

# CF™680 and CF™680R Dyes

Two outstanding 680 nm-excitable dyes to meet different needs

## Technical Summary

### CF™680

**Abs/Em Maxima:** 681/698 nm

**Extinction coefficient:** 210,000

**Molecular weight:** 3241

**Direct replacement for:** Alexa Fluor® 680, Cy™5.5, IRDye® 680RD, IRDye® 680LT

### CF™680R

**Abs/Em Maxima:** 680/701 nm

**Extinction coefficient:** 140,000

**Molecular weight:** 912

**Direct replacement for:** Alexa Fluor® 680, Cy™5.5, IRDye® 680RD, IRDye® 680LT

## Advantages of CF™680:

- The brightest among spectrally similar 680 nm dyes
- Superior signal-to-noise ratio in immunostaining
- Highly water-soluble and pH-insensitive

## Advantages of CF™680R:

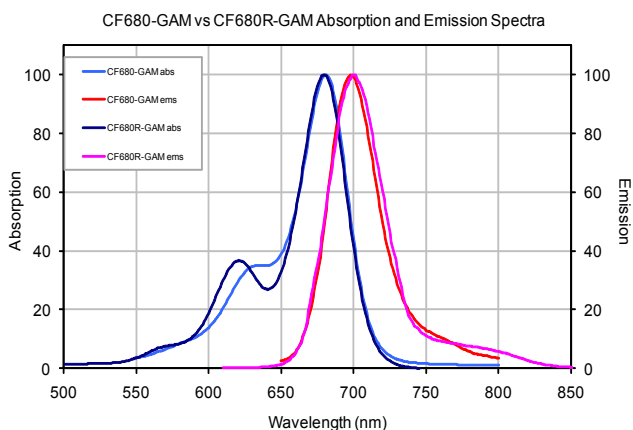
- The most photostable 680 nm dye
- Suitable for labeling nucleic acids and small bio-molecules
- Highly water-soluble and pH-insensitive

CF™680 and CF™680R are two outstanding near-IR dyes excitable at about 680 nm with emission at about 700 nm. The two dyes each have unique properties suitable for different application needs.

CF™680 is a highly water-soluble cyanine-based dye with a molecular weight of ~3000. This dye is excellent for labeling antibodies, producing the brightest fluorescence and highest signal-to-noise ratio in immunostaining among spectrally similar dyes, such as Cy™5.5, Alexa Fluor™ 680, DyLight™ 680 and IRDye® 680. However, because of its relatively large molecular size, CF™680 is not recommended for labeling nucleic acids or relatively small biomolecules, for which our CF™680R is better suited.

CF™680R is a novel rhodamine-based dye with a relatively small molecular weight of 912. The dye is highly fluorescent and, more importantly, extremely photostable. Rhodamine dyes are traditionally known to be bright and photostable. However, it has been a synthetic challenge to make functional rhodamine dyes with long wavelengths and high water solubility necessary for bio-labeling. Scientists at Biotium have overcome the challenge and invented a new way to make highly water soluble, bright and photostable rhodamine dyes with wavelengths ranging from red to near-IR. These dyes are excellent for labeling proteins, nucleic acids and small bio-molecules. They are ideal for confocal microscopy, single molecule-based imaging and other applications that demand both brightness and photostability.

A list of CF™680- and CF™680R-based products are shown in Table 1. A full selection of secondary antibodies, antibody labeling kits, and other bioconjugates including phalloidin, annexin V and  $\alpha$ -bungarotoxin are also available for many CF™ dyes. Please visit the Biotium website at [www.biotium.com](http://www.biotium.com) for details.



**Figure 1.** Absorption and emission spectra of CF™680 and CF™680R conjugated to goat anti-mouse IgG, respectively, in PBS.

## APPLICATIONS

### In Vivo Imaging

CF reactive dyes and kits for small animal imaging

### Flow Cytometry

Superior non-tandem conjugates for cell staining

### Western blotting

Perform Westerns with highly cross-adsorbed antibodies to minimize cross-reactivity and background

### Microscopy

Bright and photostable antibodies or reactive dyes for multiple labeling procedures

### Protein Labeling

Reactive dyes and kits for custom conjugations

Please also see our other superior near-IR CF™ dyes, including CF™750, CF™770 and CF™790.

# CF™680 and CF™680R Fluorescent Reagents

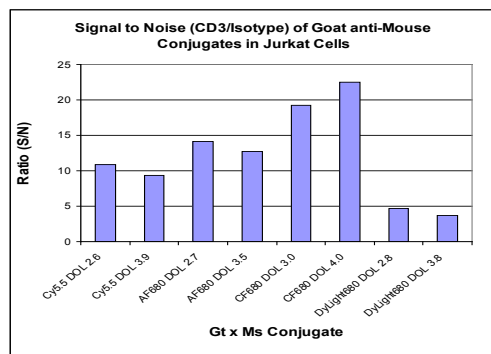


Figure 2. Intracellular staining of Jurkat cells was performed with mouse anti-human CD3 antibody or isotype control followed by 1 mg of goat anti-mouse IgG conjugates. Fluorescence was detected by a BD FACS Calibur in the FL4 channel. The bars represent the signal-to-noise ratio of CD3 positive fluorescence to isotype for conjugates with similar degrees of labeling (DOL).

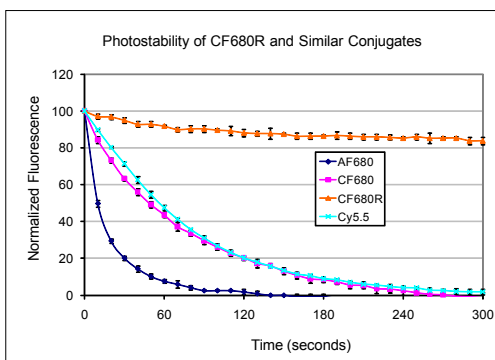


Figure 3. Photostability comparison by microscopy. Jurkat cells were stained with mouse anti-CD3 followed by CF™680R (Biotium), AlexaFluor® 680 (Invitrogen) or Cy™5.5 (GE Healthcare) goat anti-mouse IgG conjugates. Cells were imaged using an Olympus mercury arc lamp microscope equipped with a Cy5 filter set and CCD camera. The graph illustrates relative fluorescent intensities of sequential images taken every 10 seconds for 5 minutes.

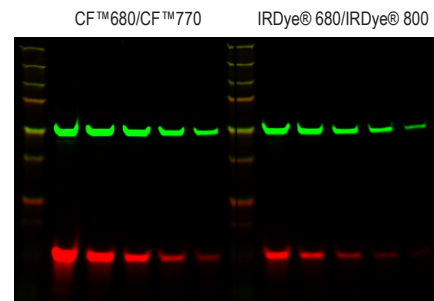


Figure 4. Near-IR CF™680 and CF™770 for two-color Western blotting. Two-fold dilutions of HeLa cell lysate were run on an acrylamide gel, transferred to a nitrocellulose membrane and probed with mouse alpha-tubulin and rabbit COX IV primary antibodies followed by goat anti-mouse CF™770 or IRDye® 800 (green) and goat anti-rabbit CF™680 or IRDye® 680 (red) at the same final concentrations. After probing, membranes were dried and scanned using an Odyssey® infrared imaging system (LI-COR Biosciences). Quantitation of the bands showed approximately a 3.5-fold higher fluorescence intensity of CF™ dyes compared to the respective IRDye® secondary antibodies (LI-COR).

*If you are looking for an antibody conjugate not listed in our current catalog, please let us know. We may be able to add it as a new product, or perform a custom conjugation for you.*

Listed products are for research use only. Not for use in diagnostic or therapeutic procedures. CF is a trademark of Biotium; CF dye technologies are covered by pending US and international patents. Alexa Fluor is registered trademark of Invitrogen. Cy is trademark of GE Healthcare. LI-COR, ODYSSEY, and IRDYE are trademarks or registered trademarks of LI-COR, Inc. in the United States and other countries.

Table 1. CF™680 and CF™680R Product List

CF™680- and CF™680R-Labeled Secondary Antibody Conjugates		
Product Name	Size	Cat No.
CF™680 Donkey Anti-Goat IgG (H+L) whole antibody, 2mg/mL (min X Chicken, Guinea Pig, Syrian Hamster, Horse, Human, Mouse, Rabbit, and Rat)	0.25 mL	20060
CF™680R Donkey Anti-Goat IgG (H+L) whole antibody, 2mg/mL (min X Chicken, Guinea Pig, Syrian Hamster, Horse, Human, Mouse, Rabbit, and Rat)	0.25 mL	20196
CF™680R Donkey Anti-Mouse IgG (H+L) whole antibody, 2 mg/mL (min X Bovine, Chicken, Goat, Guinea Pig, Syrian Hamster, Horse, Human, Rabbit, and Sheep)	0.25 mL	20194
CF™680R Donkey Anti-Rabbit IgG (H+L) whole antibody, 2 mg/mL (min X Bovine, Chicken, Goat, Guinea Pig, Syrian Hamster, Horse, Human, Mouse, Rat, and Sheep)	0.25 mL	20195
CF™680 Donkey Anti-Sheep IgG (H+L) whole antibody, 2mg/mL (min X Chicken, Guinea Pig, Syrian Hamster, Horse, Human, Mouse, Rabbit, and Rat)	0.25 mL	20062
CF™680 Goat Anti-Mouse IgG (H+L) whole antibody, 2 mg/mL (min x Human, Bovine, Horse, Rabbit, and Swine)	0.25 mL	20065
CF™680 Goat Anti-Mouse IgG (H+L), F(ab') <sub>2</sub> fragment, 2 mg/mL	0.25 mL	20063
CF™680R Goat Anti-Mouse IgG (H+L) whole antibody, 2 mg/mL (min x Human, Bovine, Horse, Rabbit, and Swine)	0.25 mL	20192
CF™680 Goat Anti-Rabbit IgG (H+L) whole antibody, 2 mg/mL (min X Human, Mouse, and Rat)	0.25 mL	20067
CF™680 Goat Anti-Rabbit IgG (H+L), F(ab') <sub>2</sub> fragment, 2 mg/mL	0.25 mL	20064
CF™680R Goat Anti-Rabbit IgG (H+L) whole antibody, 2 mg/mL (min X Human, Mouse, and Rat)	0.25 mL	20193
CF™680 Goat Anti-Rat IgG (H+L) whole antibody, 2 mg/mL (min X Human, Bovine, Horse, and Rabbit)	0.25 mL	20069
CF™680 Rabbit Anti-Goat IgG (H+L) whole antibody, 2 mg/mL	0.5 mL	20068

CF™680 and CF™680R Reactive Dyes and Labeling Kits		
Product Name	Size	Cat No.
CF™680 succinimidyl ester	1 mmole	92139
CF™680 maleimide	1 mmole	92029
CF™680R succinimidyl ester	1 mmole	92107
CF™680R maleimide	1 mmole	92032
CF™680R SE protein labeling kit	3 labelings (for 1 mg protein each)	92226
CF™680 SE protein labeling kit	3 labelings (for 1 mg protein each)	92220
Mix-n-Stain CF™680 antibody labeling kit, for labeling 5-20 ug antibody	1 labeling	92282
Mix-n-Stain CF™680 antibody labeling kit, for labeling 20-50 ug antibody	1 labeling	92262
Mix-n-Stain CF™680 antibody labeling kit, for labeling 50-100 ug antibody	1 labeling	92240
Mix-n-Stain CF™680R antibody labeling kit, for labeling 5-20 ug antibody	1 labeling	92283
Mix-n-Stain CF™680R antibody labeling kit, for labeling 20-50 ug antibody	1 labeling	92263
Mix-n-Stain CF™680R antibody labeling kit, for labeling 50-100 ug antibody	1 labeling	92246
VivoBrite rapid antibody labeling kit for small animal in vivo imaging, CF680 SE	3 labelings (1-2 mg IgG each)	92160

CF™680- and CF™680R Bioconjugates		
Product Name	Size	Cat No.
Annexin V, CF™680 conjugate, lyophilized	25 ug	29007
CF™680 α-Bungarotoxin	0.5 mg	00008
CF™680R α-Bungarotoxin	0.5 mg	00003
CF™680R Phalloidin	300 U	00048
CF™680 Wheat Germ Agglutinin (WGA)	5 mg	29025
CF™680R Wheat Germ Agglutinin (WGA)	5 x 1 mg	29025