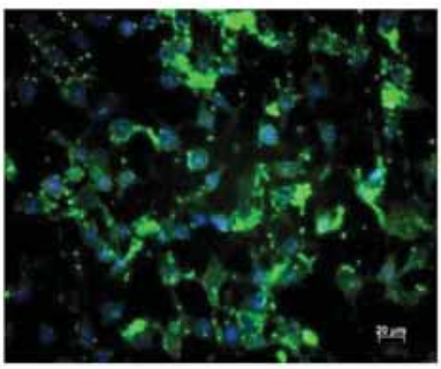
BioActs provides assay products such as apoptosis, DNA damage, etc. for in-situ analysis of cells. Not only widespread assay technology but also BioActs' assay products developed by our leading assay technologies with our advanced fluorescent technology applied are equipped with a wider range of options in selecting fluorescent.

O ApoFlamma® series

ApoFlamma® series completed with BioActs' own probe technology is developed for fluorescent imaging of apoptosis. There are two types of products group that is ApoFlamma® PS series and ApoFlamma® H series. ApoFlamma® PS series combines specifically to Phosphatidylserine (PS) exposed to cell-surface receptor of dead cell and ApoFlamma® H series combines specifically to histone 1 discharged to outside by apoptosis. Each product features a wide range of fluorescent selection from UV to NIR. Also both product group can be used for in vitro/in vivo application and especially product lines in the NIR fluorescent can be used freely from auto fluorescent.

O ApoFlamma® H series

One of apoptosis sign is exposing phenomenon of histone H1 to surface of cell membrane which was combined with DNA in the nucleus. ApoFlamma® H series can detect sensitively histone H1 which is on the surface of cell membrane in the apoptosis. This product is probe product combined Apopep-1 (Apoptosis-targeting Peptide-1) and BioAct's excellent Flamma® Fluors fluorescent dye. Also this product can classify apoptosis and necrosis according to stained location by entering into nucleus and adhering with histone 1. ApoFlamma® H and PS Series products provide necessary reagent to identify apoptosis occurred cell with simple staining process with Fluorescent microscope or Flow cytometry method and analysis.

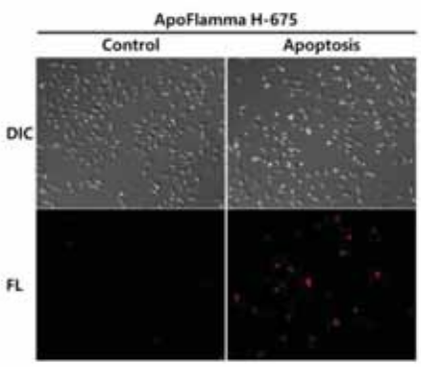


ApoFlamma® H (green) cell imaging

Result obtained by treating ApoFlamma® H FAM after treating H460 cell with Etoposide 50 uM to induce apoptosis. Can confirm marking around nuclear envelop of cell through image.

ApoFlamma® H 675 microscope imaging

Result obtained from treating ApoFlamma® H 675 after treating HeLa cell 6hr with Actinomycin D 1uM. Imaging was not made to cell at which apoptosis was not induced but can confirm marking around nuclear envelop of apoptosis induced cell and can confirm auto fluorescent was not affected by advantages of NIR wavelength.

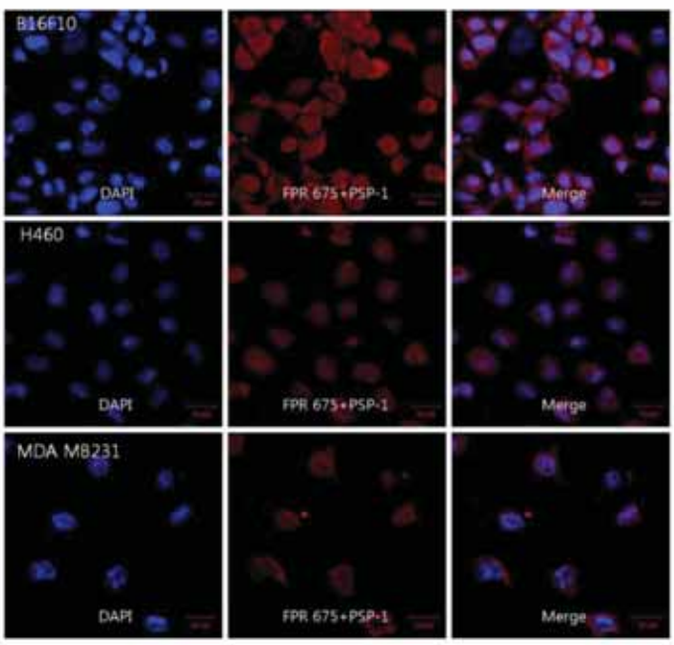


Key Features

- Using at various platform (Histology, Cell, FACS)
- Noncompetitive combination with Annexin V
- Do not depend on calcium

ApoFlamma® PS series

As early stage of apoptosis, phosphatidylserine (PS) which is cell membrane phospholipid, is exposed to outside of cell by moving from inside of cell membrane to outside. Dead cell can be detected by combining specific peptide sequence and excellent BioAct's FAM (fluorescein) fluorescent dye. By using ApoFlamma® H and PS Series products can check cell where apoptosis had occurred with simple staining process using Fluorescent microscope or Flow cytometry.



Microscope observation of ApoFlamma® PS series for dead cell

This is fluorescent imaging of various cells (B16F10, H460, MDA-MB-231) at which apoptosis was induced by treating etoposide and result of each cell stained with FRP 675+PSP-1 (product name: ApoFlamma® PS 675). Confirmed apoptosis occurred cell through imaging.

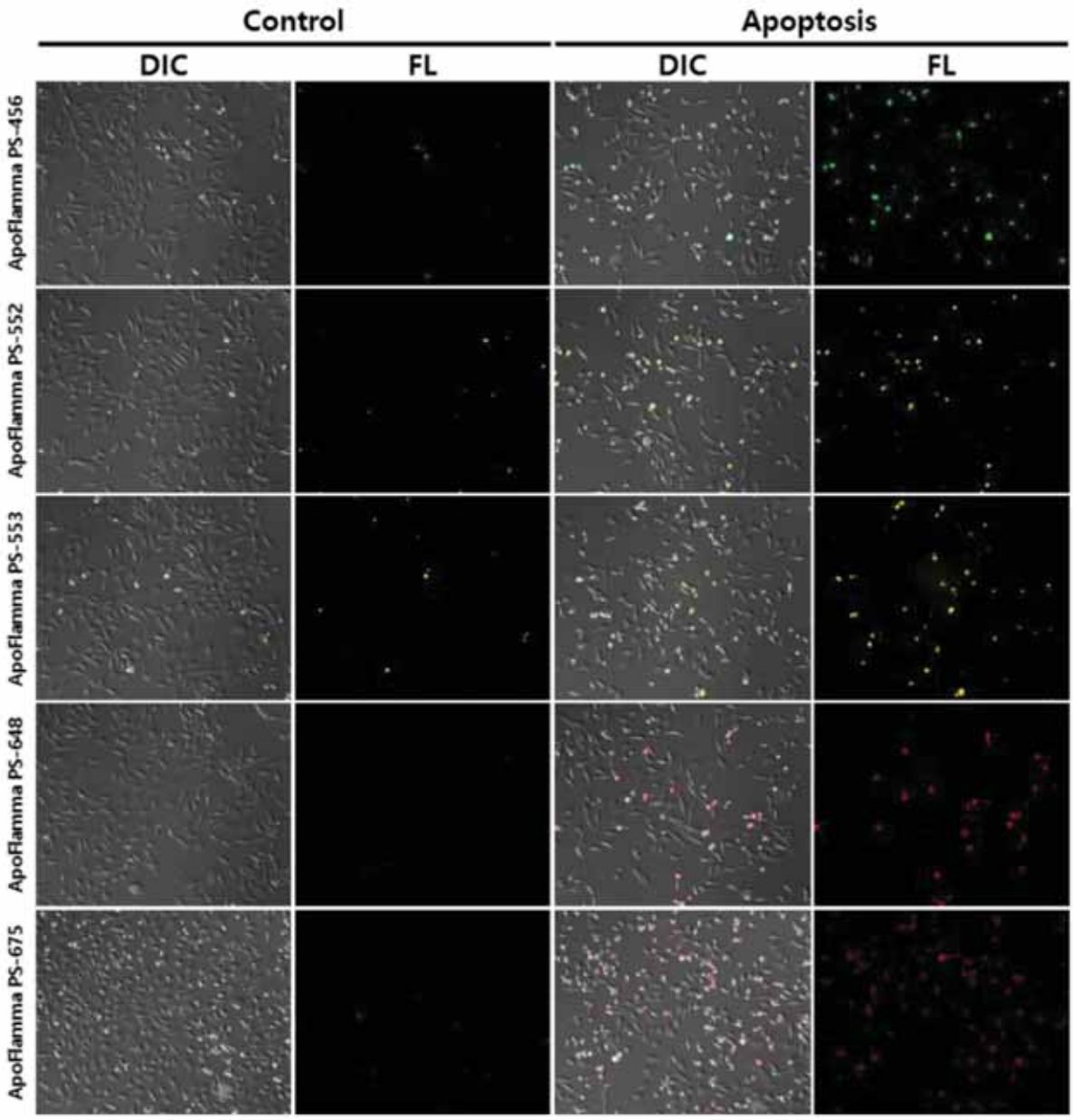


Image observation for inside of ApoFlamma® PS series cell

This is result of treating each ApoFlamma® PS series after treating HeLa cell 6hr with Actinomycin D (Act D) 1uM. Imaging is not made for cell which apoptosis was not induced but can confirm PS was marked on apoptosis induced cell through imaging.

Cat. No.	Product name	Emission color	Ex_{Max} (nm)	Em_{Max} (nm)	Available for	Size	Target
AHW1025	ApoFlamma® H FAM	Green	492	519	Live cell application	50, 250 or 1000 assay	Histone-1
AHP1001	ApoFlamma® H TAMRA	Orange	543	575	Live cell application	50, 250 or 1000 assay	Histone-1
AHW1011	ApoFlamma® H 552	Yellow	550	565	Live cell application	50, 250 or 1000 assay	Histone-1
AHW1028	ApoFlamma® H 560	Yellow	560	589	Live cell application	50, 250 or 1000 assay	Histone-1
AHW1415	ApoFlamma® H 581	Yellow	581	596	Live cell application	50, 250 or 1000 assay	Histone-1

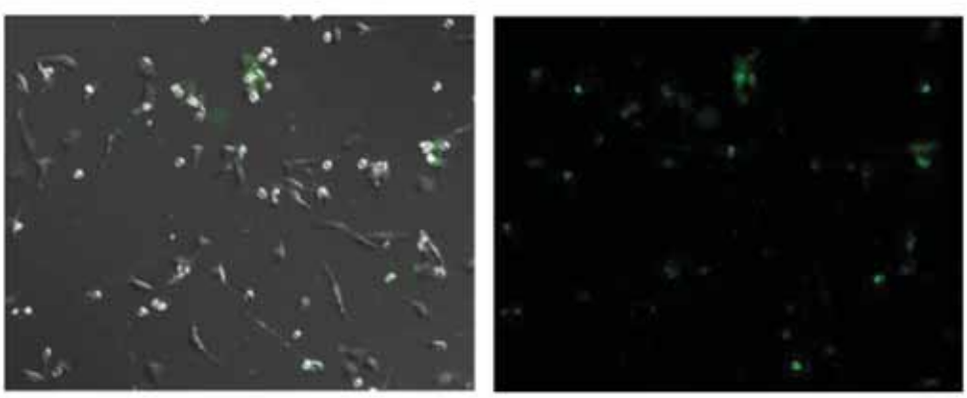
AHW1215	ApoFlamma® H 648	Red	648	663	Live cell application	50, 250 or 1000 assay	Histone-1
AHW1501	ApoFlamma® H 675	Far red	675	691	Live cell application	10, 50 or 200 assay	Histone-1
AHW1301	ApoFlamma® H 749	NIR	749	774	Live cell application	10, 50 or 200 assay	Histone-1
AHW1601	ApoFlamma® H 774	NIR	774	806	Live cell application	10, 50 or 200 assay	Histone-1
AHO1601	ApoFlamma® H ICG	NIR	785	821	Live cell application	10, 50 or 200 assay	Histone-1
APW1025	ApoFlamma® PS FAM	Green	492	519	Live cell application	50, 250 or 1000 assay	Phosphatidyl serine
APP1001	ApoFlamma® PS TAMRA	Orange	543	575	Live cell application	50, 250 or 1000 assay	Phosphatidyl serine
APW1011	ApoFlamma® PS 552	Yellow	550	565	Live cell application	50, 250 or 1000 assay	Phosphatidyl serine
APW1028	ApoFlamma® PS 560	Yellow	560	589	Live cell application	50, 250 or 1000 assay	Phosphatidyl serine
APW1415	ApoFlamma® PS 581	Yellow	581	596	Live cell application	50, 250 or 1000 assay	Phosphatidyl serine
APW1215	ApoFlamma® PS 648	Red	648	663	Live cell application	50, 250 or 1000 assay	Phosphatidyl serine
APW1501	ApoFlamma® PS 675	Far red	675	691	Live cell application	10, 50 or 200 assay	Phosphatidyl serine
APW1301	ApoFlamma® PS 749	NIR	749	774	Live cell application	10, 50 or 200 assay	Phosphatidyl serine
APW1601	ApoFlamma® PS 774	NIR	774	806	Live cell application	10, 50 or 200 assay	Phosphatidyl serine
APO1601	ApoFlamma® PS ICG	NIR	785	821	Live cell application	10, 50 or 200 assay	Phosphatidyl serine

Citation & Reference

1. An apoptosis-homing peptide-conjugated low molecular weight heparin-taurocholate conjugate with antitumor properties. Bae SM. Biomaterials 34 (2013) 2077-2086.
2. Polyproline-type helical-structured low-molecular weight heparin (LMWH)-taurocholate conjugate as a new angiogenesis inhibitor. Lee E, Int J Cancer 2009;15:2755-65.

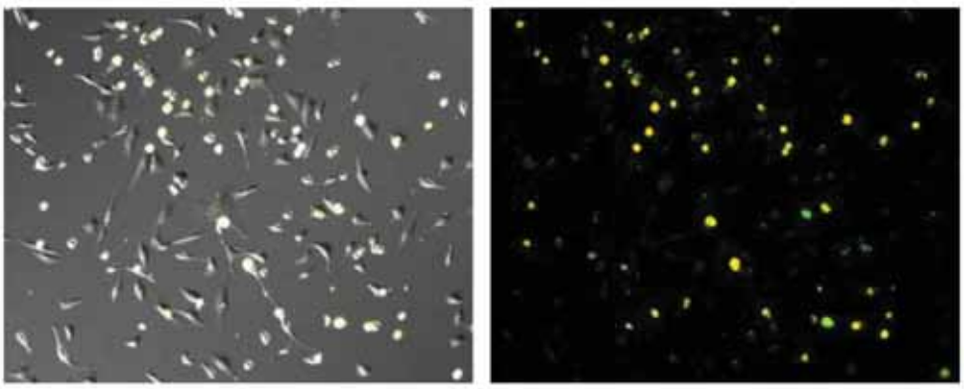
O Annexin V Flamma® series

As oncoming sign of apoptosis, phosphatidylserine (PS) which is cell membrane phospholipid, is exposed to surface of cell by moving from inside of cell membrane to outside. Annexin V is calcium dependent phospholipid combining protein adhering to phospholipid which is negative charged like PS. Accordingly can detect dead cell using Annexin-V Flamma® probe (Annexin V) detecting cell membrane imbalance of cell where apoptosis is occurring. This is apoptosis detecting product based on Annexin V at which Flamma® fluorescent technique was applied and has wide fluorescent selecting option to cope with various fluorescent channel except FITC channel.



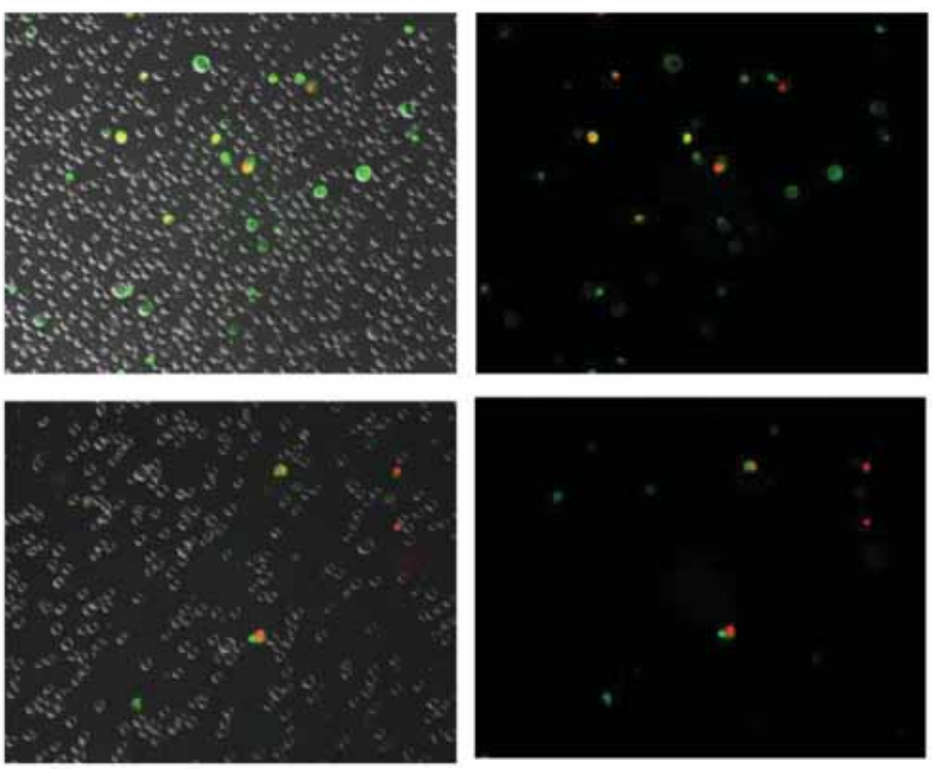
Annexin V - Flamma® 488 cell staining

Induced apopotosis by treating Actinomycin D at HeLa cell in advance and obtained cell image after staining 1X Annexin V binding buffer 15 min with Annexin V - Flamma® 488 diluted with 1:20 dilution factor. Right drawing is fluorescent merging image and left drawing includes DIC.



Annexin V - Flamma® 488, PI cell staining

Induced apopotosis by treating Actinomycin D on HeLa cell in advance and obtained cell image after staining 1X Annexin V binding buffer 15 min with Annexin V - Flamma® 488 (Green), PI (Yellow) diluted with 1:20 dilution factor. Right drawing is fluorescent merging image and left drawing includes DIC.



Annexin V - Flamma® 488 cell staining

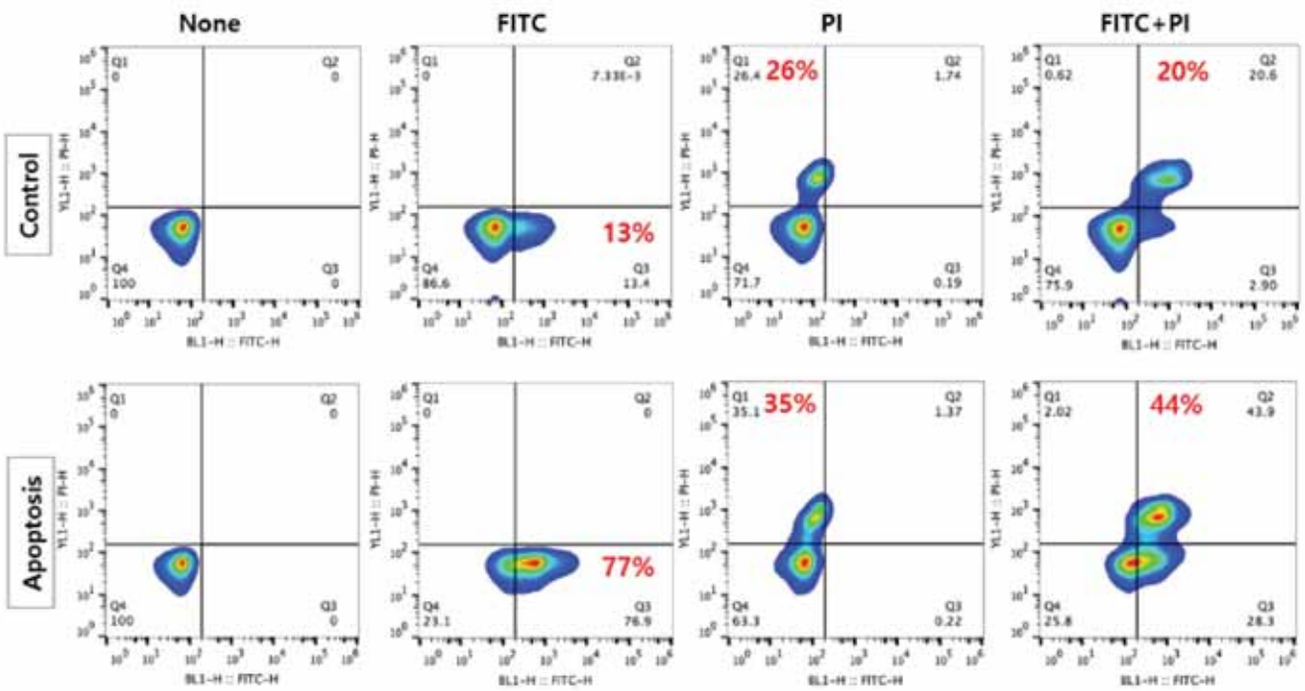
Induced apoptosis by treating Actinomycin D on HL 60 cell and obtained dell image by staining 1X Annexin V binding buffer 15 min with Annexin V - Flamma® 488 and 1ug/ml concentration of PI diluted with 1:20 dilution factor. Upper and lower image are same pictures and right picture is fluorescent merging image and left picture is right picture includes DIC picture. Cell marked with green color can detect early stage dead cell as stained with Annexin V - Flamma® 488 and knew red stained cell with PI is cell in necrosis.

Classification of dead cell, natural death or necrosis is needed to detect and analyze more specific dead cells with Annexin V Flamma® series. Such classification can be distinguished with staining pattern by proceeding double staining with Annexin V and propidium iodide (PI). PI is a principle to stain nucleic acid by permeating cell membrane of dead cell, can detect natural death or cell necrosis.

So normal living cell is not marked at Annexin V and PI, early stage dead cell is stained with Annexin V and natural death or cell subject to necrosis is stained with PI. Also late stage dead cells are stained both with Annexin V and PI, that is late stage dead cells' cell membrane is not strong that stained with PI permeated cell membrane together with Annexin V and can be analyzed.

Annexin V-Flamma® Apoptosis detection Kit includes PI solution and Annexin V Binding buffer. Through simple staining process, can be used to detect early stage apoptosis with fluorescent microscope and Flow cytometry. Specimen analysis is performed on live cell and cell fixation process is not needed.

This is apoptosis detecting product based on Annexin V applied Flamma® fluorescent technique and has wide fluorescent selecting option to cope with various fluorescent channel except FITC channel.



Analysis and detection of Annexin V - Flamma® 488 and PI, parenchymatous cell

At Hela cell, apoptosis of cell was induced by treating with Actinomycin D in advance and after staining Annexin V - Flamma® 488, PI for 15min with 1X Annexin V binding buffer diluted with 1:20 dilution factor, check quantitative value through cell analysis.

Kit Component (Microscopy / FACS)

- Annexin V
- 5x Annexin V binding buffer
- Propidium iodide (PI)

Cat. No.	Product name	Emission color	Ex_{Max} (nm)	Em_{Max} (nm)	Size
XAP1102	Annexin V-FITC Apoptosis detection kit	Green	492	519	50 assay, 250 assay
XAP1201	Annexin V-Flamma® 488 Apoptosis detection kit	Green	495	519	50 assay, 250 assay
XAP1301	Annexin V-Flamma® 552 Apoptosis detection kit	Yellow	550	565	50 assay, 250 assay
XAP1801	Annexin V-TAMRA Apoptosis detection kit	Yellow	543	575	50 assay, 250 assay
XAP1901	Annexin V-Flamma® 560 Apoptosis detection kit	Yellow	560	589	50 assay, 250 assay
XAP2102	Annexin V-FITC	Green	492	519	50, 250 or 1000 assay
XAP2202	Annexin V-Flamma® 488	Green	495	519	50, 250 or 1000 assay
XAP2302	Annexin V Flamma® 552	Yellow	550	565	50, 250 or 1000 assay
XAP2802	Annexin V Flamma® TAMRA	Yellow	543	575	50, 250 or 1000 assay
XAP2902	Annexin V-Flamma® 560	Yellow	560	589	50, 250 or 1000 assay
XAP2402	Annexin V Flamma® 648	Red	648	663	50, 250 or 1000 assay
XAP2022	Annexin V Flamma® 675	Far Red	675	691	50, 250 or 1000 assay
XAP2032	Annexin V Flamma® 749	NIR	749	774	50, 250 or 1000 assay
XAP2042	Annexin V Flamma® 774	NIR	774	806	50, 250 or 1000 assay
XAP2052	Annexin V Flamma® ICG	NIR	785	821	50, 250 or 1000 assay

Citation & Reference

1. Molecular imaging of apoptosis: from micro to macro. Zeng W, Wang X, Xu P, Liu G, Eden HS, Chen X. Theranostics. 2015 Feb 20;5(6):559-82.
2. Quantification of apoptosis and necroptosis at the single cell level by a combination of Imaging Flow Cytometry with classical Annexin V/propidium iodide staining. Pietkiewicz S, Schmidt JH, Lavrik IN. J Immunol Methods. 2015 Aug;423:99-103. doi: 10.1016/j.jim.2015.04.025. PubMed PMID: 25975759.
3. Cell harvesting method influences results of apoptosis analysis by annexin V staining. Bundscherer A, Malsy M, Lange R, Hofmann P, Metterlein T, Graf BM, Gruber M. Anticancer Res. 2013 Aug;33(8):3201-4. PubMed PMID: 23898079.

O TUNEL assay Kit

Flamma® Fluors TUNEL assay kit can specifically detect apoptotic cell in the cell aggregates and measure its amount. Flamma® Fluorometric TUNEL assay detects DNA schizolysis that is a biochemical feature commonly occurring in the process of apoptosis regardless of the kind of cell. This product, at simple non-radioactive test, detects apoptotic cell death from adherent cells and suspension cells at the single cell level exactly and quickly.

In addition, it can be applied to analysis of apoptotic cell of paraffin-embedded tissue sections as well as cultured cells. Also TUNEL assay kit fluorescence has a wide range of fluorescent selection to accommodate a variety of fluorescent channels besides FITC channel.

Kit Component

- 5x Reaction Buffer
- Flamma® Fluors – dUTP mixture
- Terminal Deoxynucleotidyl Transferase Recombinant (30Units/ μL)
- 20x Rinse Buffer
- Plastic coverslips

Cat. No.	Product name	Emission color	Ex_{Max} (nm)	Em_{Max} (nm)	Available for	Size
XTN1101	FITC TUNEL assay kit	Green	495	522	Fixed cell application	50 assay, 100assay, 200assay
XTN1401	Flamma® 488 TUNEL assay kit	Green	494	523	Fixed cell application	50 assay, 100assay, 200assay
XTN1201	Flamma® 552 TUNEL assay kit	Yellow	551	570	Fixed cell application	50 assay, 100assay, 200assay
XTN1301	Flamma® 648 TUNEL assay kit	Red	648	672	Fixed cell application	50 assay, 100assay, 200assay

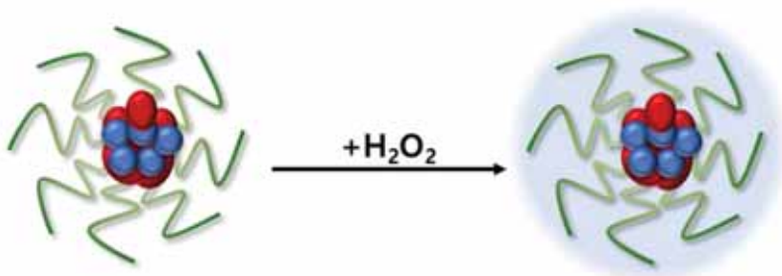
Citation & Reference

1. Arsenic Trioxide Selectively Induces Acute Promyelocytic Leukemia Cell Apoptosis Via a Hydrogen Peroxide-Dependent Pathway. 1999. Yongkui Jing, Jie Dai, Ruth M.E. Chalmers-Redman, Willam G. Tatton and Samuel Waxman. *Blood*. 94, 2102-2111.
2. Activation of a PGC-1-related coactivator (PRC)-dependent inflammatory stress program linked to apoptosis and premature senescence. 2013. Gleyzer N, Scarpulla RC. *J Biol Chem*. 288, 8004-8015.
3. A 43 kD protein from the leaves of the herb Cajanus indicus L. modulates doxorubicin induced nephrotoxicity via MAPKs and both mitochondria dependent and independent pathways. 2012. Pal S, Sil PC. *Biochimie*. 94. 1356-1367.

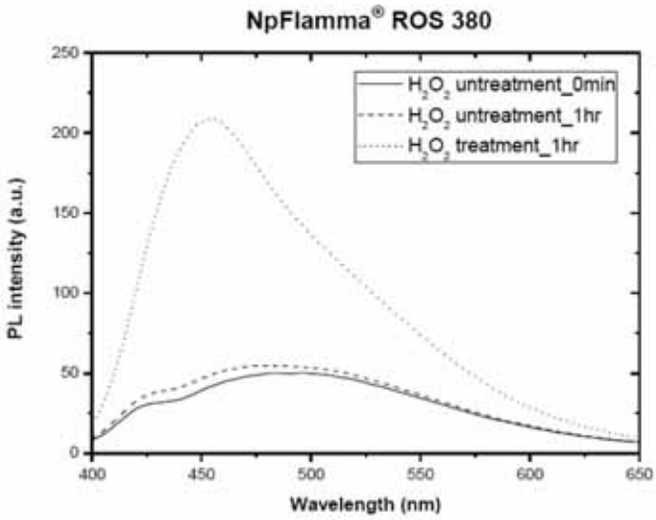
O NpFlamma® ROS 380

NpFlamma® ROS 380 is a compound that generates fluorescent by reacting to Reactive Oxygen Species (ROS), and it is a water-dispersed fluorescent probe available for detecting various diseases associated with inflammation in real time. This product is a fluorescent probe that measures oxidative stress, and it enables Ex max. 380, Em max. 450nm observations when active oxygen species are generated. In reduced state it is hardly fluorescent, but shows bright fluorescent when oxidized by reactive oxygen species.

As advantage of NpFlamma® ROS 380 is that there is no interference of excitation light and background fluorescent because it does not require an excitation light irradiation, and it can obtain high signals and is advantageous for detection in despite of its low luminescence efficiency compared to fluorescent detection method.



NpFlamma® ROS 380 reaction scheme



Fluorescent signal measuring graph according to existence and non- existence of H2O2 of NpFlamma® ROS 380

Result of observing fluorescent signal, 1hr after treating H2O to NpFlamma® ROS 380 1mg/ml. Can confirm difference of fluorescent signal of particle contingent upon H2O2 treatment.

Cat. No.	Product name	Emission color	Ex_{Max} (nm)	Em_{Max} (nm)	Application	Size
SSH0001	NpFlamma® ROS 380	● Blue	380	450	ROS detection	1mg

Citation & Reference

1. Fluorogenic nanoreactor assembly with boosted sensing kinetics for timely imaging of cellular hydrogen peroxide. J Heo, CK Lim, Chem. Commun., 2016, 52, 1131-1134.

◉ Immunofluorescent Imaging

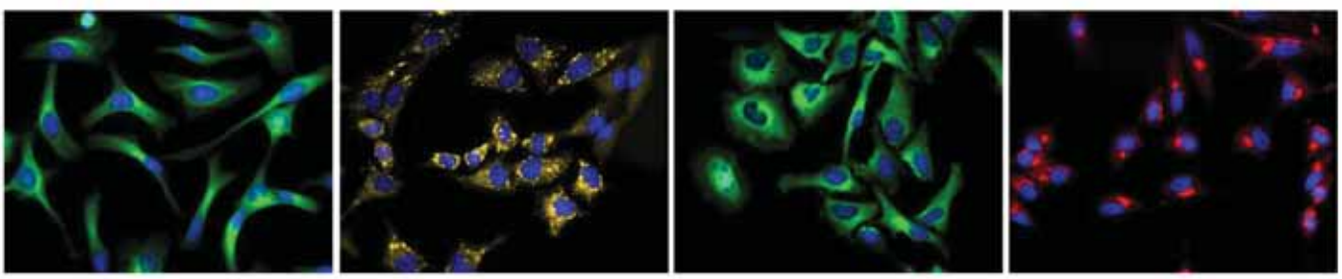
Immunofluorescent is a technique used in a variety of assay analysis as well as fluorescent imaging applications. Immunofluorescent technique is a method devised to assay or imaging with immunostaining through fluorescent detecting and tracking the target substance by labeling fluorescent dye to antibodies showing specific bonds to particular antigens or compounds. Immunofluorescent method can be applied to tissue sections, cultured cell lines and a single cell, and detecting targets can be biochemical molecules such as saccharides and proteins, and biomolecules such as drugs. For immunostaining utilizing antibody, it is often used in combination with other fluorescent probes not using antibody.

O Unconjugated Primary Antibody

BioActs supplys high purity primary antibody. Can get clear image by using primary antibody targeting cell organelle such as Tubulin, Mitochondria, Autophagosome, golgi and wide lines of secondary antibody combined with excellent and various kinds of fluorescent dye Flamma® series or horseradish peroxidase (HRP) together. BioActs' fluorescent secondary antibody drives best result at the most fluorescent link system such as fluorescent microscope and Confocal Laser Scanning Microscope (CLSM), flow cytometry, fluorescent western blot, etc under strict production process and QC. BioActs' HRP secondary antibody also shows ultimate performance in the all area of chemiluminescent detection systems for proteome sympathy. More information can be referenced from technique supporting part of bioacts.com or antibodycenter.co.kr.

Cat. No.	Product name	Host	Target	Available for	Size
RPA5414	Alpha tubulin antibody (Tubulin)	Mouse	Human, Mouse, Rat	FACS, ICC, IF, IHC, IP, WB	100ul
RPA4111	Cox4 antibody (Mitochondria)	Rabbit	Human, Rat	FACS, ICC, IF, IHC, IP, WB	100ul
RPA4313	LC3B Antibody (Autophagosome)	Rabbit	Human, Rat, Mouse	FACS, ICC, IF, IHC, IP, WB	100ul
RPA5212	Golgin-97 Antibody (Golgi)	Mouse	Human	FACS, ICC, IF, IHC, IP, WB	100ug
RPA5616	PDI Antibody (Endoplasmic reticulum)	Mouse	Human, Mouse, Rat	FACS, ICC, IF, IHC, IP, WB	100ul
RPA4515	PMP70 Antibody (Peroxisome)	Rabbit	Human, Mouse, Rat	FACS, ICC, IF, IHC, IP, WB	100ug

O Conjugated Secondary Antibody for Imaging



Indirect or secondary immunofluorescent method is more generally used than a combined method of direct fluorescent method and secondary antibody due to strong signal amplification structure and low cost advantages. Primary antibody of indirect immunofluorescent method is an antibody specifically combines to target molecule has no fluorescent label, secondary antibody is an antibody using primary antibody as an antibody and is a polyclonal antibody as well as labelled fluorescent agent and has characteristics of several secondary antibodies combination to a molecule of primary antibody. The antibody of indirect immunofluorescent'-'primary antibody'-'secondary antibody' union structure has several times more stained fluorescent agent numbers per a molecule of antibody than antibody of direct immunofluorescent - primary antibody, so has highly amplified fluorescent signal. But indirect immunofluorescent method has more complicated union structure than direct immunofluorescent method that should be careful at nonspecific fluorescent signal and cross reaction and test process is somewhat cumbersome.

BioActs' fluorescent secondary antibody was developed by combining high peculiarity antibody and Flamma® Fluor of strong fluorescent performance. Please try BioActs fluorescent secondary antibodies consisted of various antibody line up and wide fluorescent spectrum.

Host	Target	Fluorephore	Cat. No.	Emission color	Ex_{Max} (nm)	Em_{Max} (nm)	Application	Size
Goat	anti-Mouse IgG	Flamma® 488	RSA1141a	Green	495	519	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 552	RSA1151a	Yellow	550	565	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 594	RSA1191a	Red	590	617	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 648	RSA1161a	Red	648	663	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 675	RSA1171a	Far Red	675	691	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 749	RSA1101a	NIR	749	774	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		ICG	RSA1181a	NIR	785	821	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		HRP	RSA1122a	-	-	-	ICC, IP, ELISA, IHC, WB	0.5mg, 1mg, 2mg
	anti-Rabbit IgG	Flamma® 488	RSA1241a	Green	495	519	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 552	RSA1251a	Yellow	550	565	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
	anti-Rat IgG	Flamma® 594	RSA1291a	Red	590	617	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 648	RSA1261a	Red	648	663	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 675	RSA1271a	Far Red	675	691	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 749	RSA1201a	NIR	749	774	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		ICG	RSA1281a	NIR	785	821	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		HRP	RSA1221a	-	-	-	ICC, IP, ELISA, IHC, WB	0.5mg, 1mg, 2mg
		Flamma® 488	RSA1541a	Green	495	519	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 552	RSA1551a	Yellow	550	565	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 594	RSA1591a	Red	590	617	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 648	RSA1561a	Red	648	663	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 675	RSA1571a	Far Red	675	691	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 749	RSA1501a	NIR	749	774	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		ICG	RSA1581a	NIR	785	821	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		HRP	RSA1521a	-	-	-	ICC, IP, ELISA, IHC, WB	0.5mg, 1mg, 2mg
Rabbit	anti-Goat IgG	Flamma® 488	RSA4441a	Green		519	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 552	RSA4451a	Yellow	550	565	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 594	RSA4491a	Red	590	617	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 648	RSA4461a	Red	648	663	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 675	RSA4471a	Far Red	675	691	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 749	RSA4401a	NIR	749	774	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		ICG	RSA4481a	NIR	785	821	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		HRP	RSA4421a	-	-	-	ICC, IP, ELISA, IHC, WB	0.5mg, 1mg, 2mg

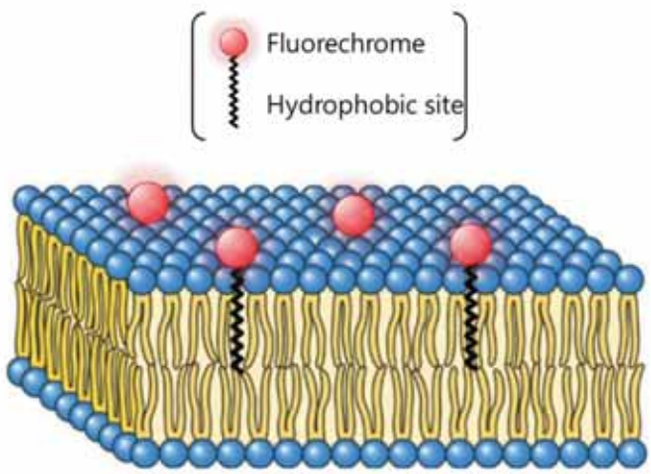
Citation & Reference

1. Promoter- and RNA polymerase II-dependent hsp-16 gene association with nuclear pores in Caenorhabditis elegans. Rohner S,Kalck V,Wang X,Ikegami K,Lieb JD,Gasser SM,Meister P *The Journal of cell biology* (200:589)
2. BRAG2/GEP100/IQSec1 interacts with clathrin and regulates α5β1 integrin endocytosis through activation of ADP ribosylation factor 5 (Arf5). Moravec R,Conger KK,D'Souza R,Allison AB,Casanova JE *The Journal of biological chemistry* (287:31138)

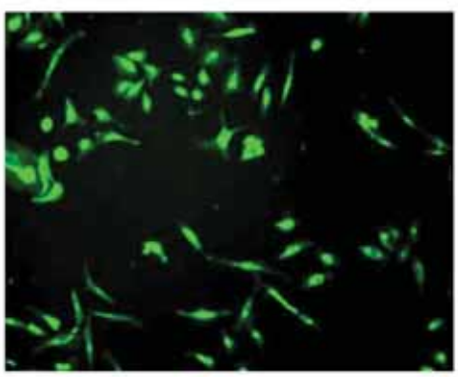
◉ Live Cell Imaging Probes

○ CytoFlamma® Cell membrane

Cell membrane builds boundary between outside and cells and maintains internal structure. Membrane composed of phospholipids and proteins forms a double layer by properties of phospholipids. Phospholipids are amphiphilic molecules with hydrophobic 'tail' and hydrophilic 'head'. Its hydrophobic portion is located inside and hydrophilic portion is located outside to form a double-layer structure. Using this feature called lipid bilayer, CytoFlamma® Fluors, which is hydrophobic dyes, dyes cell membranes by directly penetrating into cell membranes. Because of its low cytotoxicity and ability to penetrate into cell membranes, it also can be used in live cells.

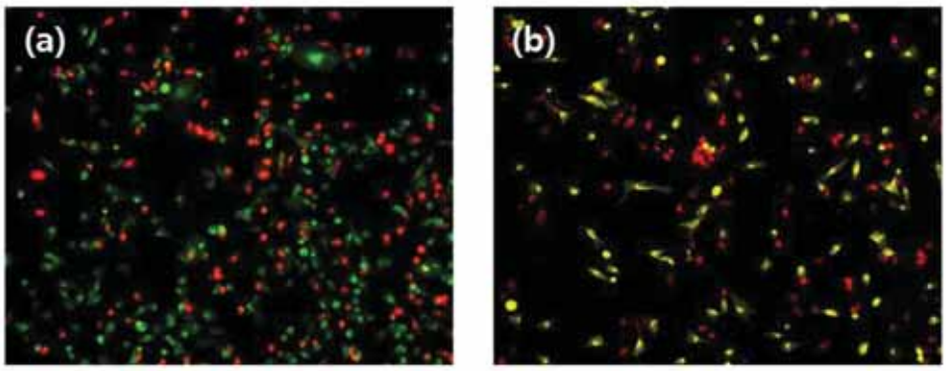


Outer and inner formation of cell and mimetic diagram for principle



CytoFlamma® 488 cell membrane staining

Detaching HeLa cell from plate and treating CytoFlamma® 488 cell membrane and after 5 min staining, dividing to plate again and after 24hr cultivating, got image with FITC filter.



Culture CytoFlamma® Cell membrane after staining

Result from cell cultivation after staining HeLa cell treated with CytoFlamma® series. (a) CytoFlamma® 496 (green) and CytoFlamma® 648 (red) (b) CytoFlamma® 552 (yellow) and CytoFlamma® 648 (red)

Cat. No.	Product name	Emission color	Ex_{Max} (nm)	Em_{Max} (nm)	Available for	Size
RCS5001	CytoFlamma® 496 Cell membrane	Green	496	516	Fixed/Live cell application	0.1mg, 0.5mg, 1mg
RCS1001	CytoFlamma® 552 Cell membrane	Yellow	550	565	Fixed/Live cell application	0.1mg, 0.5mg, 1mg
RCS2001	CytoFlamma® 648 Cell membrane	Red	648	663	Fixed/Live cell application	0.1mg, 0.5mg, 1mg
RCS3001	CytoFlamma® 675 Cell membrane	Far red	675	698	Fixed/Live cell application	0.1mg, 0.5mg, 1mg

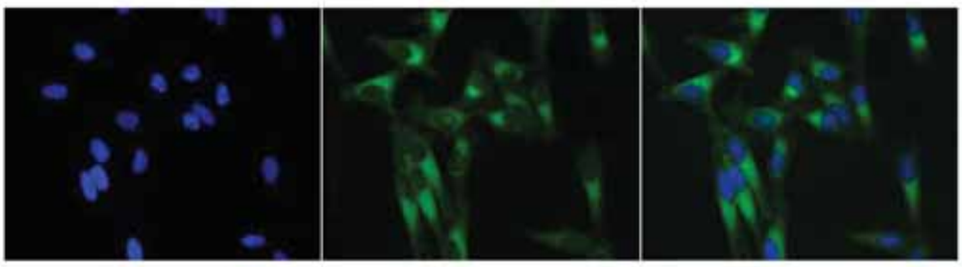
Citation & Reference

1. Wheat Germ Agglutinin Staining as a Suitable Method for Detection and Quantification of Fibrosis in Cardiac Tissue after Myocardial Infarction. B. Emde. Eur J Histochem. 2014 Oct 22; 58(4): 2448.

2. Labeling membrane glycoproteins or glycolipids with fluorescent wheat germ agglutinin. Chazotte B. Cold Spring Harb Protoc. 2011 May 1;2011(5)

O MitoFlamma® Green

MitoFlamma® Green is a green fluorescent probe specifically staining mitochondria of cell. By marking mitochondria of live cell, can trace it by imaging cell mutation from drug or external stimulus. Also designed to make further processing is possible by fixing mitochondria after marking so having good advantage of multi imaging as mitochondria staining is maintained after fixing. After fixing further test such as immunocytochemistry or in situ hybridization, etc are possible and various test design and analysis meets to test purpose is also possible. This probe can be applied for fluorescent microscopy or flow cytometry and analysis based on microplate. MitoFlamma® Green is a mitochondria marking product based on BODIPY dye, can obtain cell fluorescent image using FITC filter.

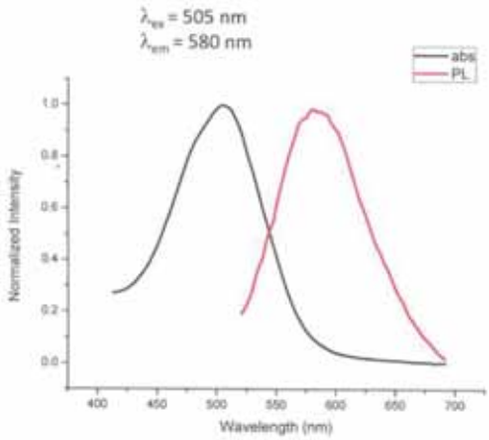


MitoFlamma® Green / HeLa cell staining

After treating HeLa cell with MitoFlamma® Green product diluted to 1uM concentration 1hr at 37℃ with 5% CO2 condition, using 4% paraformaldehyde fixed cell and stained nucleus with DAPI together. Can confirm specific mark of nucleus and mitochondria with cell fluorescent image and from left in sequence it is the result of merging DAPI and MitoFlamma® Green.

Product features

- Target organelle: Mitochondria
- Application: Flow Cytometer, Fluorescent Microscope, Microplate Reader
- Unit size: 1mg, 20 x 50 μg
- Molecular Weight: 714.50
- Excitation / Emission (nm): 508 / 580 nm
- Common filter set: FITC filter
- Soluble solvent: DMF / DMSO
- Solvents for used to cells: 1% DMSO in PBS or media
- Storage condition: -20℃, protect from light



MitoFlamma® Green Fluorescent spectra

This is absorbance/fluorescent spectrum of MitoFlamma® Green shows relative absorbance/fluorescent value at all wavelength. Black line graph is absorbance value and red line is fluorescent value graph. Absorbance value is highest at 505nm and fluorescent has highest value at 580nm.

Cat. No.	Product name	Emission color	Ex_{Max} (nm)	Em_{Max} (nm)	Available for	Size
RMS1101	MitoFlamma® Green	Green	505	580	Mitochondria staining(Live cell)	20x50 ug, 1mg

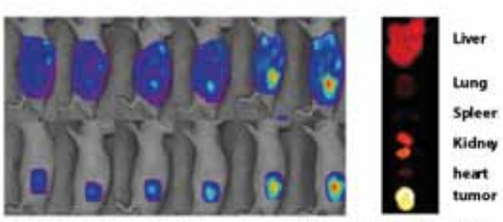
In Vivo Imaging

In Vivo optical imaging is a method to monitor biologically useful information by visualizing small animals in real time, and it is used in the preclinical stage of research such as drug development, cancer cells detection and treatment reaction monitoring. Fluorescent technology is nonradioactive, has long half-life, facilitates the use of multiple channels, and the structure of its related equipment and devices are simpler than radioactive equipment. Due to these attributes, research on applying fluorescent techniques to in vivo imaging area is actively progressing in recent years.

Near-infrared fluorescent dye (NIR Fluorescent Dye) provided by BioActs has a wavelength range of 700~900nm, and it is free from noises caused by autofluorescent of biological substances and it is used as effective imaging agents in in-vivo optical imaging due to its long wavelength.

◉ Fluorescent Imaging Agent

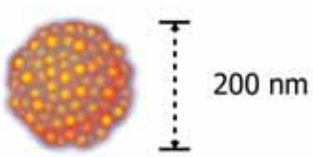
BioActs' In Vivo fluorescent agents, based on various principles such as fluorescent angiography, In Vivo Imaging of enzyme activity and imaging of specific binding, is in readiness for using in a wide range of equipment and devices with fluorescent options for fluorescent wavelength range of 700 nm ~ 800 nm.

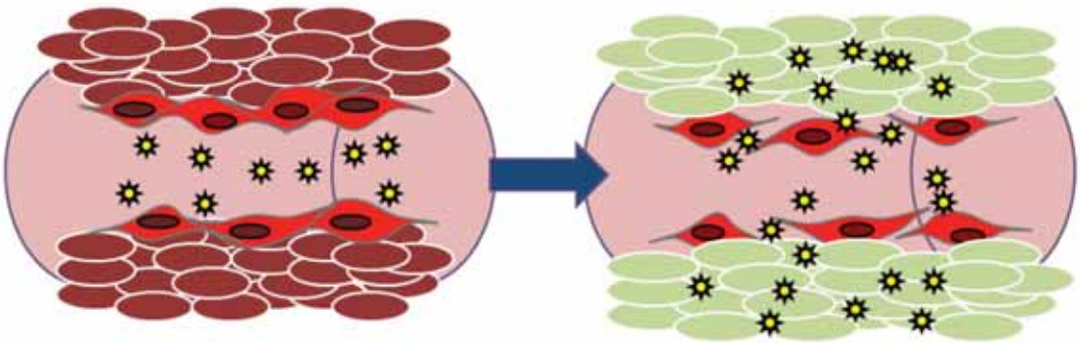


NpFlamma® HGC 675 injection for tumer detection

O NpFlamma® HGC series

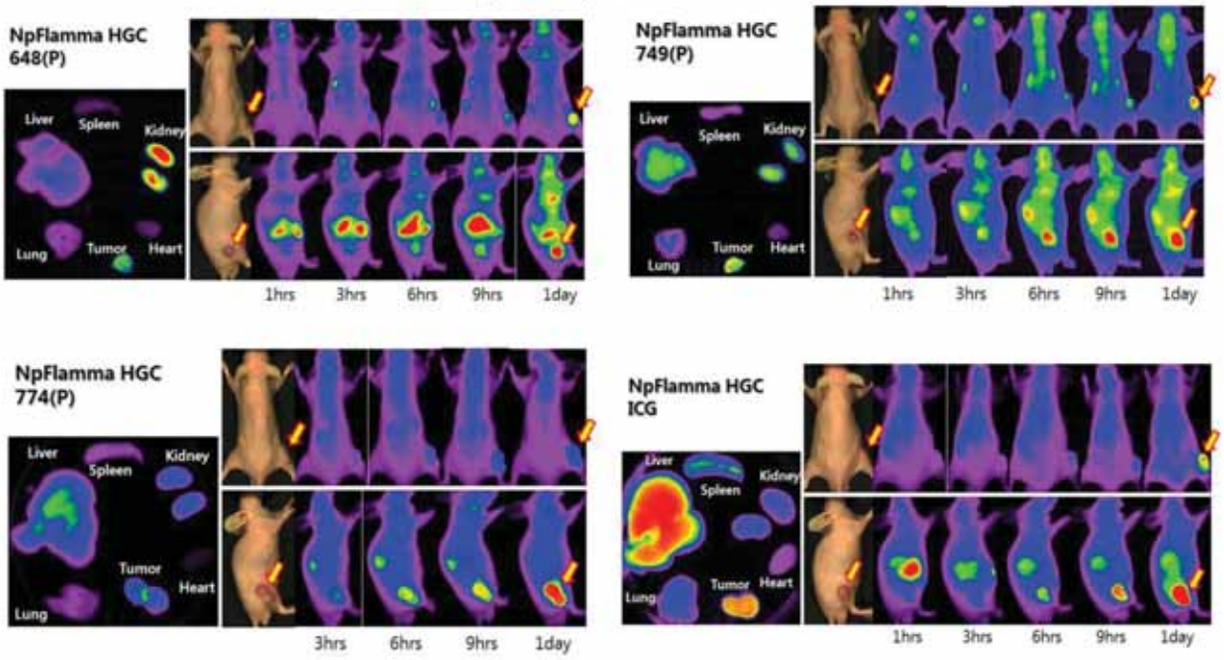
NpFlamma® HGC series, the near-infrared fluorescent contrast agents developed based on chitosan nanoparticles, is fluorescent contrast agents for blood vessels that is completed with patented technology of BioActs. Because chitosan that is a base material of NpFlamma® HGC series is a biologically-derived material, it is free from toxicity problems and has advantages such as having long half-life, high light stability and high water solubility.



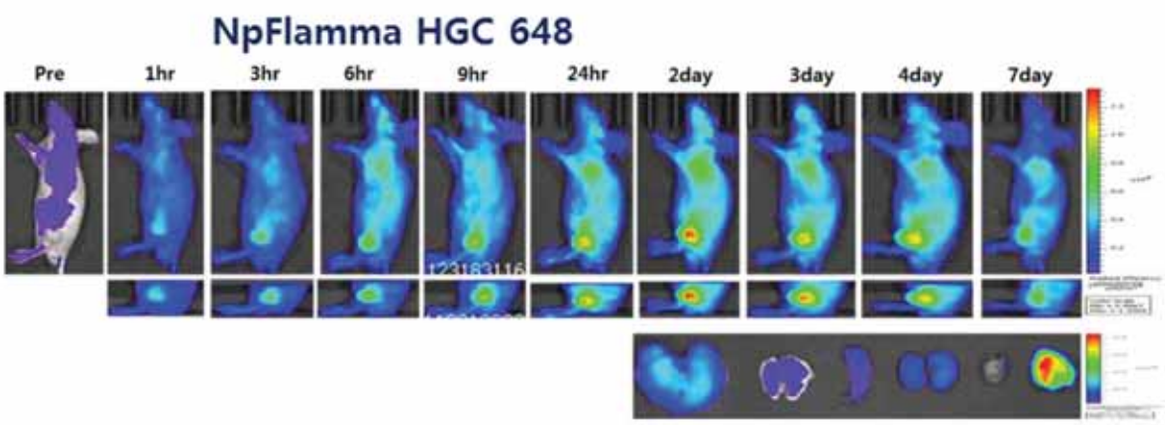


Normal Tissue **Tumor Tissue**

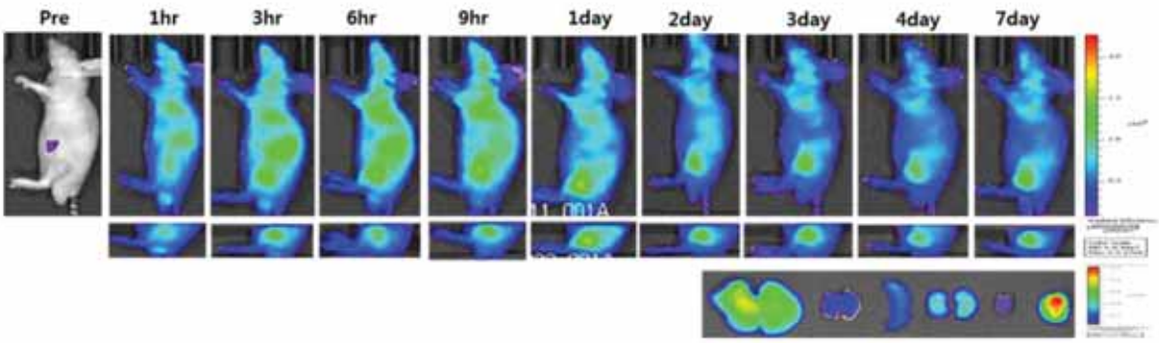
NpFlamma® HGC products group can penetrate into tumor cell tissues to observe strong fluorescent specifically to cancer cell



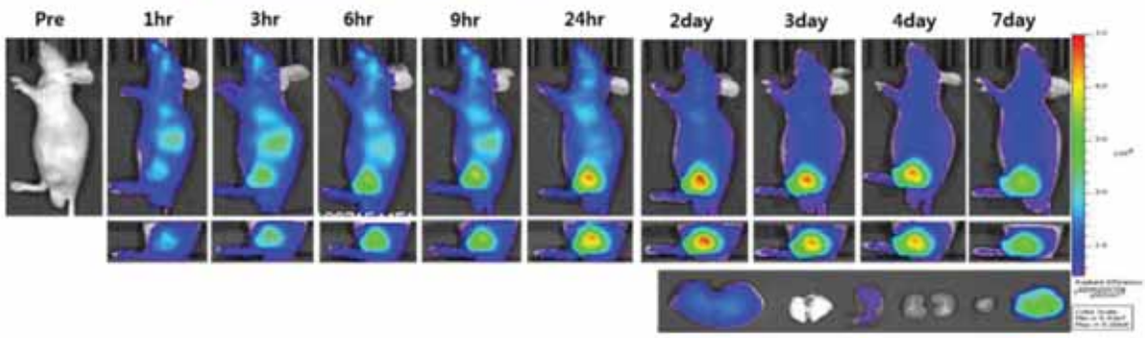
An effective tumor imaging is available using NpFlamma® HGC products group.



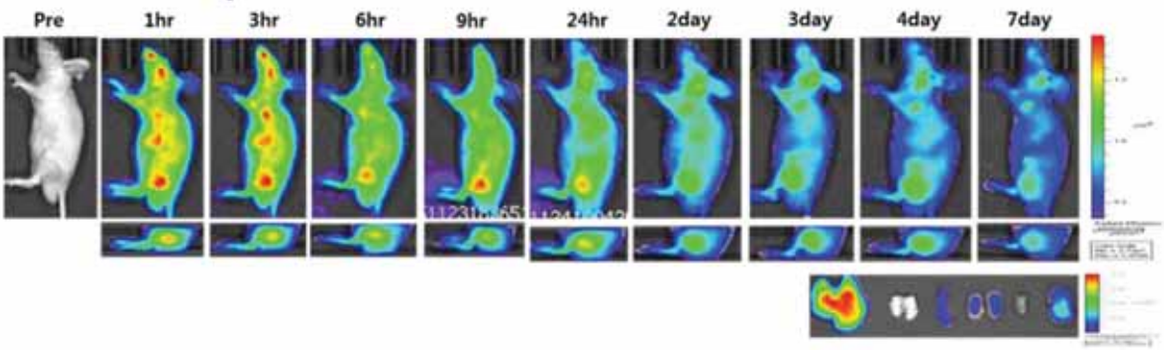
NpFlamma HGC 675



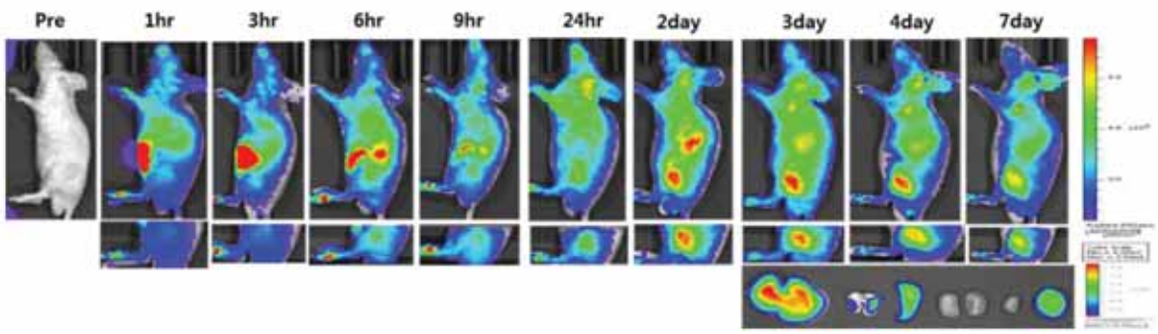
NpFlamma HGC 749



NpFlamma HGC 774

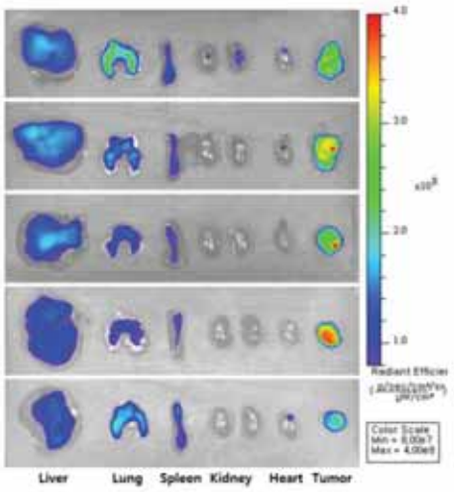


NpFlamma HGC ICG



As result of conducting fluorescent observation for the mouse after injecting NpFlamma® HGC products group up to max. 7 days, it was possible to confirm a strong fluorescent from cancer tissues until the 7th day.

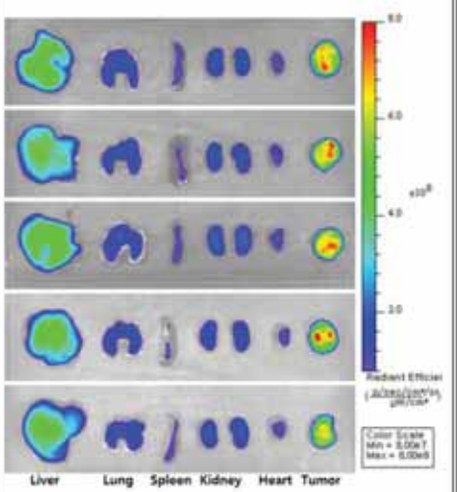
NpFlamma HGC 749 (n=5)



* 각 Organ 의 Liver 에 대한 형광 Ratio.

	Liver	Lung	Spleen	Kidney	Heart	Tumor
1	1	1.632	-	-	-	2.271
2	1	0.879	-	-	-	2.292
3	1	0.834	-	-	-	2.171
4	1	0.682	-	-	-	2.762
5	1	1.476	-	-	-	1.955

AngioSense 750EX (n=5)



* 각 Organ 의 Liver 에 대한 형광 Ratio.

	Liver	Lung	Spleen	Kidney	Heart	Tumor
1	1	0.357	-	0.388	-	1.311
2	1	0.398	-	0.410	-	1.626
3	1	0.319	-	0.372	-	1.358
4	1	0.360	-	0.405	-	1.400
5	1	0.396	-	0.451	-	1.389

As result of comparing ex-vivo image of organ after 24 hr for NpFlamma® HGC product and the other company's product, it was confirmed that tumor accumulating efficiency against the other's organ was high against the other's tested organ, and that the accumulating trend of the other company's tested organ was low.

Cat. No.	Product name	Emission color	Ex_{Max} (nm)	Em_{Max} (nm)	Common filter set	Excitation laser line	Size
PNC1201	NpFlamma® HGC 648	Red	648	675	Cy®5	594, 633 nm	10 doses, 50 doses, 250 doses
PNC1401	NpFlamma® HGC 675	Far red	675	698	Cy®5.5	633, 680 nm	10 doses, 50 doses, 250 doses
PNC1301	NpFlamma® HGC 749	NIR	750	782	Cy®7	680 nm	10 doses, 50 doses, 250 doses
PNC1601	NpFlamma® HGC 774	NIR	777	802	Cy®7.5	785 nm	10 doses, 50 doses, 250 doses
PNC1501	NpFlamma® HGC ICG	NIR	785	821	Cy®7.5	785 nm	10 doses, 50 doses, 250 doses

Citation & Reference

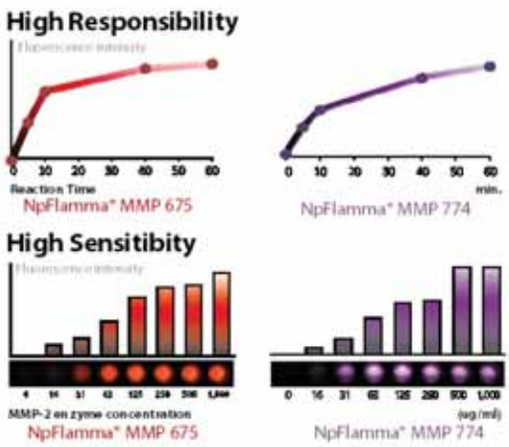
1. New generation of multifunctional nanoparticles for cancer imaging and therapy (Kyeongsoon Park, Seulki Lee, Eunah Kang, Kwangmeyung Kim, Kuiwon Choi, Ick Chan Kwon, *Advanced Functional Materials, 2009, Volume 19, Issue 10, Pages 1553–1566*)

2. Tumor-homing multifunctional nanoparticles for cancer theragnosis: Simultaneous diagnosis, drug delivery, and therapeutic monitoring (Kwangmeyung Kim, Jong Ho Kim, Hyungkyu Park, Yoo-Shin Kim, Kyeongsoon Park, Heayun Nam, Seulki Lee, Jae Hyung Park, Rang-Woon Park, In-San Kim, Kuiwon Choi, Sang Yoon Kim, Kinam Park, Ick Chan Kwon, *Journal of Controlled Release, 2010, Volume 146, Issue 2, Pages 219–227*)

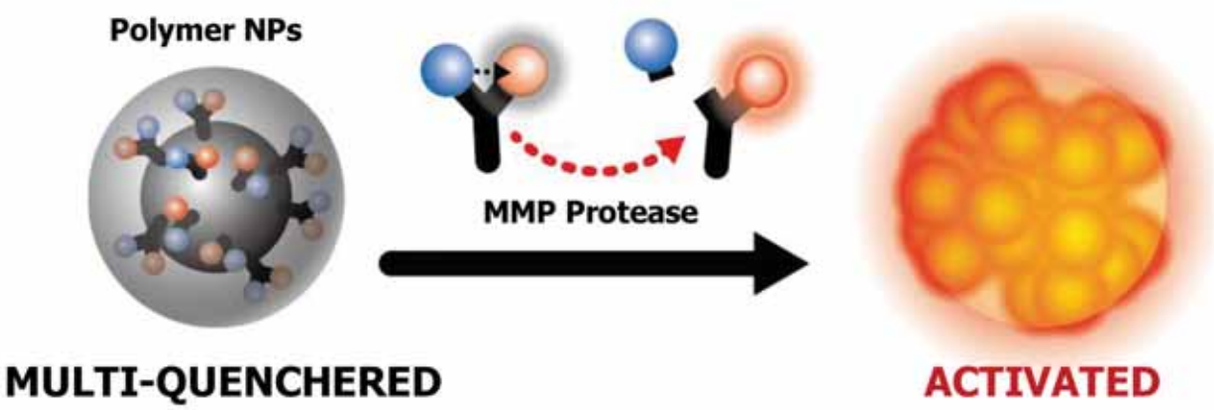
3. Glycol chitosan nanoparticles as specialized cancer therapeutic vehicles: Sequential delivery of doxorubicin and Bcl-2 siRNA (Hong Yeol Yoon, Sejin Son, So Jin Lee, Dong Gil You, Ji Young Yhee, Jae Hyung Park, Maggie Swierczewska, Seulki Lee, Ick Chan Kwon, Sun Hwa Kim, Kwangmeyung Kim & Martin G. Pomper, *Scientific Reports, 2014, 4, Article number: 6878*)

NpFlamma® MMP series

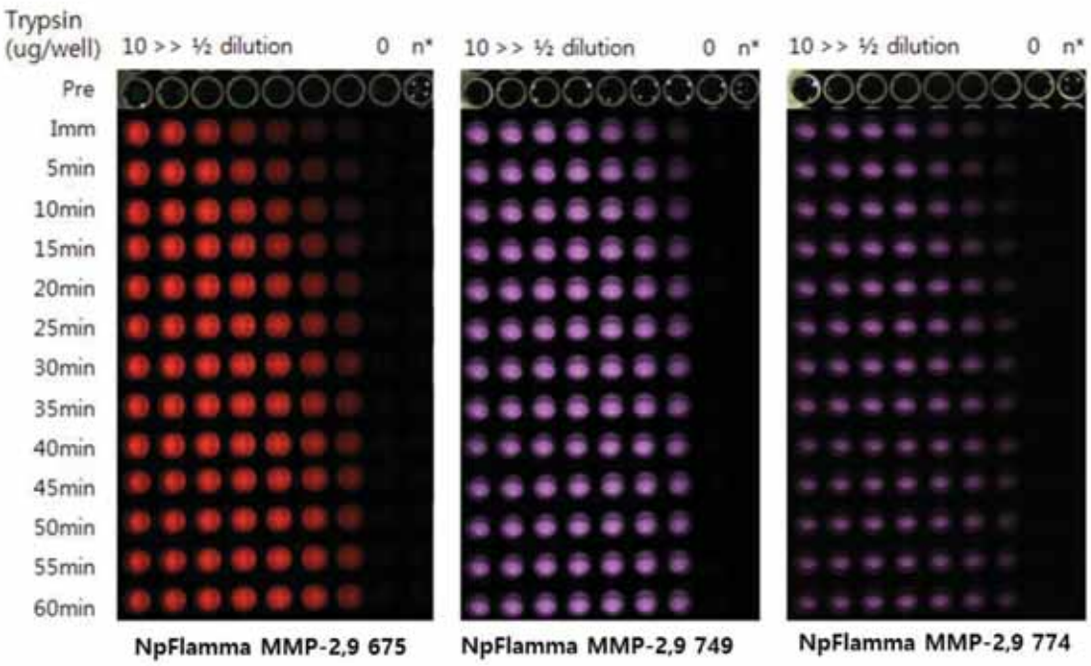
MMP (matrix metalloprotease) is a generic term for enzymes that decompose matrix of cells and it is involved in tissue regeneration, cancer metastasis and inflammation development process. For its own cell division and elimination of waste products, cancer tissues create blood vessels that grow and maintain tumors. Angiogenesis is a capability that must be obtained for the growth of tumor, and tumor that couldn't secure blood vessels experiences hypoxia and can't grow larger than 1 ~ 2cm and causes central necrosis.



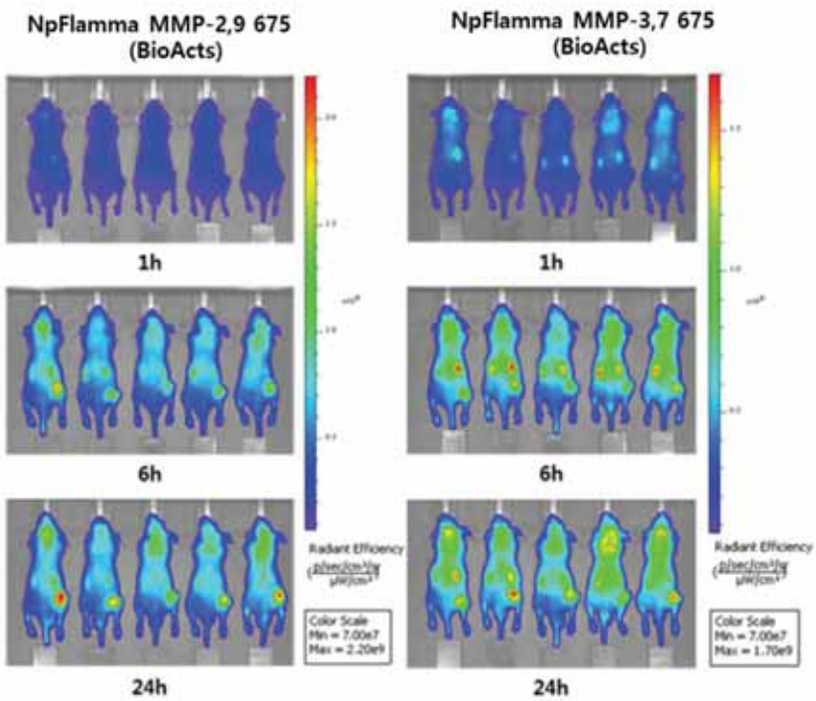
Cancer cells secrete VEGF and FGF, which are growth factors, in order to induce angiogenesis in vascular endothelial cells, but can't reach to vascular endothelial cells as being caught in ECM (extracellular matrix). However, as MMPs (matrix metalloprotease) secreted from inflammatory cells can decompose ECM, they assist delivery of VEGF secreted by cancer cells and make peripheral space for angiogenesis. For these reasons, the cancer cells induce inflammatory cells and these induced inflammatory cells are called TAM (tumor-associated macrophage). TAM not only secretes MMP but also secretes growth factors such as VEGF and interleukin -8 in order to actively help angiogenesis.

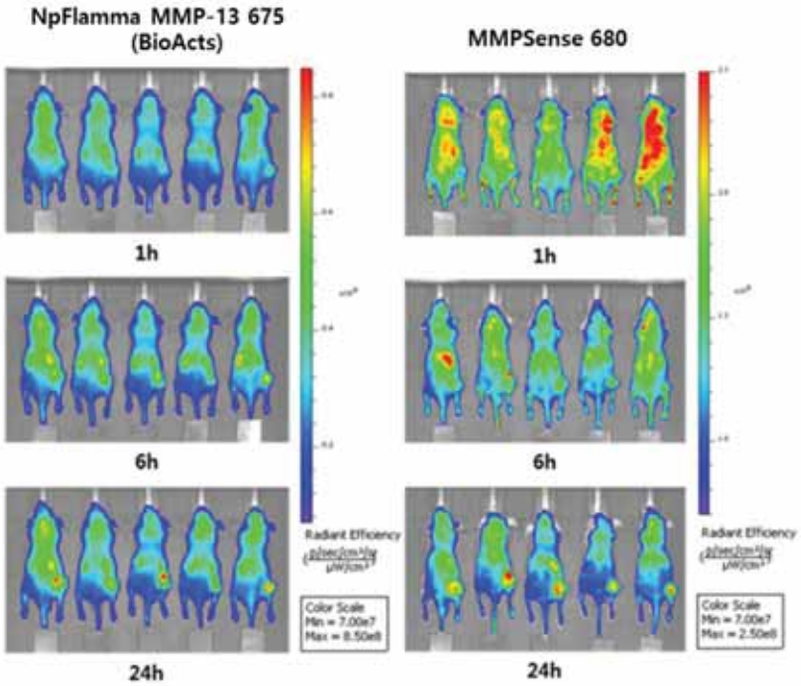


NpFlamma® MMP series of BioActs is a product developed to activate fluorescent depending on the types of MMP expressed in vivo. It is MMP activatable imaging agents that are completed by applying fluorescent technique of Flamma® Fluors and quencher technique of qFlamma® based on BioActs' patented technology in peptides.



High restoring force of fluorescent of NpFlamma® MMP Series according to conc. of Trypsin was confirmed

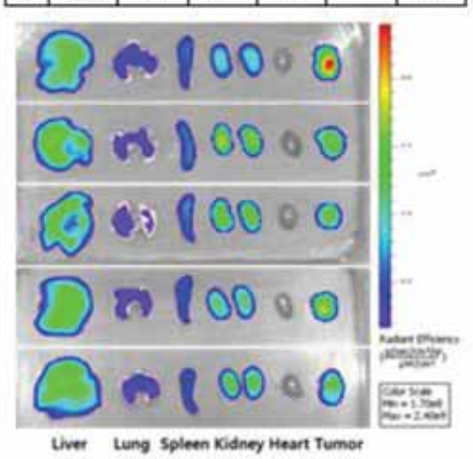




As result of comparing the in-vivo images by hours for NpFlamma® MMP product and the other's product, high tumor accumulating efficiency against the other's tstes organ was confirmed

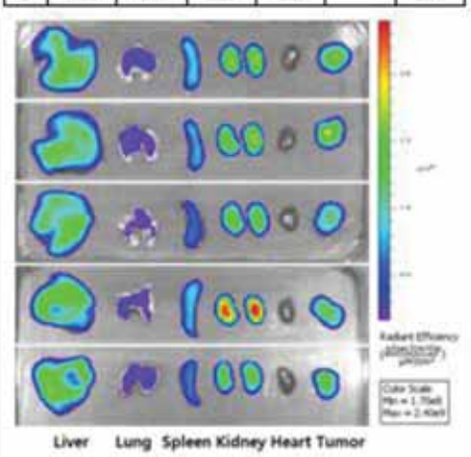
NpFlamma MMP-2,9 675 (n=5)

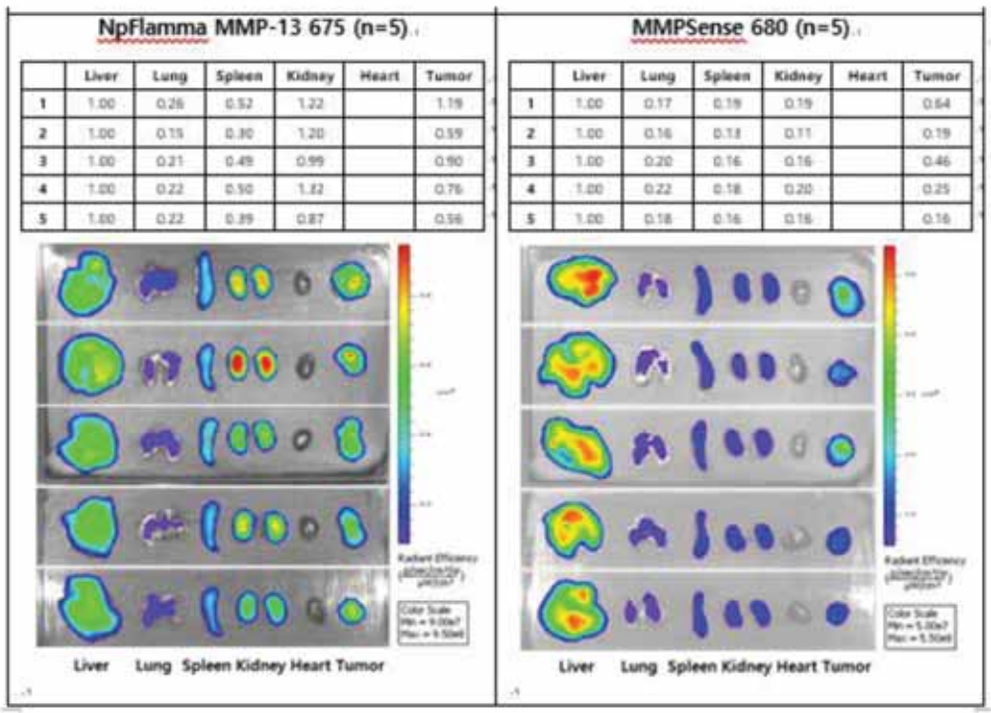
	Liver	Lung	Spleen	Kidney	Heart	Tumor
1	1.00	0.24	0.85	0.71		1.27
2	1.00	0.18	0.36	1.03		0.85
3	1.00	0.17	0.34	0.92		0.60
4	1.00	0.17	0.27	0.72		0.80
5	1.00	0.17	0.21	0.71		0.65



NpFlamma MMP-3,7 675 (n=5)

	Liver	Lung	Spleen	Kidney	Heart	Tumor
1	1.00	0.17	0.56	0.98		0.87
2	1.00	0.15	0.40	0.92		0.79
3	1.00	0.11	0.28	0.77		0.57
4	1.00	0.16	0.58	1.19		0.74
5	1.00	0.17	0.36	0.86		0.66





As result of comparing the ex-vivo images of organ between NpFlamma® MMP product and the other's product, high tumor accumulating efficiency against the other's organ was confirmed

Cat. No.	Product name	Emission color	Ex_{Max} (nm)	Em_{Max} (nm)	Common filter set	Excitation laser line	Size
PNM0103	NpFlamma® MMP-2,9 648	Red	653	670	Cy®5	594, 633 nm	10 doses, 50 doses, 250 doses
PNM0104	NpFlamma® MMP-2,9 675	Far red	683	694	Cy®5.5	680 nm	10 doses, 50 doses, 250 doses
PNM0105	NpFlamma® MMP-2,9 749	NIR	760	778	Cy®7	785 nm	10 doses, 50 doses, 250 doses
PNM0106	NpFlamma® MMP-2,9 774	NIR	793	810	Cy®7.5	785 nm	10 doses, 50 doses, 250 doses
PNM0101	NpFlamma® MMP-2,9 ICG	NIR	798	835	Cy®7.5	785 nm	10 doses, 50 doses, 250 doses
PNM0203	NpFlamma® MMP-3,7 648	Red	653	670	Cy®5	594, 633 nm	10 doses, 50 doses, 250 doses
PNM0204	NpFlamma® MMP-3,7 675	Far red	683	694	Cy®5.5	680 nm	10 doses, 50 doses, 250 doses
PNM0205	NpFlamma® MMP-3,7 749	NIR	760	778	Cy®7	785 nm	10 doses, 50 doses, 250 doses
PNM0206	NpFlamma® MMP-3,7 774	NIR	793	810	Cy®7.5	785 nm	10 doses, 50 doses, 250 doses
PNM0201	NpFlamma® MMP-3,7 ICG	NIR	798	835	Cy®7.5	785 nm	10 doses, 50 doses, 250 doses
PNM0303	NpFlamma® MMP-13 648	Red	653	670	Cy®5	594, 633 nm	10 doses, 50 doses, 250 doses
PNM0304	NpFlamma® MMP-13 675	Far red	683	694	Cy®5.5	680 nm	10 doses, 50 doses, 250 doses
PNM0305	NpFlamma® MMP-13 749	NIR	760	778	Cy®7	785 nm	10 doses, 50 doses, 250 doses
PNM0306	NpFlamma® MMP-13 774	NIR	793	810	Cy®7.5	785 nm	10 doses, 50 doses, 250 doses
PNM0301	NpFlamma® MMP-13 ICG	NIR	798	835	Cy®7.5	785 nm	10 doses, 50 doses, 250 doses

Citation & Reference

1. Optimization of matrix metalloproteinase fluorogenic probes for osteoarthritis imaging (Ju Hee Ryu, Aeju Lee, Jin Hee Na, Seulki Lee, Hyung Jun Ahn, Jong Woong Park, Cheol-Hee Ahn, Byung-Soo Kim, Ick Chan Kwon, Kuiwon Choi, Inchan Youn, Kwangmeyung Kim, *Amino Acids,* 2011, Volume 41, Issue 5, pp 1113–1122)

2. Dark Quenched Matrix Metalloproteinase Fluorogenic Probe for Imaging Osteoarthritis Development in Vivo (Seulki Lee,

Kyeongsoon Park, Seung-Young Lee, Ju Hee Ryu, Jong Woong Park, Hyung Jun Ahn, Ick Chan Kwon, In-Chan Youn, Kwangmeyung Kim, Kuiwon Choi, *Bioconjugate Chem.*, 2008, 19 (9), pp 1743–1747)

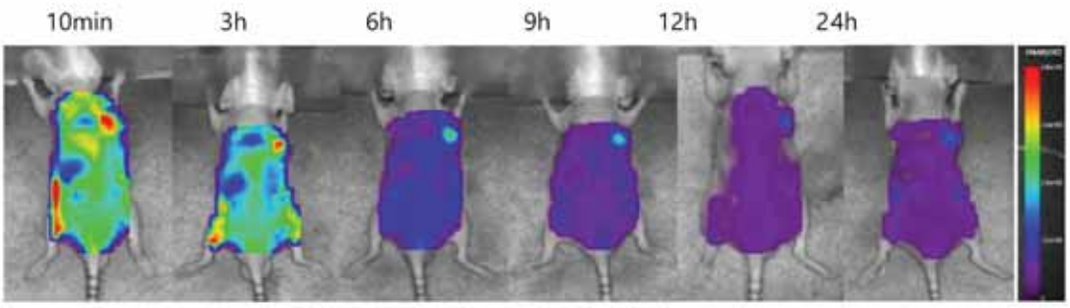
3. Early Diagnosis of Arthritis in Mice With Collagen-Induced Arthritis, Using a Fluorogenic Matrix Metalloproteinase 3–Specific Polymeric Probe (Ju Hee Ryu, Aeju Lee, Jun-Uk Chu, Heebeom Koo, Chang-Yong Ko, Han Sung Kim, Soo-Young Yoon, Byung-Soo Kim, Kuiwon Choi, Ick Chan Kwon, Kwangmeyung Kim, Inchan Youn, *ARTHRITIS & RHEUMATISM*, 2011, Vol. 63, No. 12, pp 3824–3832)

4. Polymeric Nanoparticle-Based Activatable Near-Infrared Nanosensor for Protease Determination In Vivo (Seulki Lee, Ju Hee Ryu, Kyeongsoon Park, Aeju Lee, Seung-Young Lee, In-Chan Youn, Cheol-Hee Ahn, Soon Man Yoon, Seung-Jae Myung, Dae Hyuk Moon, Xiaoyuan Chen, Kuiwon Choi, Ick Chan Kwon, Kwangmeyung Kim, *Nano Lett.*, 2009, Vol. 9, No. 12, pp 4412-4416)

AngioFlamma® series

Integrin is a heterodimeric cell-surface receptor and combined with RGD (arginine-glycine-aspartate) sequence exposed to outside to mediate adhesion and fixation between cells and matrix of outside of cells. In addition, while integrin involved in cell signaling and gene expression related to growth, movement, and survival of cells, integrin is also used as a marker for disease research as its abnormal regulation links to blood coagulation, inflammatory response and cancer expression.

AngioFlamma® of BioActs is a fluorescent targeted probe that is applied with fluorescent technique of Flamma® Fluors based on RGD peptide, and it is used as a probe for in vivo detection of inflammatory response, tumor and angiogenesis.



Breast cancer cell imaging using AngioFlamma® 675

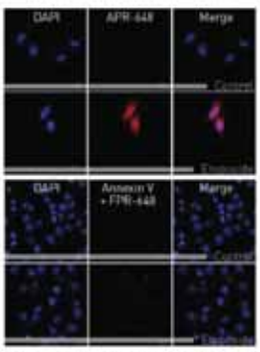
Cat. No.	Product name	Emission color	Ex_{Max} (nm)	Em_{Max} (nm)	Common filter set	Excitation laser line	Size
ARW1025	AngioFlamma® FAM	Green	492	519	FITC	488 nm	0.5mg, 1mg, 5mg
ARW1011	AngioFlamma® 552	Yellow	550	565	TRITC	488, 532 nm	0.5mg, 1mg, 5mg
ARR1001	AngioFlamma® TAMRA	Orange	543	575	TRITC	488, 532 nm	0.5mg, 1mg, 5mg
ARW1028	AngioFlamma® 560	Orange	560	589	TRITC	488, 532 nm	0.5mg, 1mg, 5mg
ARW1415	AngioFlamma® 581	Orange	581	596	TRITC	488, 532 nm	0.5mg, 1mg, 5mg
ARW1215	AngioFlamma® 648	Red	648	663	Cy®5	594, 633 nm	0.5mg, 1mg, 5mg
ARW1501	AngioFlamma® 675	Far red	675	691	Cy®5.5	633, 680 nm	0.5mg, 1mg, 5mg
ARW1301	AngioFlamma® 749	NIR	749	774	Cy®7	680 nm	0.5mg, 1mg, 5mg
ARW1601	AngioFlamma® 774	NIR	774	806	Cy®7.5	785 nm	0.5mg, 1mg, 5mg
ARO1601	AngioFlamma® ICG	NIR	785	821	Cy®7.5	785 nm	0.5mg, 1mg, 5mg

Citation & Reference

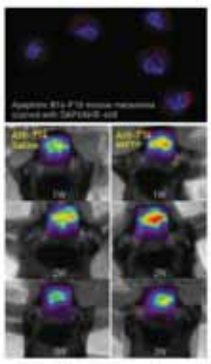
1. Zwitterionic Chitosan–Polyamidoamine Dendrimer Complex Nanoparticles as a pH-Sensitive Drug Carrier (*Karen C. Liu, Yoon Yeo, Mol. Pharmaceutics, 2013, 10 (5), pp 1695–1704*)

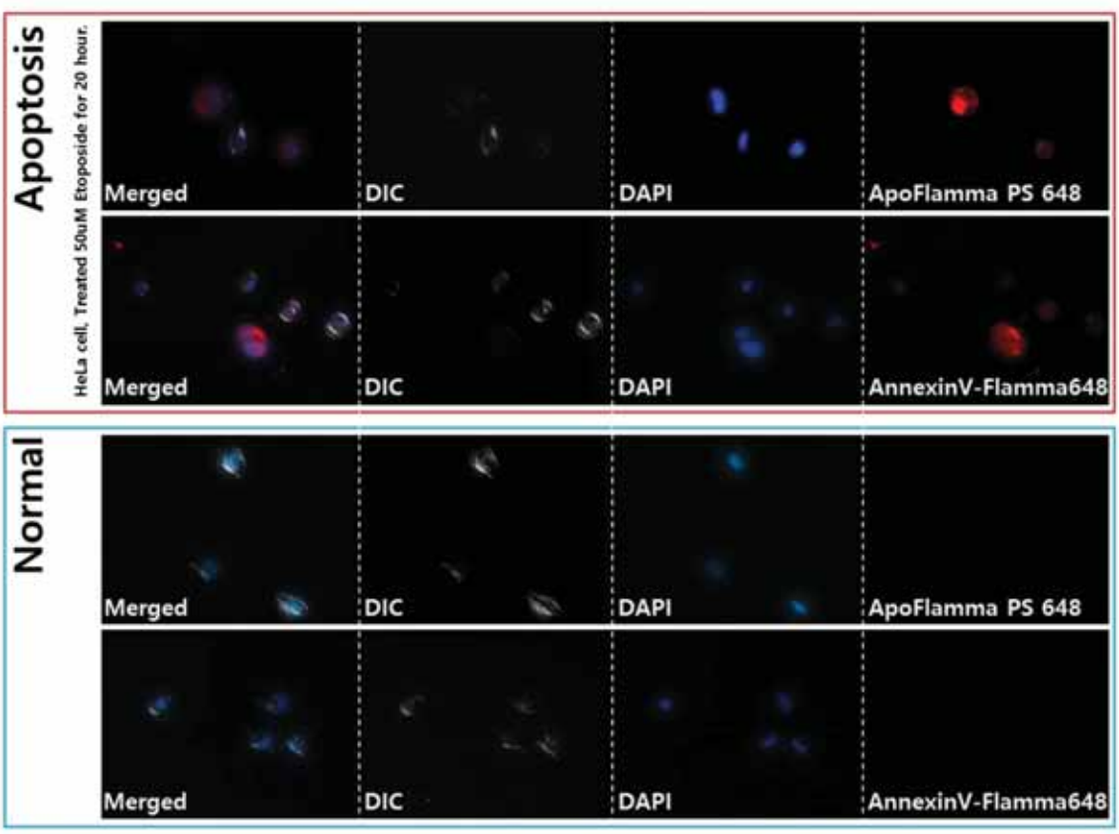
ApoFlamma® series

ApoFlamma® series is a fluorescent probe for detecting apoptotic cells, and it targets and bonds apoptotic cells. two products groups, which are ApoFlamma® PS series that specifically bonds to phospatidylserine exposed to outer membrane of apoptotic cells and ApoFlamma® H series that specifically bonds to histone 1 released to outside by apoptosis, can be both used for in vivo purposes. In particular, the product line-up of NIR fluorescent area can be freely used from autofluorescence.

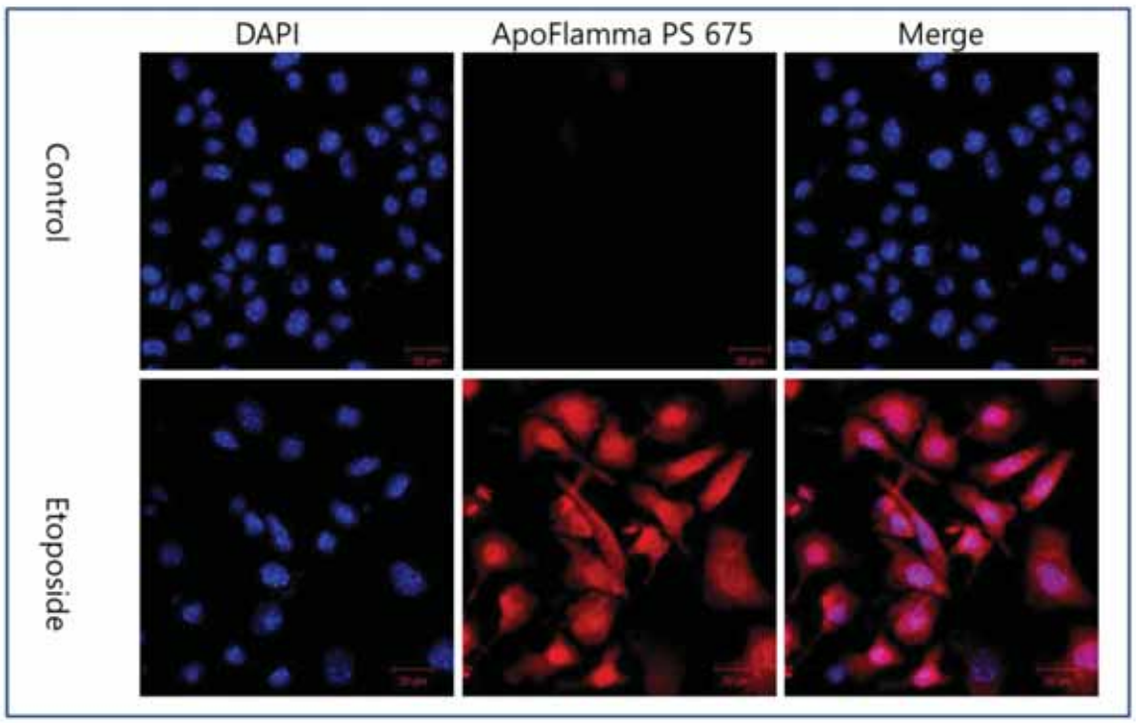


Tested on HeLa human cervical cancer cells

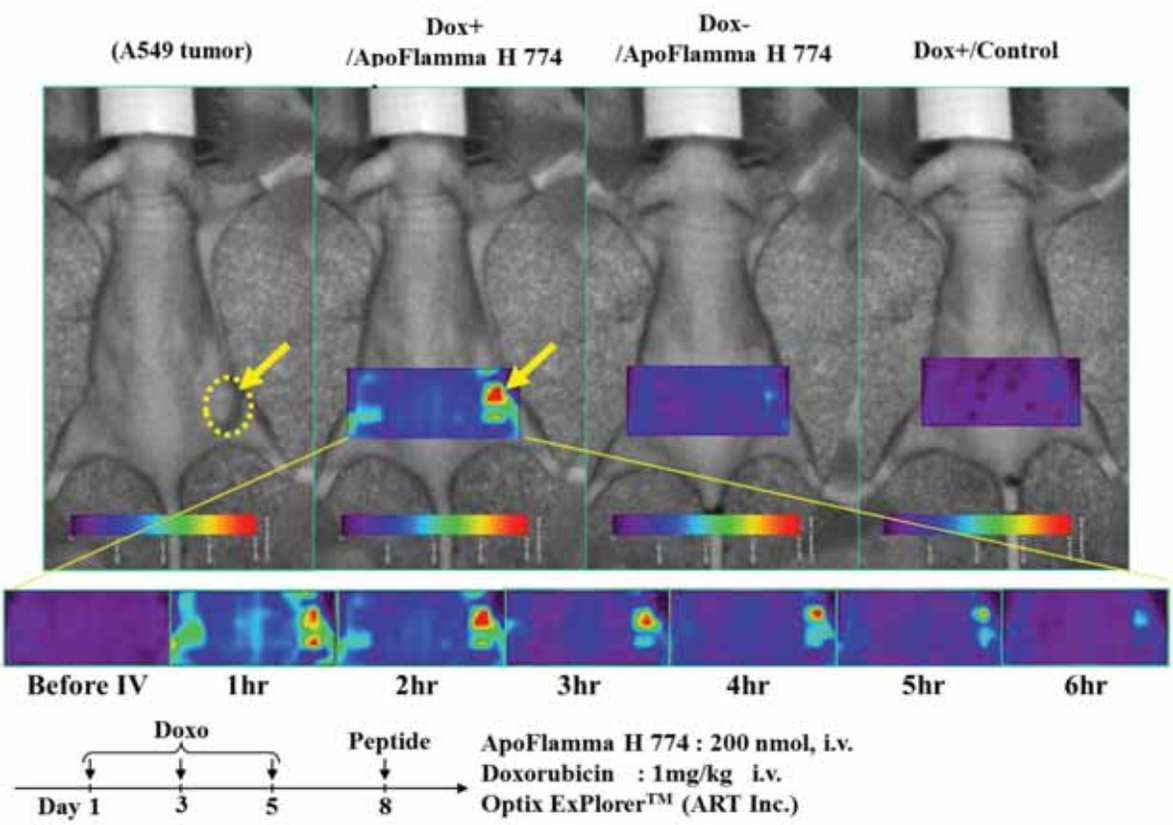




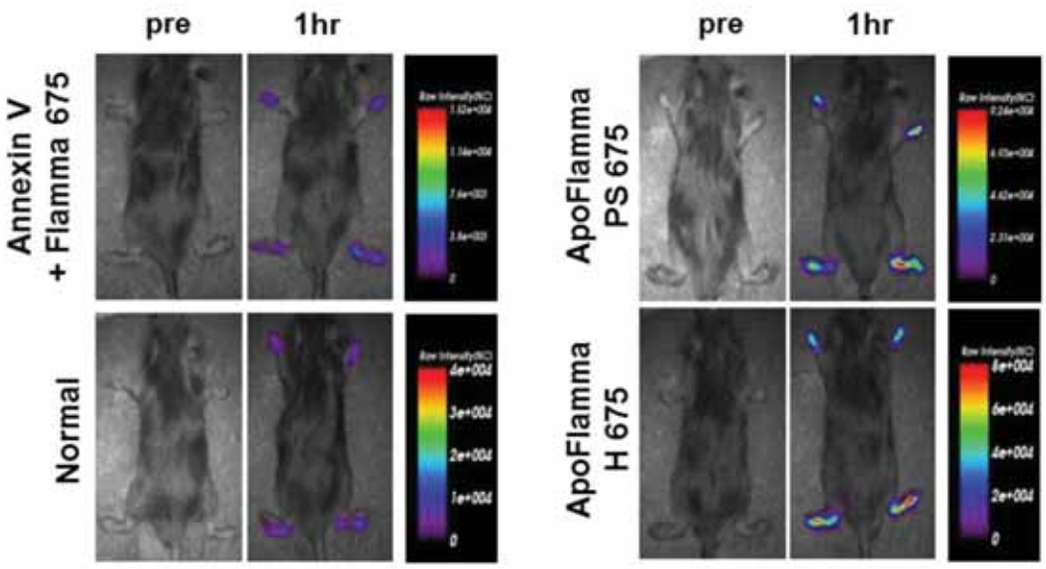
Imaging using ApoFlamma® PS 648 of the Etoposide-treated Hela cell



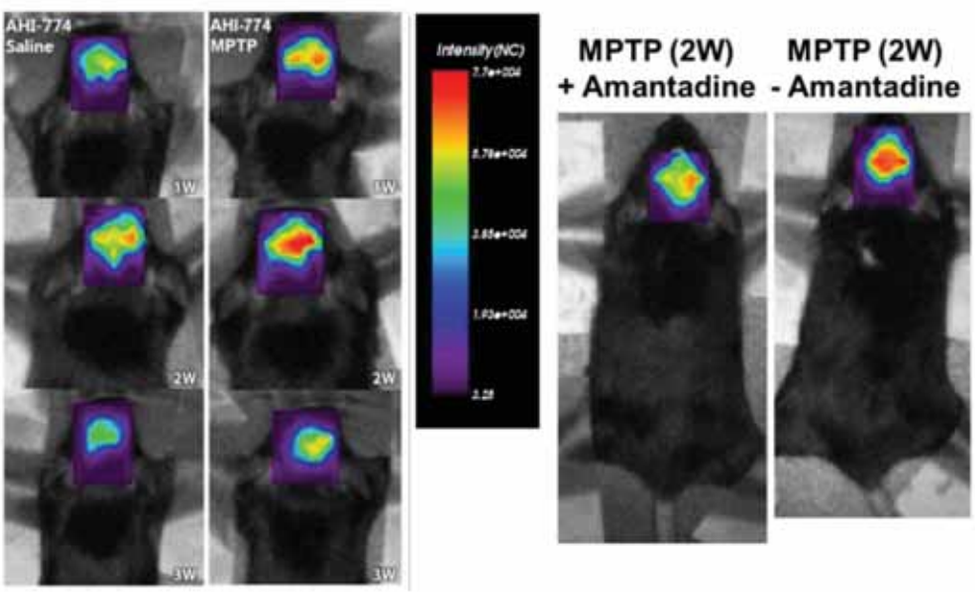
Imaging with ApoFlamma PS 675 of B16F10 cells treated with Etoposide



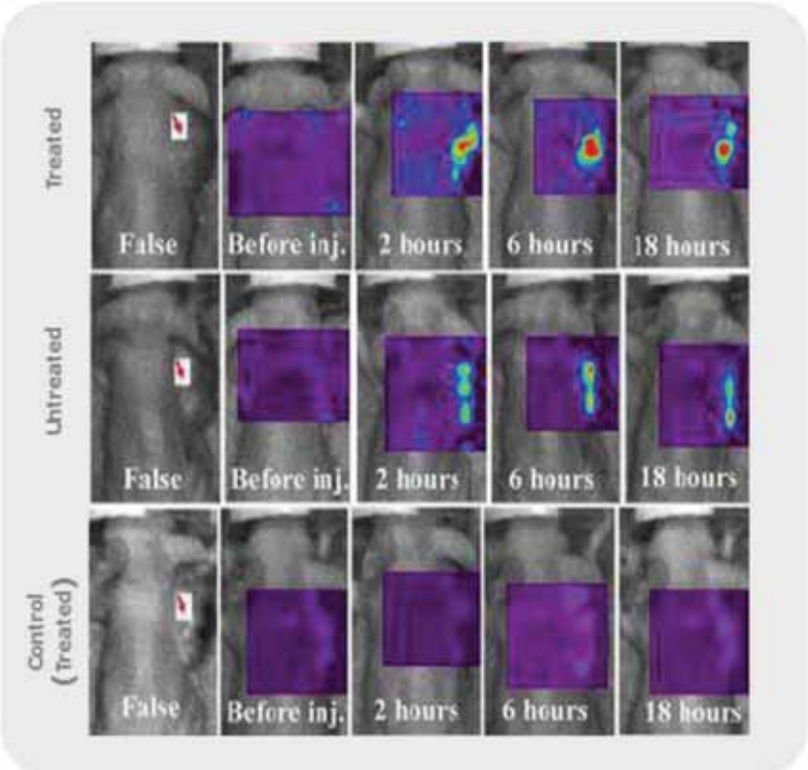
Imaging Apoptosis process of drug-injected tumor cells using ApoFlamma® H 774



Imaging Apoptosis process of rheumatoid using ApoFlamma® product



Imaging images of protective drugs using ApoFlamma® H 774 with Parkinson's disease model induced by injection of MPTP drug.



Apoptotic cells by camptothecin imaging with ApoFlamma® PS FAM

Cat. No.	Product name	Emission color	Ex_{Max} (nm)	Em_{Max} (nm)	Common filter set	Excitation laser line	Size
APW1025a	ApoFlamma® PS FAM	Green	492	519	FITC	488 nm	50 doses, 250 doses, 1000 doses
APW1011a	ApoFlamma® PS 552	Yellow	550	565	TRITC	488, 532 nm	50 doses, 250 doses, 1000 doses
APP1001a	ApoFlamma® PS TAMRA	Orange	543	575	TRITC	488, 532 nm	50 doses, 250 doses, 1000 doses
APW1028a	ApoFlamma® PS 560	Orange	560	589	TRITC	488, 532 nm	50 doses, 250 doses, 1000 doses
APW1415a	ApoFlamma® PS 581	Orange	581	596	TRITC	488, 532 nm	50 doses, 250 doses, 1000 doses
APW1215a	ApoFlamma® PS 648	Red	648	663	Cy®5	594, 633 nm	50 doses, 250 doses, 1000 doses
APW1501a	ApoFlamma® PS 675	Far red	675	691	Cy®5.5	633, 680 nm	10 doses, 50 doses, 200 doses
APW1301a	ApoFlamma® PS 749	NIR	749	774	Cy®7	680 nm	10 doses, 50 doses, 200 doses
APW1601a	ApoFlamma® PS 774	NIR	774	806	Cy®7.5	785 nm	10 doses, 50 doses, 200 doses
APO1601a	ApoFlamma® PS ICG	NIR	785	821	Cy®7.5	785 nm	10 doses, 50 doses, 200 doses
AHW1025a	ApoFlamma® H FAM	Green	492	519	FITC	488 nm	50 doses, 250 doses, 1000 doses
AHW1011a	ApoFlamma® H 552	Yellow	550	565	TRITC	488, 532 nm	50 doses, 250 doses, 1000 doses
AHP1001a	ApoFlamma® H TAMRA	Orange	543	575	TRITC	488, 532 nm	50 doses, 250 doses, 1000 doses
AHW1028a	ApoFlamma® H 560	Orange	560	589	TRITC	488, 532 nm	50 doses, 250 doses, 1000 doses
AHW1415a	ApoFlamma® H 581	Orange	581	596	TRITC	488, 532 nm	50 doses, 250 doses, 1000 doses
AHW1215a	ApoFlamma® H 648	Red	648	663	Cy®5	594, 633 nm	50 doses, 250 doses, 1000 doses
AHW1501a	ApoFlamma® H 675	Far red	675	691	Cy®5.5	633, 680 nm	10 doses, 50 doses, 200 doses
AHW1301a	ApoFlamma® H 749	NIR	749	774	Cy®7	680 nm	10 doses, 50 doses, 200 doses
AHW1601a	ApoFlamma® H 774	NIR	774	806	Cy®7.5	785 nm	10 doses, 50 doses, 200 doses
AHO1601a	ApoFlamma® H ICG	NIR	785	821	Cy®7.5	785 nm	10 doses, 50 doses, 200 doses

Citation & Reference

1. Monitoring the correlation between I-uptake and apoptosis using Apoptosis-targeting peptide-1 (ApoPep-1) (Kyung Oh Jung, Seung Hoo Kim, Hyewon Youn, Keon Kang, Dong Soo Lee, June-Key Chung, *J Nucl Med, 2011, vol. 52, no. supplement 1, 1761*)
2. Relationship between Apoptosis Imaging and Radioiodine Therapy in Tumor Cells with Different Sodium Iodide Symporter Gene Expression (Kyung Oh Jung, Hyewon Youn, Young-Hwa Kim, Seunghoo Kim, Juri Na, Yong-il Kim, Jin Woo Park, Keon Wook Kang, Dong Soo Lee, June-Key Chung, *Molecular Imaging, 2014: pp 1–9*)
3. Sodium [18F]Fluoride PET/CT in Myocardial Infarction (Jeong Hee Han, Sue Yeon Lim, Min Su Lee, Won Woo Lee, *Molecular Imaging and Biology, 2015, Volume 17, Issue 2, pp 214–221*)
4. A novel method to detect articular chondrocyte death during early stages of osteoarthritis using a non-invasive ApoPep-1 probe (Xiangguo Che, Lianhua Chi, Clara Yongjoo Park, Gyoung-Ho Cho, Narae Park, Seong-Gon Kim, Byung-Heon Lee, Je-Yong Choi, *Arthritis Research & Therapy, 2015, 17:309*)
5. In Vivo Near-Infrared Fluorescence Imaging of Apoptosis Using Histone H1-Targeting Peptide Probe after Anti-Cancer Treatment with Cisplatin and Cetuximab for Early Decision on Tumor Response (Hyun-Kyung Jung, Kai Wang, Min Kyu Jung, In-San Kim, Byung-Heon Lee, *PLoS ONE, 2014, 9(6): e100341*)
6. In vivo imaging of myocardial cell death using a peptide probe and assessment of long-term heart function (Bodhraj Acharya, Kai Wang, In-San Kim, WoongChol Kang, Chanil Moon, Byung-Heon Lee, *Journal of Controlled Release, 2013, Volume 172, Issue 1, Pages 367–373*)

O Dextran, Flamma® series

Dextran is a polysaccharide widely used for drug formulation and used for developing diagnostic agent and application technique including in vivo imaging. As based on hydrophilic polysaccharide of various molecular weight so high solubility and low toxicity are features. Can be used for fluorescent blood vessel contrast medium and also can be used as marker for phagocytosis and internal processing of absorption and extrinsic material by intracellular endocytotic pathway. Marked dextran is a hydrophilic polysaccharide used for microscope research to trace cell movement and report hydraulic characteristic of cytoplasmic matrix by monitoring cell division. Generally marked dextran is transduced by micro injection.

BioActs supplys various fluorescent dextran zygote in the range of several molecular weight and holds various fluorescent marking dextran in the wide range from NIR to UV. This can be used for diagnosis and preparatory stage of new drug development.

Cat. No.	Product name	Emission color	Ex_{Max} (nm)	Em_{Max} (nm)	Common filter set	Excitation laser line	Size
RSC0201	Dextran (3K), FAM	Green	492	519	FITC	488 nm	5mg
RSC0202	Dextran (3K), Flamma® 488	Green	495	519	FITC	488 nm	5mg
RSC0205	Dextran (3K), Flamma® 552	Yellow	550	565	TRITC	488, 532 nm	5mg
RSC0207	Dextran (3K), TAMRA	Orange	543	575	TRITC	488, 532 nm	5mg
RSC0206	Dextran (3K), Flamma® 560	Orange	560	589	TRITC	488, 532 nm	5mg
RSC0210	Dextran (3K), Flamma® 581	Orange	581	596	TRITC	488, 532 nm	5mg
RSC0211	Dextran (3K), Flamma® 648	Red	648	663	Cy®5	594, 633 nm	5mg
RSC0212	Dextran (3K), Flamma® 675	Far red	675	691	Cy®5.5	633, 680 nm	5mg
RSC0213	Dextran (3K), Flamma® 749	NIR	749	774	Cy®7	680 nm	5mg
RSC0214	Dextran (3K), Flamma® 774	NIR	774	806	Cy®7.5	785 nm	5mg
RSC0215	Dextran (3K), ICG	NIR	785	821	Cy®7.5	785 nm	5mg
RSC0301	Dextran (10K), FAM	Green	492	519	FITC	488 nm	5mg
RSC0302	Dextran (10K), Flamma® 488	Green	495	519	FITC	488 nm	5mg
RSC0305	Dextran (10K), Flamma® 552	Yellow	550	565	TRITC	488, 532 nm	5mg
RSC0307	Dextran (10K), TAMRA	Orange	543	575	TRITC	488, 532 nm	5mg

RSC0306	Dextran (10K), Flamma® 560	Orange	560	589	TRITC	488, 532 nm	5mg
RSC0310	Dextran (10K), Flamma® 581	Orange	581	596	TRITC	488, 532 nm	5mg
RSC0311	Dextran (10K), Flamma® 648	Red	648	663	Cy®5	594, 633 nm	5mg
RSC0312	Dextran (10K), Flamma® 675	Far red	675	691	Cy®5.5	633, 680 nm	5mg
RSC0313	Dextran (10K), Flamma® 749	NIR	749	774	Cy®7	680 nm	5mg
RSC0314	Dextran (10K), Flamma® 774	NIR	774	806	Cy®7.5	785 nm	5mg
RSC0315	Dextran (10K), ICG	NIR	785	821	Cy®7.5	785 nm	5mg

Citation & Reference

1. A fluorescence-based in vitro assay for investigating early endosome dynamics. 2010. Barysch SV, Jahn R, Rizzoli SO. *Nat Protoc*. 5, 127-1137.
2. A UDP-GalNAc:polypeptide N-acetylgalactosaminyltransferase is required for epithelial tube formation. 2007. Tian E, Ten Hagen KG. *J Biol Chem*. 282, 606-614.
3. Automated organelle-based colocalization in whole-cell imaging. 2009. Woodcroft BJ, Hammond L, Stow JL, Hamilton NA. *Cytometry A*. 75, 941-950.

O BSA, Flamma® series

Bovine serum albumin, BSA complex is generally used as a tracer for application experiment where physical size is important. fluorescent BSA complex can be used for plasma volume measuring quantitative research and also can be used in producing peptide antigen for the purpose of producing immunity and antibody. BioActs' BSA conjugate product is a zygote having photostability as well as bright fluorescent and can research endocytosis, exocytosis and protein processing. Also can be used for diagnose agent which can trace tumor by inosculating fluorescent. It has advantage of obtaining good result in the in-vivo test as based on albumin.

Cat. No.	Product name	Emission color	Ex_{Max} (nm)	Em_{Max} (nm)	Common filter set	Excitation laser line	Size
RCS0101	BSA, FAM	Green	492	519	FITC	488 nm	5mg
RCS0102	BSA, Flamma® 488	Green	495	519	FITC	488 nm	5mg
RSC0105	BSA, Flamma® 552	Yellow	550	565	TRITC	488, 532 nm	5mg
RSC0107	BSA, TAMRA	Orange	543	575	TRITC	488, 532 nm	5mg
RCS0106	BSA, Flamma® 560	Orange	560	589	TRITC	488, 532 nm	5mg
RSC0110	BSA, Flamma® 581	Orange	581	596	TRITC	488, 532 nm	
RSC0111	BSA, Flamma® 648	Red	648	663	Cy®5	594, 633 nm	5mg
RSC0112	BSA, Flamma® 675	Far red	675	691	Cy®5.5	633, 680 nm	5mg
RSC0113	BSA, Flamma® 749	NIR	749	774	Cy®7	680 nm	5mg
RSC0114	BSA, Flamma® 774	NIR	774	806	Cy®7.5	785 nm	5mg
RSC0115	BSA, Flamma® ICG	NIR	785	821	Cy®7.5	785 nm	5mg

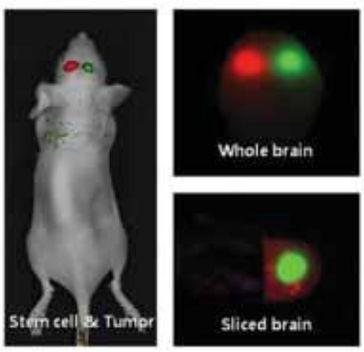
Citation & Reference

1. A betaPix Pak2a signaling pathway regulates cerebral vascular stability in zebrafish. Liu J. *Proc Natl Acad Sci U S A.* . 2007 Aug 28;104(35):13990-5
2. Cell mechanics control rapid transitions between blebs and lamellipodia during migration. Bergert M. *Proc Natl Acad Sci U S A.* 2012 Sep 4;109(36):14434-9.
3. Measuring molecular rupture forces between single actin filaments and actin-binding proteins. Ferrer JM. *Proc Natl Acad Sci U S A.* 2008 Jul 8;105(27):9221-6.

◉ Cell Tracking

O CytoFlamma® NIR

CytoFlamma®,a products group of BioActs for staining cells, also features a product line-up of NIR fluorescent area. CytoFlamma® NIR product injects fluorescently labeled cell line in small animals and track this.



Cat. No.	Product name	Emission color	Ex_{Max} (nm)	Em_{Max} (nm)	Common filter set	Excitation laser line	Size
RCS1511	CytoFlamma® 675 Cell-membrane (Live)	● Far red	675	698	Cy®5.5	633, 680 nm	0.1mg, 0.5mg, 1mg
RCS1611	CytoFlamma® 749 Cell-membrane (Live)	● NIR	749	774	Cy®7	680 nm	0.1mg, 0.5mg, 1mg
RCS1811	CytoFlamma® ICG Cell-membrane (Live)	● NIR	785	821	Cy®7.5	785 nm	0.1mg, 0.5mg, 1mg

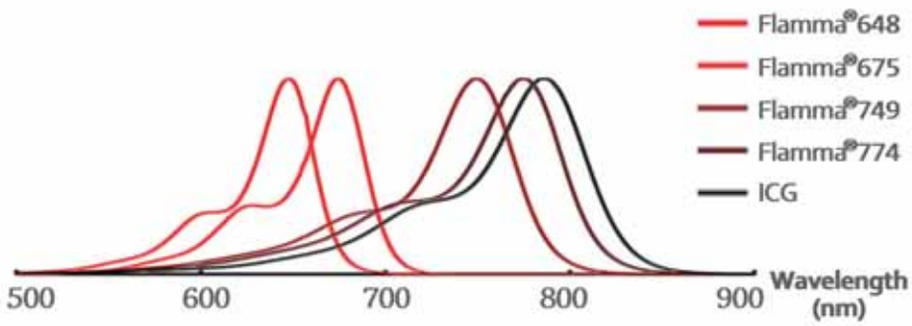
◉ Bioluminescence

O Luciferin

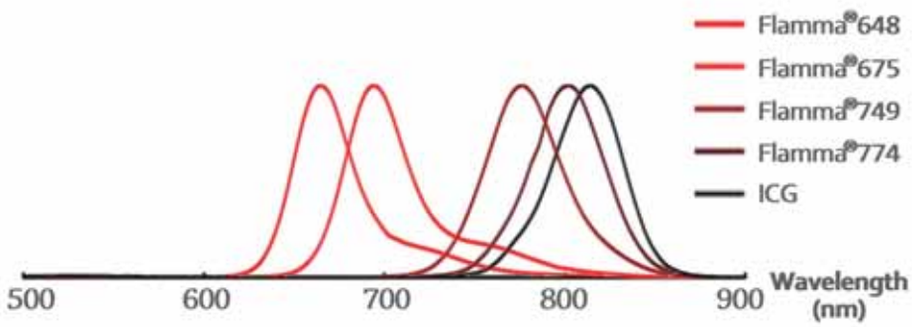
Luciferin products group produced by a leading organic synthesis technology of BioActs provides luciferin products that are high purity and high quality.

◉ NIR Fluorescent Dyes

Flamma® NIR Flours series of BioActs are near-infrared fluorescent dyes for animal imaging and these are brighter and have high water solubility and low toxicity. Flamma® NIR Flours series, which consist of various fluorescent substances that have fluorescent wavelength of 700 nm ~ 800 nm, provide many options of reactive group and functional group besides NHS ester and maleimide.



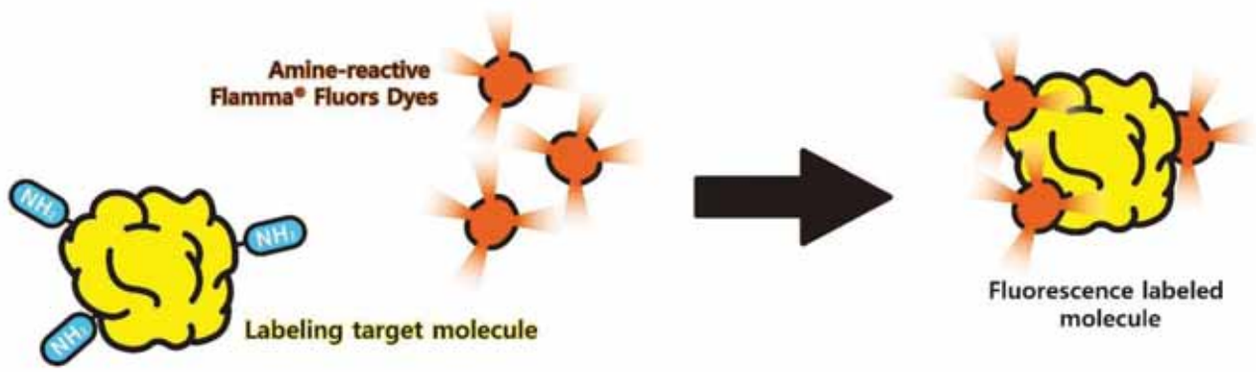
Excitation Spectra



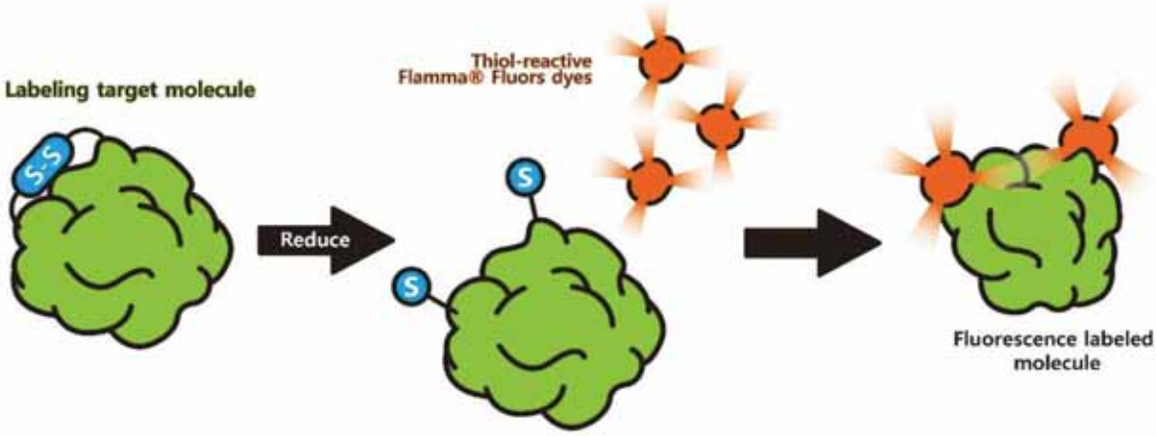
Emission Spectra

Various absorption and fluorescent wavelengths of BioActs NIR products

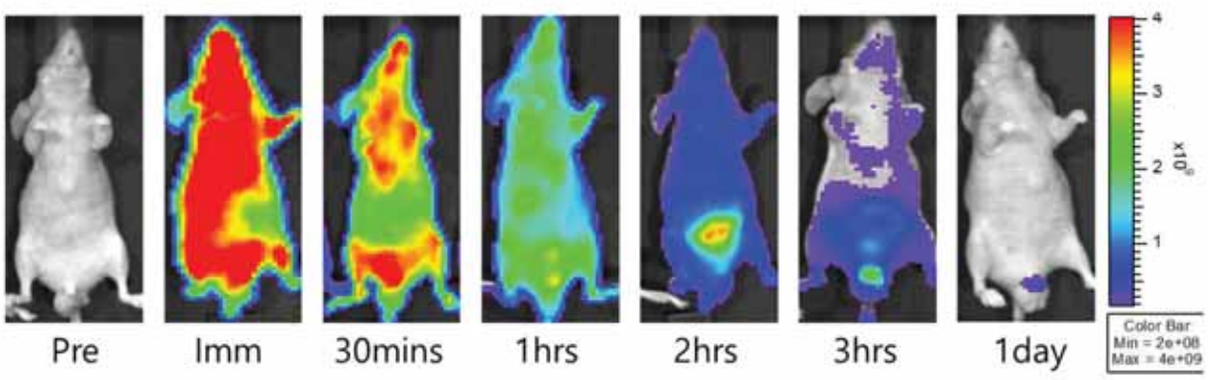
BioActs' NIR Dye contains bioreactor such as NHS ester, Maleimide, Isothiocyanate, etc., so you can select the proper reactor you want and conduct effective experiments.



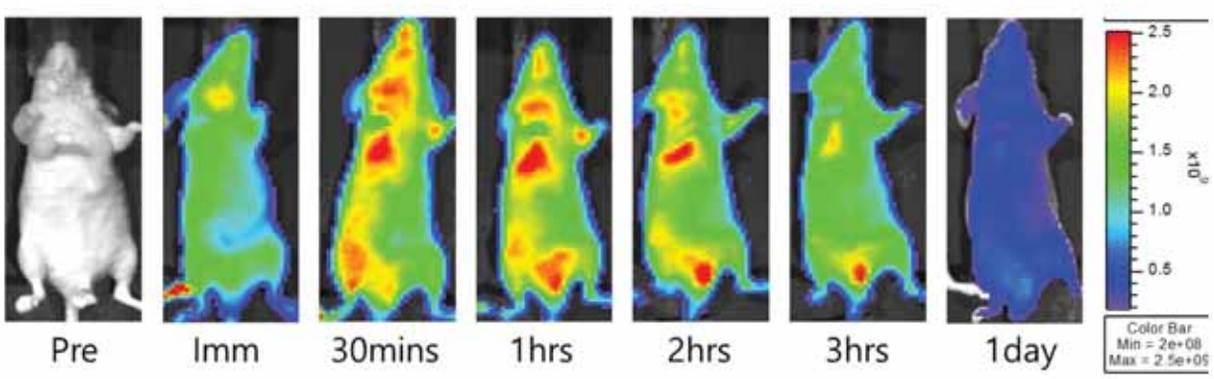
Selection of reactors for binding of biomaterials with amines



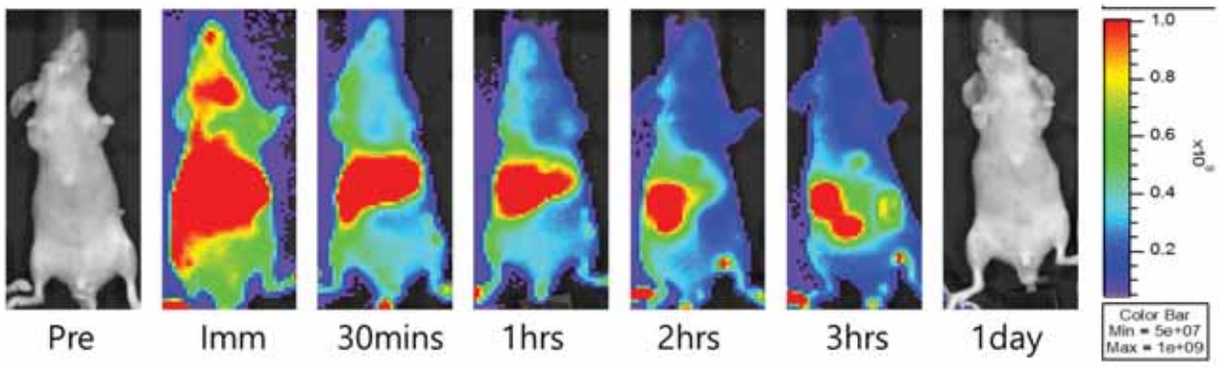
Selection of reactors for binding of biomolecules to Thiol



After 1 day of Flamma® 749 Carboxylic acid injection, elimination from the body was confirmed



After 1 day of Flamma® 774 Carboxylic acid injection, elimination from the body was confirmed



After 1 day of ICG Carboxylic acid injection, elimination from the body was confirmed)

Cat. No.	Product name	Emission color	Ex_{Max} (nm)	Em_{Max} (nm)	Common filter set	Excitation laser line	Size
PWS1215a	Flamma® 648 NHS ester	Red	648	663	Cy®5	594, 633 nm	1mg, 5mg, 25mg
PWS1515a	Flamma® 675 NHS ester	Far red	675	691	Cy®5.5	633, 680 nm	1mg, 5mg, 25mg
PWS1301a	Flamma® 749 NHS ester	NIR	749	774	Cy®7	680 nm	1mg, 5mg, 25mg
PWS1603a	Flamma® 774 NHS ester	NIR	774	806	Cy®7.5	785 nm	1mg, 5mg, 25mg
POS1604a	ICG NHS ester	NIR	785	821	Cy®7.5	785 nm	1mg, 5mg, 25mg
PWSN1215a	Flamma® 648 Sulfo-NHS ester	Red	648	663	Cy®5	594, 633 nm	1mg, 5mg, 25mg
PWSN1515a	Flamma® 675 Sulfo-NHS ester	Far red	675	691	Cy®5.5	633, 680 nm	1mg, 5mg, 25mg
PWSN1301a	Flamma® 749 Sulfo-NHS ester	NIR	749	774	Cy®7	680 nm	1mg, 5mg, 25mg
PWSN1603a	Flamma® 774 Sulfo-NHS ester	NIR	774	806	Cy®7.5	785 nm	1mg, 5mg, 25mg
POSN1604a	ICG Sulfo-NHS ester	NIR	785	821	Cy®7.5	785 nm	1mg, 5mg, 25mg
PWA1215a	Flamma® 648 Vinylsulfone	Red	648	663	Cy®5	594, 633 nm	1mg, 5mg, 25mg
PWA1515a	Flamma® 675 Vinylsulfone	Far red	675	691	Cy®5.5	633, 680 nm	1mg, 5mg, 25mg
PWA1603a	Flamma® 774 Vinylsulfone	NIR	749	774	Cy®7	680 nm	1mg, 5mg, 25mg
POA1616a	ICG Vinylsulfone	NIR	774	806	Cy®7.5	785 nm	1mg, 5mg, 25mg
POA1803a	Flamma® 800 Vinylsulfone	NIR	785	821	Cy®7.5	785 nm	1mg, 5mg, 25mg
KWI1215a	Flamma® 648 Isothiocyanate	Red	648	663	Cy®5	594, 633 nm	1mg, 5mg, 25mg
KWI1515a	Flamma® 675 Isothiocyanate	Far red	675	691	Cy®5.5	633, 680 nm	1mg, 5mg, 25mg
PWI1308a	Flamma® 749 Isothiocyanate	NIR	749	774	Cy®7	680 nm	1mg, 5mg, 25mg
PWI1603a	Flamma® 774 Isothiocyanate	NIR	774	806	Cy®7.5	785 nm	1mg, 5mg, 25mg
POI1616a	ICG Isothiocyanate	NIR	785	821	Cy®7.5	785 nm	1mg, 5mg, 25mg
KWM1042a	Flamma® 648 Maleimide	Red	648	663	Cy®5	594, 633 nm	1mg, 5mg, 25mg
PWM1415a	Flamma® 675 Maleimide	Far red	675	691	Cy®5.5	633, 680 nm	1mg, 5mg, 25mg
PWM1215a	Flamma® 749 Maleimide	NIR	749	774	Cy®7	680 nm	1mg, 5mg, 25mg
PWM1515a	Flamma® 774 Maleimide	NIR	774	806	Cy®7.5	785 nm	1mg, 5mg, 25mg
PWM1301a	ICG Maleimide	NIR	785	821	Cy®7.5	785 nm	1mg, 5mg, 25mg
PWZ1215a	Flamma® 648 Azide	Red	648	663	Cy®5	594, 633 nm	1mg, 5mg, 25mg
PWZ1515a	Flamma® 675 Azide	Far red	675	691	Cy®5.5	633, 680 nm	1mg, 5mg, 25mg
PWZ1301a	Flamma® 749 Azide	NIR	749	774	Cy®7	680 nm	1mg, 5mg, 25mg
PWZ1603a	Flamma® 774 Azide	NIR	774	806	Cy®7.5	785 nm	1mg, 5mg, 25mg
POZ1616a	ICG Azide	NIR	785	821	Cy®7.5	785 nm	1mg, 5mg, 25mg
PWH1215a	Flamma® 648 Hydrazide	Red	648	663	Cy®5	594, 633 nm	1mg, 5mg, 25mg
PWH1515a	Flamma® 675 Hydrazide	Far red	675	691	Cy®5.5	633, 680 nm	1mg, 5mg, 25mg
PWH1301a	Flamma® 749 Hydrazide	NIR	749	774	Cy®7	680 nm	1mg, 5mg, 25mg
PWH1603a	Flamma® 774 Hydrazide	NIR	774	806	Cy®7.5	785 nm	1mg, 5mg, 25mg
POH1616a	ICG Hydrazide	NIR	785	821	Cy®7.5	785 nm	1mg, 5mg, 25mg

PWR2215a	Flamma® 648 Dichlorotriazine	Red	648	663	Cy®5	594, 633 nm	1mg, 5mg, 25mg
PWR2515a	Flamma® 675 Dichlorotriazine	Far red	675	691	Cy®5.5	633, 680 nm	1mg, 5mg, 25mg
PWR2301a	Flamma® 749 Dichlorotriazine	NIR	749	774	Cy®7	680 nm	1mg, 5mg, 25mg
PWR2603a	Flamma® 774 Dichlorotriazine	NIR	774	806	Cy®7.5	785 nm	1mg, 5mg, 25mg
POR2616a	ICG Dichlorotriazine	NIR	785	821	Cy®7.5	785 nm	1mg, 5mg, 25mg
PWK1215a	Flamma® 648 Alkyne	Red	648	663	Cy®5	594, 633 nm	1mg, 5mg, 25mg
PWK1515a	Flamma® 675 Alkyne	Far red	675	691	Cy®5.5	633, 680 nm	1mg, 5mg, 25mg
PWK1301a	Flamma® 749 Alkyne	NIR	749	774	Cy®7	680 nm	1mg, 5mg, 25mg
PWK1603a	Flamma® 774 Alkyne	NIR	774	806	Cy®7.5	785 nm	1mg, 5mg, 25mg
POK1616a	ICG Alkyne	NIR	785	821	Cy®7.5	785 nm	1mg, 5mg, 25mg
PWG1215a	Flamma® 648 PEG4-Alkyne	Red	648	663	Cy®5	594, 633 nm	1mg, 5mg, 25mg
PWG1515a	Flamma® 675 PEG4-Alkyne	Far red	675	691	Cy®5.5	633, 680 nm	1mg, 5mg, 25mg
PWG1301a	Flamma® 749 PEG4-Alkyne	NIR	749	774	Cy®7	680 nm	1mg, 5mg, 25mg
PWG1603a	Flamma® 774 PEG4-Alkyne	NIR	774	806	Cy®7.5	785 nm	1mg, 5mg, 25mg
POG1616a	ICG PEG4-Alkyne	NIR	785	821	Cy®7.5	785 nm	1mg, 5mg, 25mg
DWC1021a	Flamma® 648 ADIBO	Red	648	663	Cy®5	594, 633 nm	1mg, 5mg, 25mg
DWC1051a	Flamma® 675 ADIBO	Far red	675	691	Cy®5.5	633, 680 nm	1mg, 5mg, 25mg
DWC1031a	Flamma® 749 ADIBO	NIR	749	774	Cy®7	680 nm	1mg, 5mg, 25mg
DWC1061a	Flamma® 774 ADIBO	NIR	774	806	Cy®7.5	785 nm	1mg, 5mg, 25mg
DOC1061a	ICG ADIBO	NIR	785	821	Cy®7.5	785 nm	1mg, 5mg, 25mg
PWC1201a	Flamma® 648 Carboxylic acid	Red	648	663	Cy®5	594, 633 nm	1mg, 5mg, 25mg
PWC1501a	Flamma® 675 Carboxylic acid	Far red	675	691	Cy®5.5	633, 680 nm	1mg, 5mg, 25mg
PWC1308a	Flamma® 749 Carboxylic acid	NIR	749	774	Cy®7	680 nm	1mg, 5mg, 25mg
PWC1603a	Flamma® 774 Carboxylic acid	NIR	774	806	Cy®7.5	785 nm	1mg, 5mg, 25mg
POC1616a	ICG Carboxylic acid	NIR	785	821	Cy®7.5	785 nm	1mg, 5mg, 25mg
PWE1215a	Flamma® 648 Amine	Red	648	663	Cy®5	594, 633 nm	1mg, 5mg, 25mg
PWE1515a	Flamma® 675 Amine	Far red	675	691	Cy®5.5	633, 680 nm	1mg, 5mg, 25mg
PWE1301a	Flamma® 749 Amine	NIR	749	774	Cy®7	680 nm	1mg, 5mg, 25mg
PWE1603a	Flamma® 774 Amine	NIR	774	806	Cy®7.5	785 nm	1mg, 5mg, 25mg
POE1616a	ICG Amine	NIR	785	821	Cy®7.5	785 nm	1mg, 5mg, 25mg
KWT1042a	Flamma® 648 Thiol	Red	648	663	Cy®5	594, 633 nm	1mg, 5mg, 25mg
PWT1415a	Flamma® 675 Thiol	Far red	675	691	Cy®5.5	633, 680 nm	1mg, 5mg, 25mg
PWT1215a	Flamma® 749 Thiol	NIR	749	774	Cy®7	680 nm	1mg, 5mg, 25mg
PWT1515a	Flamma® 774 Thiol	NIR	774	806	Cy®7.5	785 nm	1mg, 5mg, 25mg
PWT1301a	ICG Thiol	NIR	785	821	Cy®7.5	785 nm	1mg, 5mg, 25mg
RFP0815a	ICG	NIR	785	821	Cy®7.5	785 nm	25mg, 100mg

Citation & Reference

1. Paclitaxel loaded hyaluronic acid nanoparticles for targeted cancer therapy: In vitro and in vivo analysis (Reju G. Thomas, , MyeongJu Moon, SeJy Lee, Yong Yeon Jeong, *International Journal of Biological Macromolecules, 2015, Volume 72, Pages 510–518*)

2. Photo-crosslinked hyaluronic acid nanoparticles with improved stability for in vivo tumor-targeted drug delivery (Hong Yeol Yoona, Heebeom Koo, Ki Young Choi, Ick Chan Kwon, Kuiwon Choi, Jae Hyung Park, *Biomaterials, 2013, Volume 34, Issue 21, Pages 5273–5280*)

3. Co-delivery of VEGF and Bcl-2 dual-targeted siRNA polymer using a single nanoparticle for synergistic anti-cancer effects in vivo (So Jin Lee, Simmyung Yook, Ji Young Yhee, Hong Yeol Yoon, Myung-Goo Kim, Sook Hee Ku, Sun Hwa Kim, Jae Hyung Park, Ji Hoon Jeong, Ick Chan Kwon, Seulki Lee, Hyukjin Lee, Kwangmeyung Kim, *Journal of Controlled Release, 2015, Volume 220, Part B, Pages 631–641*)

4. Effectiveness of Losartan-Loaded Hyaluronic Acid (HA) Micelles for the Reduction of Advanced Hepatic Fibrosis in C3H/HeN Mice Model (Reju George Thomas, Myeong Ju Moon, Jo Heon Kim, Jae Hyuk Lee, Yong Yeon Jeong, *PLoS ONE, 2015, 10(12): e0145512.*)

5. Notch1 targeting siRNA delivery nanoparticles for rheumatoid arthritis therapy (Min Ju Kim, Jong-Sung Park, So Jin Lee, Jiyeon Jang, Jin Su Park, Seung Hyun Back, Gahee Bahn, Jae Hyung Park, Young Mo Kang, Sun Hwa Kim, Ick Chan Kwon, Dong-Gyu Jo, Kwangmeyung Kim, *Journal of Controlled Release, 2015, Volume 216, Pages 140–148*)

6. Cancer-targeted MDR-1 siRNA delivery using self-cross-linked glycol chitosan nanoparticles to overcome drug resistance (Ji Young Yhee, Seungyong Song, So Jin Lee, Sung-Gurl Park, Ki-Suk Kim, Myung Goo Kim, Sejin Son, Heebeom Koo, Ick Chan Kwon, Ji Hoon Jeong, Seo Young Jeong, Sun Hwa Kim, Kwangmeyung Kim, *Journal of Controlled Release, 2015, Volume 198, Pages 1–9*)

7. A new fluorescence/PET probe for targeting intracellular human telomerase reverse transcriptase (hTERT) using Tat peptide-conjugated IgM (Kyung oh Jung, Hyewon Youn, Seung Hoo Kim, Young-Hwa Kim, Keon Wook Kang, June-Key Chung, *Biochemical and Biophysical Research Communications, 2016, Volume 477, Issue 3, Pages 483–489*)

8. Controlled Release of Hepatocyte Growth Factor from MPEG-b-(PCL-ran-PLLA) Diblock Copolymer for Improved Vocal Fold Regeneration (Jae Won Choi, Yeon Soo Kim, Ju Kyeong Park, Eun Hye Song, Ji Hoon Park, Moon Suk Kim, Yoo Seob Shin, Chul-Ho Kim, *Macromolecular Bioscience, 2016, DOI: 10.1002/mabi.201600163*)

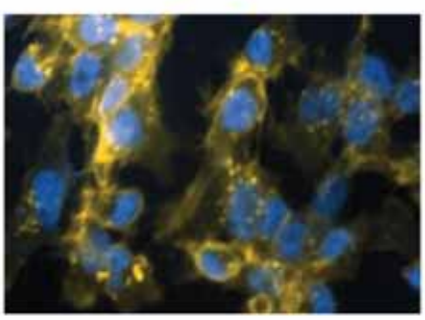
Antibody

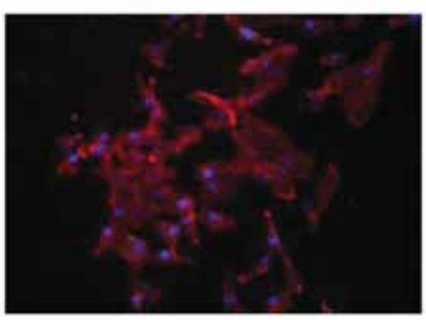
◉ Conjugated Primary Antibody

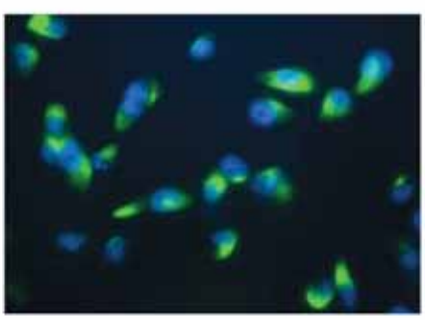
Direct or primary immunofluorescent method uses a single primary antibody labeled with fluorescent substance. Primary antibody labeled with fluorescent substance identifies and bonds the part called epitope in antigen, and detects and tracks identified antibody by inducing fluorescent reaction in labeled fluorescent substance. Because direct immunofluorescent method that uses one antibody per target antigen has a smaller number of antibodies than indirect immunofluorescent method, its experiment process is short, non-specific background signal is low, and it has a feature that cross-reactivity of secondary antibody is relatively unrestricted. However, its sensitivity is low due to low brightness of fluorescent since fluorescent dyeing ratio per antigen is several times lower than indirect immunofluorescent method.

Through antibody labeling service, BioActs produces fluorescent antibodies for direct immunofluorescent. With a conjugation of antibody library that has nearly hundreds of thousands types and strong fluorescent performance of Flamma® Fluor, BioActs provides primary fluorescent antibody that can accommodate any equipment.

◉ Conjugated Secondary Antibody







Indirect or secondary immunofluorescent method is a way that combines primary antibody and secondary antibody, and It is more commonly used than direct immunofluorescent method due to its strong signal amplification structure and low cost. Primary antibody of indirect immunofluorescent is an antibody that specifically bonds to target molecules and doesn't have fluorescent labeling. Secondary antibody is an antibody that has primary antibody as an antigen, and labeled with fluorescent. In addition, as a polyclonal antibody it has a feature that combines several secondary antibodies per molecule of primary antibody. Due to the nature of secondary antibody, 'Antigen'-'Primary antibody'-'Secondary antibody' structure of indirect immunofluorescent has more number of fluorescent per molecule of antigen that can be dyed and more amplified fluorescent signal than 'Antigen'-'Primary antibody' structure of direct immunofluorescent. However, indirect immunofluorescent method has more complicated structure of antibody-combining than direct immunofluorescent, therefore caution to nonspecific fluorescent signals and cross reaction is required and the testing process is quite cumbersome.

Secondary fluorescent antibody of BioActs is a product developed by combining a highly specific antibody with Flamma® Fluor that has strong fluorescent performance. You can experience BioActs' fluorescent secondary antibodies with a variety of antibodies line-up and wide fluorescent spectrum.

Host	Target	Fluorephore	Cat. No.	Emission color	Ex_{Max} (nm)	Em_{Max} (nm)	Application	Size
Goat	anti-Mouse IgG	Flamma® 488	RSA1141	Green	495	519	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 552	RSA1151	Yellow	550	565	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 594	RSA1191	Red	590	617	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 648	RSA1161	Red	648	663	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 675	RSA1171	Far Red	675	691	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 749	RSA1101	NIR	749	774	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		ICG	RSA1181	NIR	785	821	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		HRP	RSA1122	-	-	-	ICC, IP, ELISA, IHC, WB	0.5mg, 1mg, 2mg
	anti-Rabbit IgG	Flamma® 488	RSA1541	Green	495	519	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 552	RSA1551	Yellow	550	565	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 594	RSA1591	Red	590	617	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 648	RSA1561	Red	648	663	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 675	RSA1571	Far Red	675	691	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 749	RSA1501	NIR	749	774	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		ICG	RSA1581	NIR	785	821	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		HRP	RSA1521	-	-	-	ICC, IP, ELISA, IHC, WB	0.5mg, 1mg, 2mg
	anti-Rat IgG	Flamma® 488	RSA1241	Green	495	519	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 552	RSA1251	Yellow	550	565	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 594	RSA1291	Red	590	617	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 648	RSA1261	Red	648	663	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 675	RSA1271	Far Red	675	691	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 749	RSA1201	NIR	749	774	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		ICG	RSA1281	NIR	785	821	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		HRP	RSA1221	-	-	-	ICC, IP, ELISA, IHC, WB	0.5mg, 1mg, 2mg
Rabbit	anti-Goat IgG	Flamma® 488	RSA4441	Green		519	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 552	RSA4451	Yellow	550	565	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 594	RSA4491	Red	590	617	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 648	RSA4461	Red	648	663	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 675	RSA4471	Far Red	675	691	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		Flamma® 749	RSA4401	NIR	749	774	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		ICG	RSA4481	NIR	785	821	FACS, ICC, IF, IHC, IP, WB	0.5mg, 1mg, 2mg
		HRP	RSA4421	-	-	-	ICC, IP, ELISA, IHC, WB	0.5mg, 1mg, 2mg

Antibody Labeling Kit

Flamma® Fluors Antibody Labeling Kit of BioActs is a product designed to easily label antibody with various fluorescent substances of Flamma® Fluors. Flamma® Fluors Antibody Labeling Kit has been prepared to proceed entire process from labeling reaction to purification. Flamma® Fluors dye in the product is a reactive dye in which vinylsulfone reactive group that effectively bonds with primary amines of antibody is applied and it can create efficient antibody-dye conjugates

Cat. No.	Product name	Emission color	Ex_{Max} (nm)	Em_{Max} (nm)	Common filter set	Excitation laser line	Size
XPL1104a	Flamma® 552 Protein labeling kit	Yellow	550	565	TRITC	488, 532 nm	1 kit
XPL2104a	Flamma® 648 Protein labeling kit	Red	648	663	Cy®5	594, 633 nm	1 kit
XPL3104a	Flamma® 675 Protein labeling kit	Far red	675	691	Cy®5.5	633, 680 nm	1 kit
XPL4104a	Flamma® 749 Protein labeling kit	NIR	749	774	Cy®7	680 nm	1 kit

Nucleic Acid Labeling

◉ Fluorescent Phosphoramidites

BioActs provides Fluorescent dyes in main Phosphoamidite form to label Nucleotides. Phosphoramidite with fluorescent dye attached can be used for PCR and Sequencing. This Phosphoramidite is mostly used as a material for automated synthesis by Oligonucleotide synthesizers and can analyze amplified product with labeled PCR Probes or Primers. In case of fluorescein Phosphoramidite provided, it is tagged on 5' position of Oligonucleotide and deprotection is easily made for use during synthesis process.

○ Flamma® Fluors Phosphoramidite

Oligonucleotide probe is a factor that is detectable when used for DNA analysis, and it is synthesized through Phosphate modification process of Phosphoramidite polymers. Automated synthesis of well-known Oligonucleotide uses Phosphoramidite chemistry to add Nucleotide and increase Sequence.

Functionalized phosphoramidite nucleotide polymers can be applied as a part of well-known Labeled probes. Most of these techniques are required in automated DNA synthesis, and can be used in Fluorescent molecules, Biotin and Chelating groups.

Flamma Fluors® Series having high fluorescent intensity is used to produce fluorescent Phosphoramidite. By introducing fluorescent dyes with different wavelengths, when it is bound to a probe, it can be applied to Multiplex detection of target substance, detection of Infectious agents and Genotyping such as allele-specific PCR.

◉ Quencher Phosphoramidite

BioActs provides a Quencher in the form of major Phosphoamidite for labeling Nucleotide.
Quencher-attached Phosphoramidite can be used for PCR applications and sequencing. Phosphoramidite mostly used as a material for fluorescent labeling in oligonucleotide automated synthesis using oligo synthesizers. It is labeled at PCR probe or Primer to analyze amplification products. For Quencher Phosphoramidite provided, it is tagged at 5' position of Oligonucleotide and easily used after deprotection in synthesis process.

○ qFlamma® Phosphoramidite

Along with fluorescent Phosphoramidite in use, Quencher Phosphoramidite having a function of fluorescent quenching can be utilized in producing Oligonucleotide Probes. Not only it enables Real-time PCR by quenching fluorescent of probe, but also it can be utilized in a multiplex way.

By introducing qFlamma® Black-1 that has an excellent quenching function, qFlamma® Phosphoramidite facilitates to quench various wavelengths and can be produced as a variety Probes.

◉ Fluorescent Nucleotides

O Flamma® Fluors dUTP/dCTP series

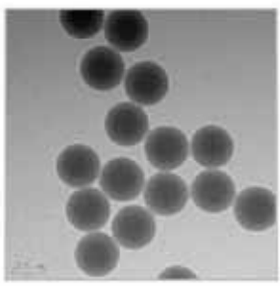
Flamma Fluors® dUTP / dCTP Series is a fluorescent product that enables multicolor analysis such as Microarrays, FISH and Gene mapping. Fluorescent Nucleotide products of BioActs are designed to be used for PCR, Nick-translation, random primed labeling and cDNA synthesis.

Cat. No.	Product name	Emission color	Ex_{Max} (nm)	Em_{Max} (nm)	Common filter set	Excitation laser line	Size
CWUP1003	Flamma® 488 dUTP	Green	495	519	FITC	488 nm	50nmole, 250nmole
PWUP1122	Flamma® 552 dUTP	Orange	550	565	TRITC	488, 532 nm	50nmole, 250nmole
PWUP1215	Flamma® 648 dUTP	Red	648	665	Cy®5	594, 633 nm	50nmole, 250nmole
CWCP1003	Flamma® 488 dCTP	Green	495	519	FITC	488 nm	50nmole, 250nmole
PWCP1122	Flamma® 552 dCTP	Orange	550	565	TRITC	488, 532 nm	50nmole, 250nmole
PWCP1215	Flamma® 648 dCTP	Red	648	665	Cy®5	594, 633 nm	50nmole, 250nmole

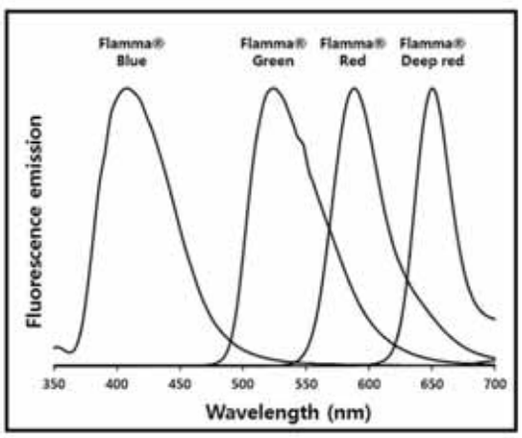
IVD materials

Fluorescent Polystyrene Beads

PS Bead Flamma® Series

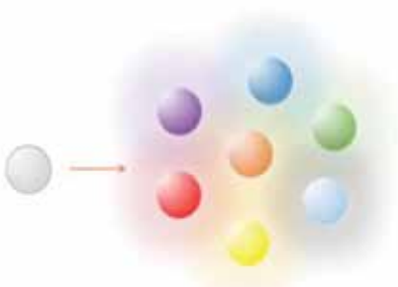


Flamma® Fluors PS Bead provided by BioActs, as the applied material for diagnostics and biochemistry, etc., can be used for the unique performance according to fluorescent marker and organism particle size after loading our already developed various bright fluorescent dyes on the surface or inside. To conduct applied tests in each different field as such, we are progressing custom labeling in consideration of fluorescent wavelength and Intensity desired by users and we modified the surface using carboxylic acid so that a covalent bond of the materials such as nucleic acid, antigen, peptide, antibody, etc. can be possible. This Technical note provides a variety of information with applied field and tables using PS Bead. Polystyrene bead size can be supplied within the range of 100nm – 20um. For any larger sizes, please consult with support@bioacts.com.



Information of dye introduced into PS Bead. From left, it shows fluorescent graph of Flamma® Blue, Flamma® Green, Flamma® Red, and Flamma® Deep red.

We filled these fluorescent dyes into the bead using the special method developed by us so as to prevent photobleaching or quenching phenomenon that may appear in the specific environment.



In the case of Bioimaging or Biosensing applied field, each different bead specification such as Bead size, Surface modification, Single or Multiple fluorescent dye, fluorescent intensity is required depending on the user Bead size, Surface modification, Single or Multiple fluorescent dye, fluorescent intensity, etc. Therefore, BioActs provides a customized service through feedback with the customer. Flamma® Fluors series suggested in Table 2 include full spectrum line from UV (Ultraviolet) to NIR (Near-infrared) category, which enables to provide fluorescent Spectrum bead in the filled condition as desired by the user. Flamma® Fluors series can adapt to all optical condition of fluorescent equipment. It is quite bright and clear and also can be used widely.

In the case of Flamma® Fluors PS Bead series, the dye is introduced into the PS Bead so as to minimize self-disturbance or mutual quenching of fluorescent Intensity. In addition, we confirmed fluorescent intensity being stable even after external stimulus of sonication, etc. Figure is the photograph that compares intensity of fluorescent using fluorescent measuring equipment after sonication using Flamma® Deep red PS Bead.

Flamma® Fluors PS Bead Optical analysis Sample A: Dark red PS Bead / Sample B: Flamma® Deep red PS Bead. In the case of optical analysis, comparative analysis was conducted by proceeding 0.2% from right and 1/2 serial dilution to left side.

Cat. #	Product	Emission color	Ex	Em	Dia.	Modification	Packing size	Solids
PSC7003	Flamma® Deep Red PS Bead	Deep Red	638	651	0.1um	COOH	2, 5, 10 mL	2%
PSC7001	Flamma® Deep Red PS Bead	Deep Red	638	651	0.2um	COOH	2, 5, 10 mL	2%
PSC7004	Flamma® Deep Red PS Bead	Deep Red	638	651	0.3um	COOH	2, 5, 10 mL	2%
PSC7002	Flamma® Deep Red PS Bead	Deep Red	638	651	0.5um	COOH	2, 5, 10 mL	2%

Citation & Reference

1. Stability of water-soluble carbodiimides in aqueous solution. Gilles, M.A., Hudson, A.Q., Borders, C.L., 1990. Anal. Biochem. 184, 244-248

2. Different EDC/NHS activation mechanisms between PAA and PMAA brushes and the following amidation reactions. Wang, C., Yan, Liu, H.B., Zhou, X.H., Xiao, S.J., 2011. Langmuir 27 (19), 12058-12068.

3. Mechanism of amid formation by carbodiimides for bioconjugation in aqueous media. Nakajima, N., Ikada, Y., 1995. Bioconjug. Chem. 6, 123-130

4. The adsorptive characteristics of proteins for polystyrene and their significance in solid-phase immunoassays. Cantarero, L.A., Butler, J.E., Osborne, J.W., 1980. Anal. Biochem. 105, 375-382

5. The physical and functional behavior of capture antibodies adsorbed on polystyrene. Butler, J.E., Ni, L., Nessler, R., Joshi, K.S., Suter, M., Rosenberg, B., et al., 1992. J. Immunol. Methods 150, 77-90.

6. N-hydroxysulfosuccinimide active esters: Bis(N-hydroxysulfosuccinimide)ester of two dicarboxylic acids are hydrophilic, membrane impermeant, protein cross-linkers. Staros, J.V., 1982. Biochemistry 21, 3950-39

II. SERVICE

For the Light of Life

Custom service

BioActs Co., Ltd. produces and supplies a variety of compounds, requested from researchers and corporations. Based on accumulated know-how and technologies, BioActs provided a wide range of services such as protein fluorescent labeling, organic synthesis, oligonucleotide synthesis to our customers. Our reliable technology has been acknowledged by our clients from domestic and overseas universities, institutions, *in vitro* diagnostic and pharmaceutical companies and enabled to steadily conduct their requests

Nucleic acid

Peptide/Protein

Antibody

Small Molecules /polymer

In addition, we can introduce fluorescent materials to many other compounds such as organic and inorganic compounds, drugs, hormones, polymer, peptides, proteins, antibodies, etc. We also can provide chemical and optical analytical data, along with cell and animal experiments with additional cost.

For detailed consultation, please contact us. We will reply immediately.

Fluorescent Labeling Service

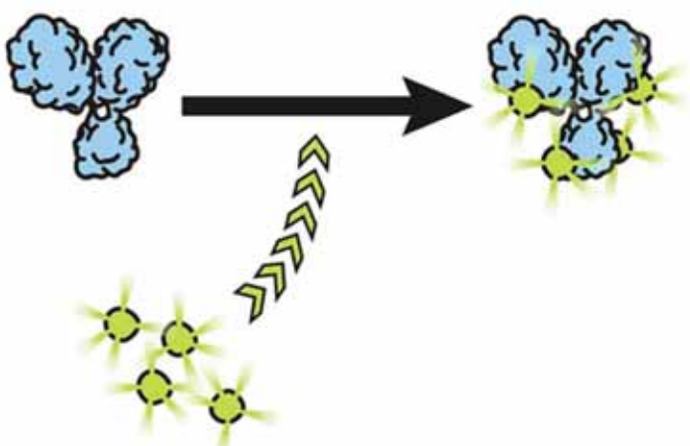
Based on the practice of bioconjugation technology for antibodies, proteins and peptides, BioAct's fluorescent labeling services have accumulated a variety of experiences from small scale labeling for researchers to large scale labeling for commercial purpose. Our fluorescent products, Flamma® Fluors series, has a wide range of fluorescent specification and labeling methods with various labeling options. Besides Flamma® Fluors, we have a range of fluorescent library that enable to introduce variety fluorescent compounds in accordance with biomolecules.

◉ Labeling Targets: Antibodies and Peptides

O Antibody / Protein

Submission of antibody/protein sample for labeling can be accepted in the freeze-dried form or in a buffer solution. Usually, more than 1 mg amount of sample is required, but a smaller volume of sample is also possible depending on cases. For consulting for labeling of less than 1 mg of sample, please contact us or our local distributor.

When submitted sample contains other substances that might interfere the labeling process or the buffer condition is not suitable for labeling, a purification step or a buffer exchange step may be performed, which will cause additional cost and time.



Fluorescent dye

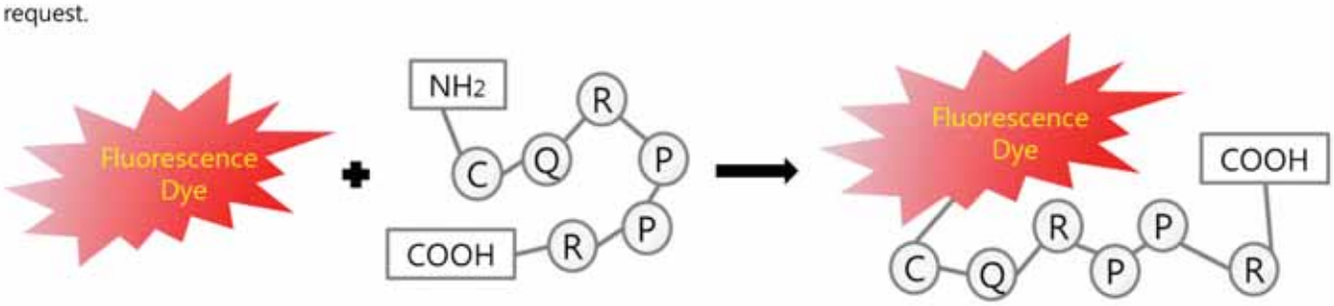
If you want to label a commercially available antibody without providing the sample, we can purchase the antibody on behalf of you and perform labeling service. Depending on the request, we can label the whole or part of the purchased antibody.

We normally send back labeled biomaterial three business days after receiving the sample, however the working period can vary due to the schedule and conditions the labeling service includes purification and concentration, and the basic form of sample is a solution but other forms, for example freeze-dried form, are also possible. Overseas sample delivery may require additional cost due to cold or frozen storage package options.

Peptide

Submission of the peptide sample for labeling can be accepted in solid, freeze-dried form or in a buffer solution. Usually, more than 1 mg of sample is required, but the smaller volume of sample is also possible depending on cases. For consulting for labeling of less than 1 mg of sample, please contact us or our local distributor.

Custom-order peptide synthesis and delivery is available, which can be associated with the requested antibody. In some cases, the labeling process may produce a low yield due to the nature of peptide sequence. Depending on the peptide types, different labeling methods will be applied, the time for completion and the cost will be consulted by request.



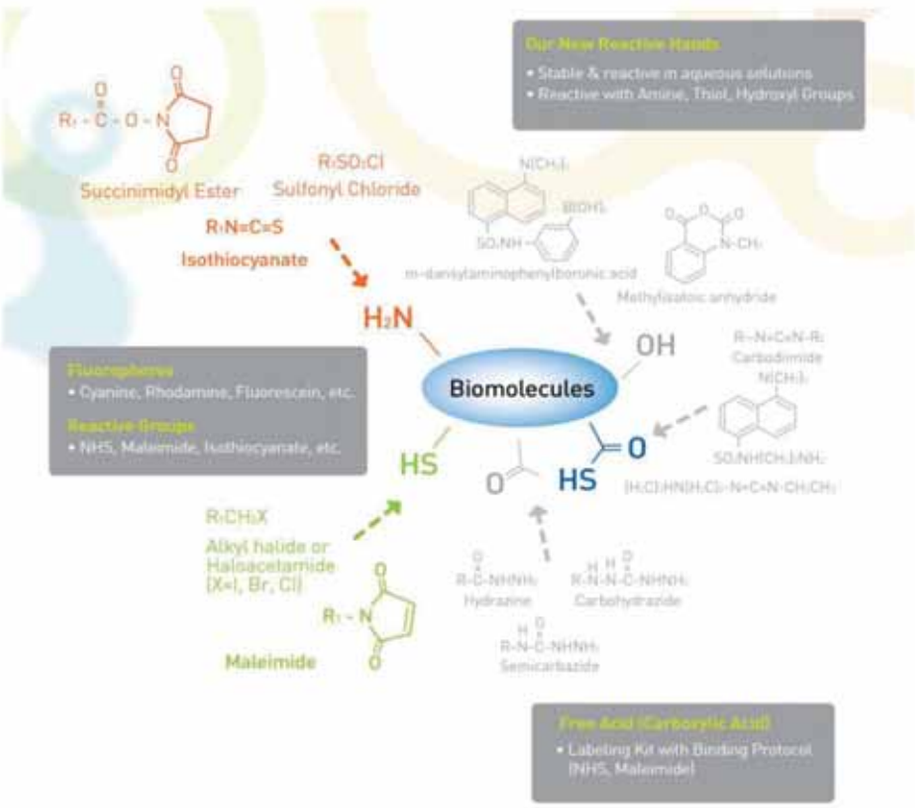
Flamma® Fluors

Flamma® Fluors, a fluorescent dye series, developed by BioActs' leading fluorescent technology can cover full spectral range from UV (Ultra Violet) to NIR (Near Infra-Red) and can be compatible with optical conditions of most of fluorescent apparatus in the field of biotechnology. In addition, Flamma® Fluors series equipped with a variety of reactive and functional groups that can be utilized in various research applications.

Flamma® Fluor	λ_{Ex} (nm)	λ_{Em} (nm)	Replacement for
Flamma® 456	495	522	FAM, FITC, Fluorescein
Flamma® 496	494	523	Alexa Fluor®488, Cy®2, DyLight® 488
Flamma® 552	551	570	Alexa Fluor®555, Cy®3, DyLight® 549
FSD™ 555	552	565	Alexa Fluor®555, Cy®3, DyLight® 549
Flamma® 581	578	595	Cy®6.5
Flamma® 648	648	672	Alexa Fluor® 647, Cy® 5, DyLight® 649
FSD™ 647	650	667	Alexa Fluor® 647, Cy® 5, DyLight® 649
Flamma® 675	675	678	Alexa Fluor® 680, Cy® 5.5, DyLight® 680
Flamma® 749	750	782	Alexa Fluor® 750, Cy® 7, DyLight® 750, IRDye® 750
Flamma® 774	777	802	Cy®7.5

Bioconjugation and functional group of Protein

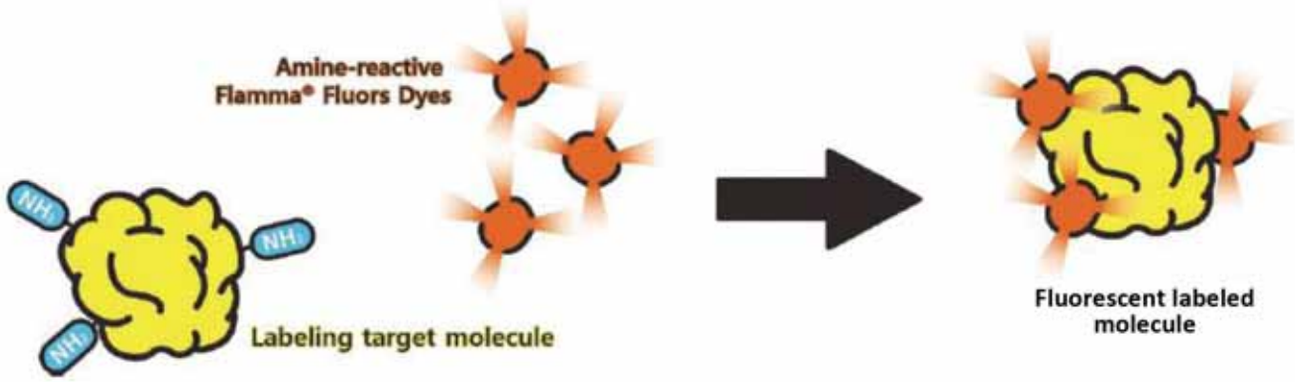
The bioconjugation is a biochemical reaction that connects chemical or biomolecules to biomaterials such as protein, antibody, etc., and the most of connections are achieved via stable covalent bond. The basic principal of the conjugation between a biomolecule and a fluorescent dye is described below.



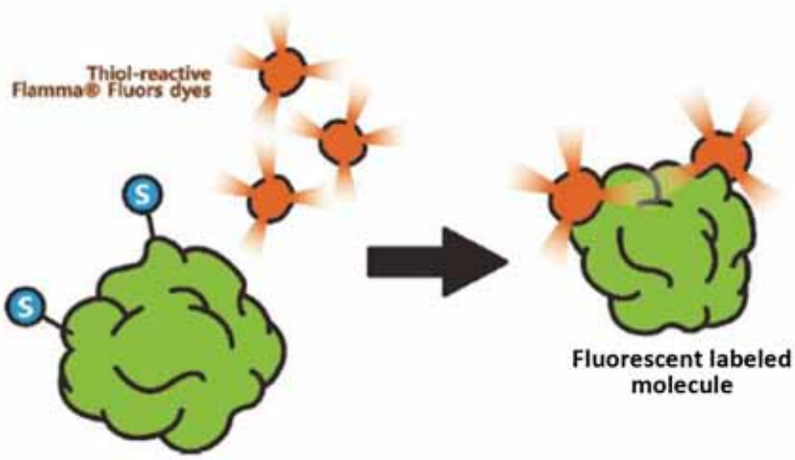
- **Amine**

The most commonly used bioconjugation method to a protein is reacting with an amine on the surface of the protein. The conjugation reaction takes place primary amine in lysine residues or the *N*-terminal of polypeptide chain. In order to activate the amine in lysine to obtain the nucleophilicity, deprotonation of ammonium is required. The reaction conditions should maintain pH 8~9. Which is lower than pKa of lysine ammonium group (10.5), the reacting groups for labeling amino functionalities are NHS ester and vinylsulfone.

- **Thiol**



Among 20 amino acids, cysteine (Cys) has a thiol (-SH) functionality, which specifically binds to maleimide reacting group via 1,4-addition. When labeling protein and peptide other than amino group, the cysteine-maleimide bonding is mainly used.



- **Carboxylic acid**

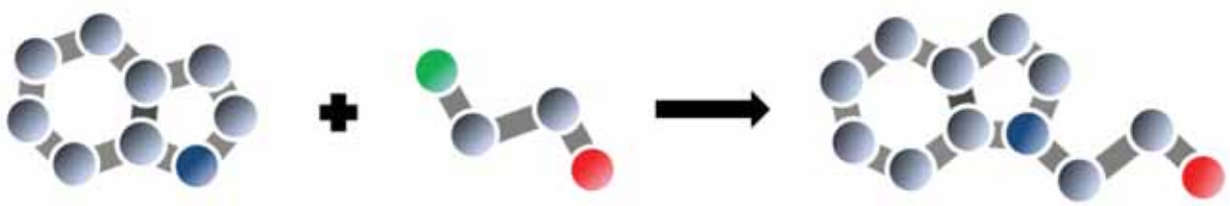
The primary acids in protein are present in the side chains of glutamic acid and aspartic acid residues along with C-terminal of polypeptide chain. Like amino groups, acids in protein are mainly relocated on the surface of protein. The acid functionality might be labeled with an amino group via the amide bond formation.

- **Carbonyl group**

When a conjugation to glycoprotein or other polysaccharide containing biomaterials, utilizing carbonyl group can be considered. For the bioconjugation to a carbonyl functionality, the hydrazine reacting group can be used based on oxidative treatment with sodium meta-periodate. The ideal acidity for hydrazine-carbonyl conjugation is pH 5~7

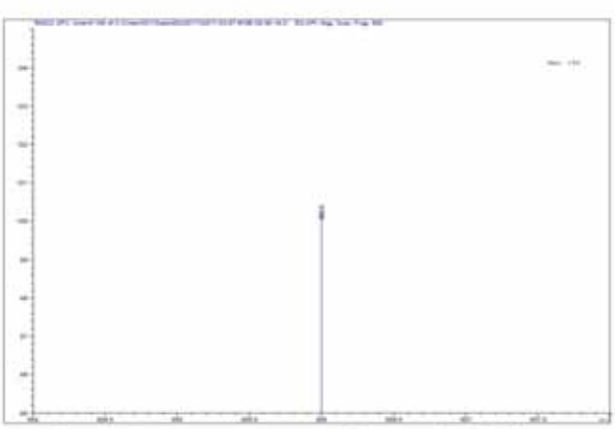
Organic Synthesis Service

Based on the accumulation of the 40-years of organic synthesis technology, BioActs provides on-demand synthesis services of a variety of compounds such as small molecules, dextran and chitosan polymers, polystyrene beads, nano particles, etc. and also offers labeling of fluorescent materials to those synthesized compounds and other biologically-derived substances such as hormones and vitamins. Our proud on-demand synthesis services have been acknowledged by many customers and often asked from them to advance into a collaborative research.

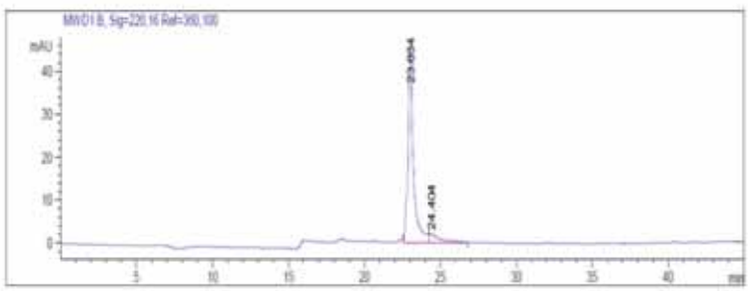


■ **Process for the service progress**

1. When you submit a request form via phone call or email, we will check the synthetic procedure and contact you after our internal review.
2. We will send you an estimate if the organic synthesis service is possible.
3. The estimate includes cost of reagents for the synthesis and other fee for the completion of the service. Upon receiving the deposit for the reagent, we will start the organic synthesis.
4. Please notice that an extra reagent cost might occur during the synthesis.
5. It the organic synthesis does not proceed well, we will deliver the detailed information to the customer and discuss the further process.
6. The basic analytical data for organic synthesis service are LC-MS and HPLC spectra, and an additional data i.e. NMR spectra might cause an extra cost.



A sample of LC-Mass spectrum of a synthesized compound.



A sample of HPLC trace of a synthesized compound

7. After delivery of the synthesized product along with analysis data, we will ask you about the payment option for the total service cost (credit card, electronic transfer or tax invoice), and you will proceed the payment in your convenience.

※ Please make sure that you should pay the reagent cost of the estimate sheet at first in order to proceed the synthesis. However, under some circumstances (school, etc.) that customers cannot pay the reagent cost in advance, then we can discuss the situation.

※ It is helpful to provide us with the literature for ordered compound and the synthetic methods such as articles and/or patents. The more information you give us, the quicker the estimate and more reliable synthesis is possible.

※ Although when proper literature procedure for synthesis is not available, we will still let you know feasibility of the synthesis within 3 days, and we will determine the progress through the consultation.

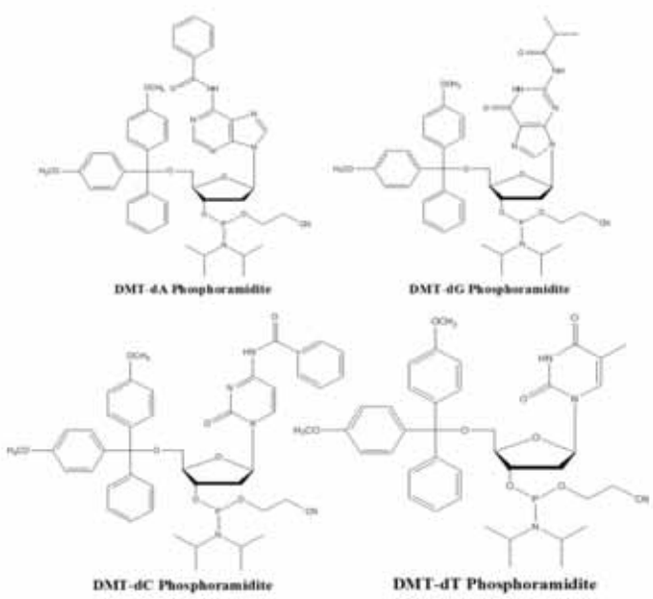
Oligonucleotide Synthesis Service

The oligonucleotide synthesis service of BioActs pursues to provide high quality oligomer through the whole process such as synthesis, quality control, packaging and delivery. By using bio-inert LC purification system, a mass production of oligomers with high quality of purity is achieved. Not only generally used FAM, HEX, TET, Cy3, Cy5, TAMRA, and Texas Red fluorescent probe, also our Flamma® Fluors series with a wide range of fluorescent specifications and binding options is offered.

◉ Oligomer Synthesis Process

The most commonly used synthetic method in the oligonucleotide synthesizer is by utilizing cyanoethyl phosphoramidite agent to form phosphodiester bond for constructing DNA or RNA backbone structure, developed by the Koster. This method enables to provide desired oligonucleotides in high yields, and phosphoramidite monomers are stable over the time until being activated in the synthesis step. Oligonucleotides are synthesized in an automated synthesizer that stretches the base chain by adding a single base from the 3' end to 5' end direction.

Synthesis begins with the attachment of the 3' end of nucleotide monomer to the solid support in a column, and after that repeat of the synthesis cycle of deblocking, coupling, oxidation and capping affords the desired length of oligonucleotide.



Phosphoramidite monomer structure

① Deblocking

The first step of the synthetic cycle is the removal of DMT, which used to protect the 5'-OH of the solid support attached nucleotide by using trichloroacetic acid. During the deblocking process, the DMT cation is liberated from the nucleotide as a dark orange by-product, and the estimation of the efficiency of the synthesis cycle can be monitored by measuring the absorbance of the cation.

② Coupling

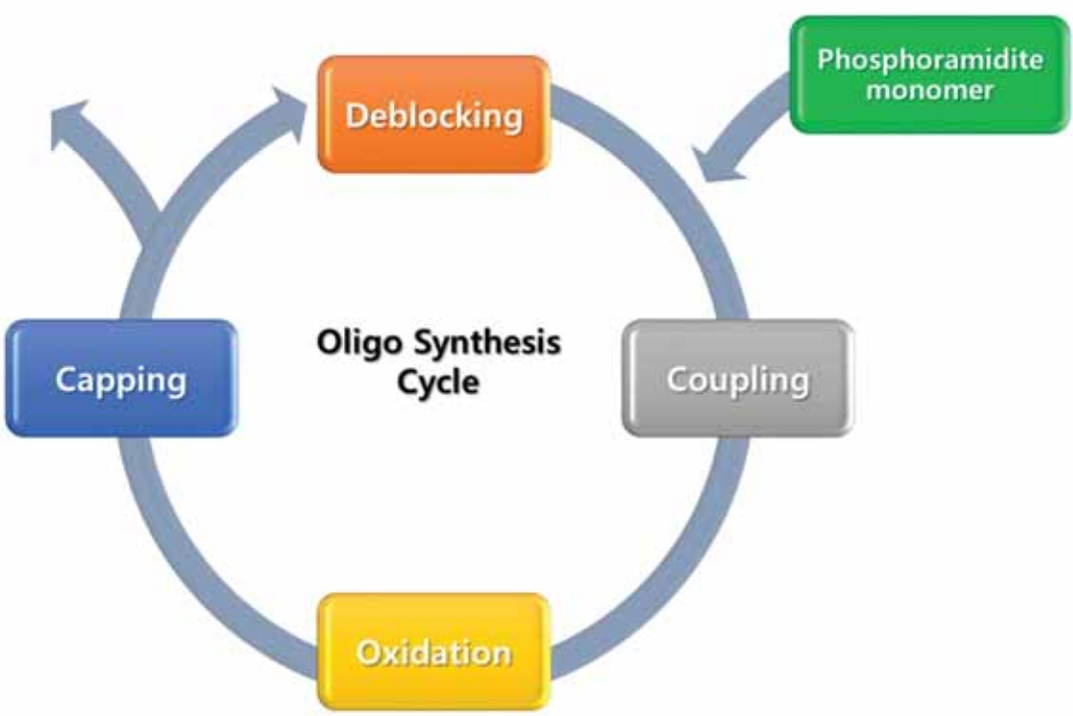
Specific oligonucleotide sequence is constructed through binding reaction with a nucleoside phosphoramidite monomer to the 5'-OH of the nucleotide sequence. All of the monomers' 5'-OH are protected with DMT. Generally used activator, tetrazole, activates the phosphoramidite to form a highly reactive tetrazolide moiety thereby binds to 5'-OH of the support-connected base.

③ Oxidation

The product from above coupling steps unstable phosphite triester, an unnatural phosphodiester linkage. The treatment of the support-bound material with iodine and water in the presence of a weak base converts the phosphite triester into a tetracoordinated phosphate triester, a protected precursor of the naturally occurring phosphate diester linkage.

④ Capping

After the completion of the coupling reaction, a small percentage of the solid support-bound 5'-OH groups (0.1 to 1%) remains unreacted and needs to be permanently blocked from further chain elongation to prevent the formation of oligonucleotides with an internal base deletion commonly referred to as (n-1) shortmers. The unreacted 5'-hydroxy groups are, to a large extent, acetylated by the capping mixture.



[Figure 4] Oligo Synthesis Cycle

Purification of Oligo Synthesis

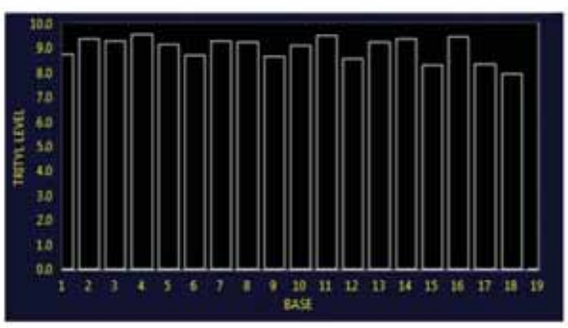
This is the process to remove impurities and to purify synthesized oligomers. The purification method can be varied by the length of oligomer and molecular weight. We are using the bio-inert LC purification for high purity oligomer production. Purification method can be selected depending on the purpose.

Cartridge purification	Bio-inert LC	PAGE
■ Standard oligomer available ■ Recommended for oligomer about 130 mer ■ Purity of ≥85%	■ Standard oligomer and modified oligomer available ■ Recommended for oligomer less 50mer ■ Purity of ≥90%	■ Standard oligomer and modified oligomer available ■ Recommended for oligomer more than 50mer ■ Purity of ≥95%

QC Analysis of Oligonucleotide Synthesis

① DMT cation monitoring

A dark orange color is observed at DMT liberation during the synthesis. By measuring UV absorbance of the color, synthesis yields and reaction environment could be checked. This analysis is called DMT monitoring of coupling.



② Measurement of light absorption (Optical Density, O.D.)

Synthesized oligomer is separate from the solid supporter, and all of protecting groups are removed. Separated oligomers are purified accord with purpose, and measuring O.D. value of 260nm absorbance of the purified oligomers can provide the quantitate analysis of synthesized compound.

③ MALDI-TOF Mass Spectrometer and CE (Capillary Electrophoresis) Analysis

For quality assurance, the HRMS MALDI-TOF or CE analysis of the synthesized oligomer will be performed before being delivered to customers. By checking the mass of synthesized oligomer, undesired byproducts such as depurination product, *N*-1 shortmers, etc can be identified. For oligomers with less than 50mer are analyzed with MALDI-TOF, and oligomers with above 50mers are analyzed by CE.

Custom DNA Oligonucleotide

BioActs provides the high quality of synthetic oligomers by utilizing automated cutting-edge equipment with skilled technicians. In case of standard oligomers, we can synthesize 10~130mer, and in case of modified oligomers, a maximum size of 50mer can be possible. We will accept a wide range amount of synthesis order: from 50 nmol to 1 umol scale is possible, and we will also discuss with the customer for the proper purification method according to its usage.

Modified Oligonucleotide

BioActs provides synthesis service of a variety of modified oligomer based on optimized processes and high-quality base materials, which synthesized in house. Bio-inert LC purification is basically used for the purification, and besides generally used FAM, HEX, TET, Cy3, Cy5, TAMRA, and Texas Red dye, our Flamma® Fluors series with a wide range of fluorescent specifications and binding options can be applied.

Fluorescent dyes	- FAM, HEX, TET, Cy3, Cy5, Cy5.5, TAMRA, Texas Red, Dy547
Non fluorescent modifications	- Biotin, Biotin-TEG
Dark quenchers	- Black Hole Quencher (BHQ1, BHQ2, BHQ3), BBQ-650
Internal modification	- Amino (C6)

Dual-labeled DNA Probes

5'-Modify	3'-Modify
FAM	BHQ1, Amino
HEX	BHQ1, BHQ2, Amino
TET	BHQ1, BHQ2, Amino
TAMRA	BHQ1, BHQ2, Amino
Cy3	BHQ1, BHQ2, BHQ3
Cy5	BHQ2, BHQ3

Contracted Research Service for Device Analysis, Cell and Animal Experiment

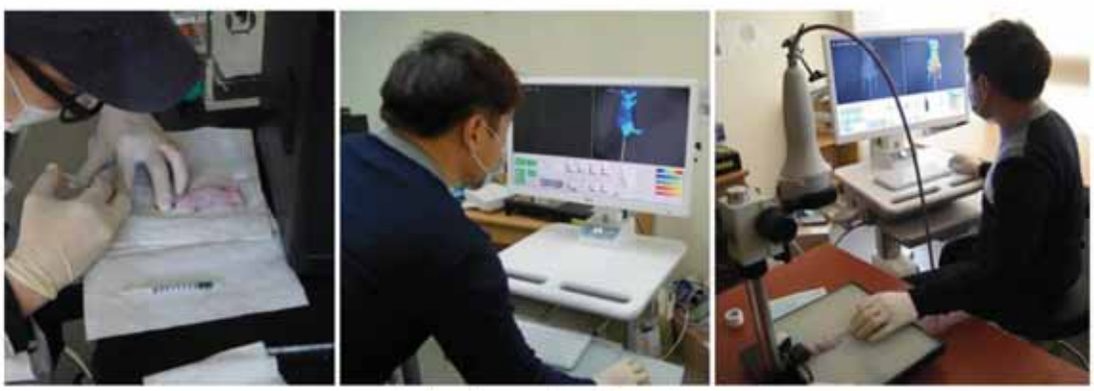
BioActs has conducted the instrumental analysis of products, cell and animal test to complete QC and QA of our products. We secure relevant equipment and skilled personal to accomplish the task. Based on accumulated know-how, we conduct contracted research services for instrumental analysis, cellular and animal test for our customers. In addition, BioActs. Co., Ltd. has built technology networks with C-BIND imaging center, Asan medical center and Konkuk University along with other domestic and foreign universities and research institutes.

BioActs can provide various contracted research services such as reagents purchase, synthesis and labeling experiments and instrumental analysis in order to realize researchers' ideas. In addition, we also offer the services for cell and animal experiments and other bio assays.

- Contracted research service for instrumental analysis
  - Analysis and refinement with chromatography: purity analysis and product purification using HPLC, MPLC, etc.
  - Optical analysis: measurements of absorption and excitation intensity, molar extinction, quantum yield, Dye/Protein ratio, etc. by utilizing UV spec., PL Spec., Nanodrop etc.
  - Structural analysis: Structure and purity analysis for materials: LC/MS, MALDI TOF HRMS, NMR, etc.
  - Analysis of data by co-work of our company and external organization.
- Contracted cell experiment service
  - Performing cell experiments on behalf of a customer by co-work between BioActs and external organization using Plate reader, FACS, Fluorescence Microscopy, Confocal Microscopy etc.

Device analysis and cell experiment service

- Contracted animal experiment service
  - ➢ Performing animal test on behalf of a customer by co-work between BioActs and external organization utilizing various optical equipment.



Animal experiment service

■ **Service process (Workflow)**

■ **Please send consultation request form to**

Email : support@bioacts.com or Tel : +82-32-818-9100

Homepage : www.bioacts.com

It is advised that you send the request form first prior to consultation. You will receive quicker response through email than a call.

■ **ETC.**

The request form can be downloaded from our homepage.

Licensing and B2B

BioActs has entered into ODM/OEM partnerships based on solid cooperation with our customers, and operates LCS (Licensing and Commercial Supply) with a win-win strategy. Our long B2B experience has accumulated not only credibility of our superior technology but also customized know-hows for B2B.
Products of BioActs are only used for research purposes, and the uses for clinical diagnosis purposes are not allowed. In case of using the products for commercial purposes, additional right to use should be consulted with our company in advance.

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  Homepage : www.bioacts.com
  It is advised that you send the request form first prior to consultation. You will receive quicker response through email than a call.

- **ETC.**
  The request form can be downloaded from our homepage.

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