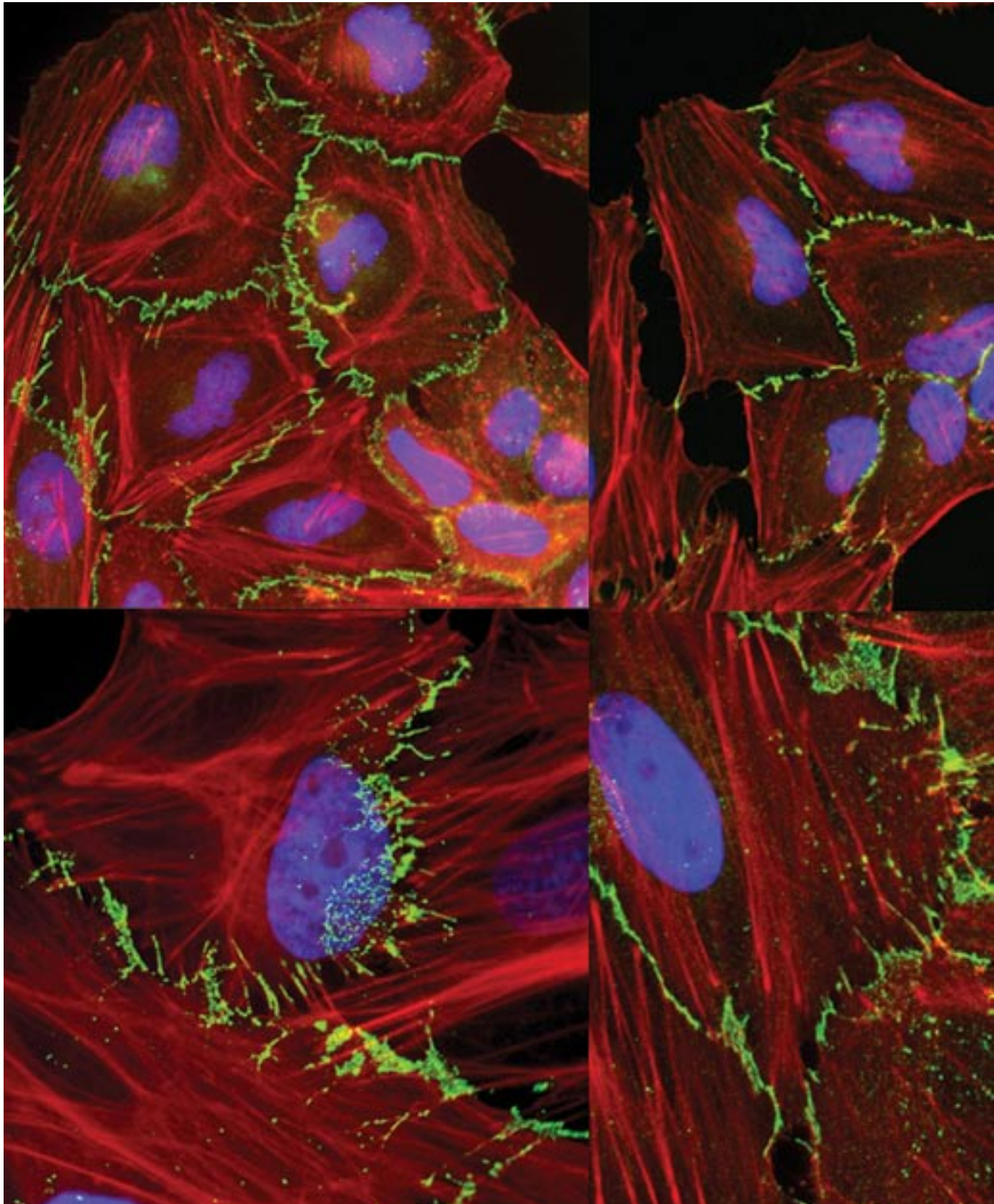
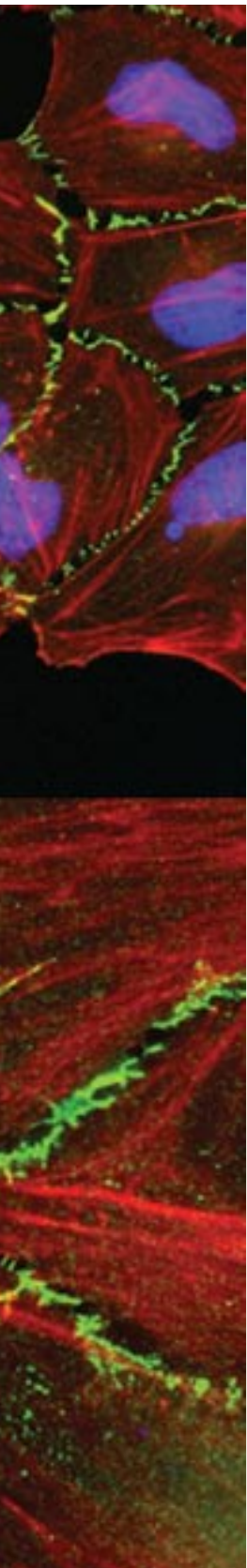


# IMMUNODETECTION





## A guide to antibody labeling and detection

CHOICE. BECAUSE THE ONLY PRODUCT YOU REALLY NEED IS THE RIGHT ONE.

Each immunolabeling experiment presents its own challenges. From the initial binding of the primary antibody to the final detection of the fluorophore label—and at every wash step in between—you face optimization protocols that will determine the sensitivity and selectivity of your experiment. A primary antibody present in only small amounts requires specialized techniques for labeling. Likewise, immunodetection of a low-abundance target often entails significant signal amplification steps and extremely low background levels. And because the localization and abundance of the target molecule are critical pieces of information, the fluorophore label you choose for immunodetection often needs to be compatible with fluorescent probes for other cellular structures in a multiplexing protocol. This guide to antibody labeling can help you sift through the options for primary and secondary antibody detection and select the solution that best fits your experiments. →



**Figure 1—Indirect immunofluorescence staining of adherens junctions.** Adherens junctions between highly confluent HeLa cells were labeled using Zymed® mouse anti- $\alpha$ -catenin antibody in conjunction with Alexa Fluor® 488 goat anti-mouse IgG antibody (green). F-actin was labeled with Alexa Fluor® 635 phalloidin, and nuclei were stained with DAPI (blue). After staining, the sample was mounted in ProLong® Gold Antifade Reagent.

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## finding the primary antibody you need

Achieving quality results in immunodetection begins with primary antibodies that are highly specific for your protein of interest, regardless of your detection methodology. Immunofluorescence microscopy, flow cytometry, immunoprecipitation, western blotting—each of these techniques relies on the specific, high-affinity binding of the primary antibody to its antigen. A misstep here, in the form of a poorly characterized or low-titer antibody, translates into high background levels that only tend to increase through subsequent detection and amplification steps.

With well over 10,000 citations in scientific journal articles, Zymed® antibodies are established reagents for research at the leading edge (Figure 1). Widely published Zymed® primary antibodies include:

- anti-amyloid- $\beta$  precursor protein<sup>1,2</sup>
- anti-E-cadherin<sup>3,4</sup>
- anti-connexin 43<sup>5,6</sup>
- anti-occludin<sup>7,8</sup>
- anti-SUMO-1 (GMP-1)<sup>9,10</sup>
- anti-transferrin receptor<sup>11,12</sup>
- anti-ubiquitin<sup>13,14</sup>
- anti-ZO-1<sup>15,16</sup>

These high-quality antibodies have earned a reputation for highly specific, reproducible binding to their targets and have been vali-

dated in multiple research applications. Now that Zymed Laboratories is fully integrated into Invitrogen, you can find these antibodies along with the rest of our extensive portfolio of more than 3,700 primary antibodies online at [www.invitrogen.com/antibodies](http://www.invitrogen.com/antibodies).

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## options for detecting your primary antibody

With a suitable primary antibody in hand, you must next determine the detection methodology that best fits your application. The multiplexing parameters and instrument platform, as well as the abundance of both the primary antibody and the protein target, will be important in determining whether you should fluorescently label your primary antibody or use a fluorescently labeled secondary antibody for detection. Directly labeled primary antibodies are typically used in flow cytometry applications and secondary detection reagents are more common in imaging experiments; however, there is nothing inherent in either detection method to limit their use with these particular instrument platforms.

Although secondary detection methods can provide both significant signal amplification and additional flexibility for multicolor applications, a primary antibody directly labeled with a fluorophore often produces lower background fluorescence and less nonspecific

binding (Figure 2). Furthermore, multiple primary antibodies of the same isotype or derived from the same species can easily be used in the same experiment if they have been directly labeled with compatible fluorophores. However, without the signal amplification step provided by secondary detection methods, it is more important than ever to label the primary antibody with the brightest and most photostable fluorophores available.

And that's where our fluorophores come in. When it comes to choosing a fluorophore for antibody labeling, we offer two very different but equally important options: fluorescent organic dyes, including our Alexa Fluor® dye series (Figure 3) and violet-excited Pacific Blue™ and Pacific Orange™ dyes, and Qdot® semiconductor nanocrystals. With over 12,000 citations in scientific journals, Alexa Fluor® dyes have proven to exhibit superior fluorescence properties in a diverse range of applications. Quantum dots, developed more recently for biological applications,<sup>17-20</sup> are useful when extremely high photostability is paramount, or when you need to perform multicolor analysis using one excitation source.

Your fluorophore choice will ultimately depend on the requirements of your application: What quantity of unlabeled antibody is available for labeling? Do you need to resolve

low-abundance targets? Will the labeled cell or tissue samples be exposed to extraordinary levels of excitation light or archived for long periods of time? Do you need compatible fluorophores for multiplex analysis? The descriptions below of each type of fluorophore can help you find the best match for your experiment.

#### covalent antibody labeling with Alexa Fluor® dyes

Fluorescent organic dyes, and the Alexa Fluor® dye series in particular, remain the primary workhorses for immunodetection, consistently providing high-quality results in imaging and flow cytometry applications. Tried-and-true Alexa Fluor® dye-labeled primary antibodies have proven superior to antibodies labeled with traditional organic fluorophores such as fluorescein (FITC), tetramethylrhodamine (TRITC), Cy®3, or Cy®5 for immunodetection. Compared to our Qdot® nanocrystals, Alexa Fluor® dyes are significantly smaller in size, which may be an important advantage in some applications where accessibil-

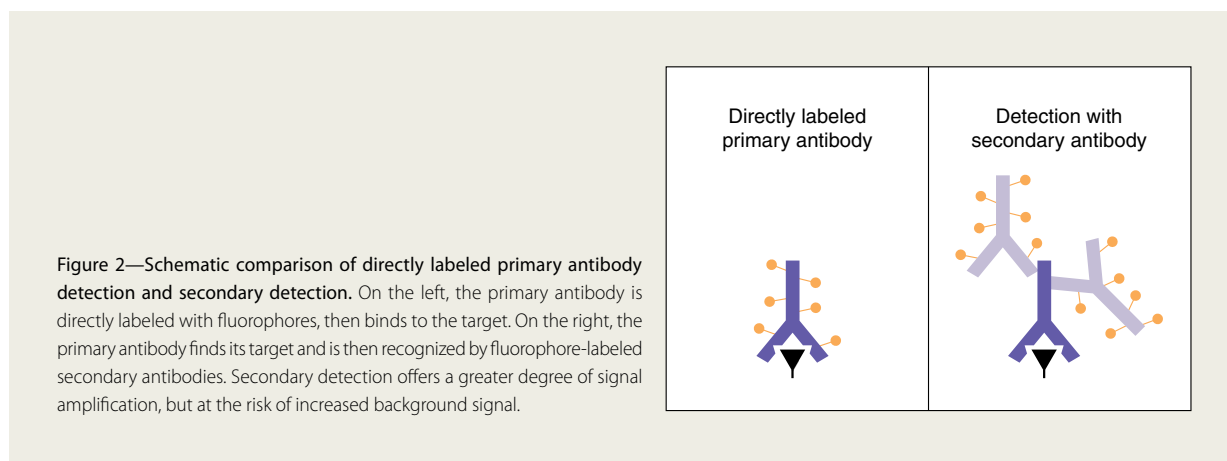
ity of the antigen is an issue. In addition, Alexa Fluor® dyes are available with blue emission, a part of the spectrum that Qdot® nanocrystals currently do not cover.

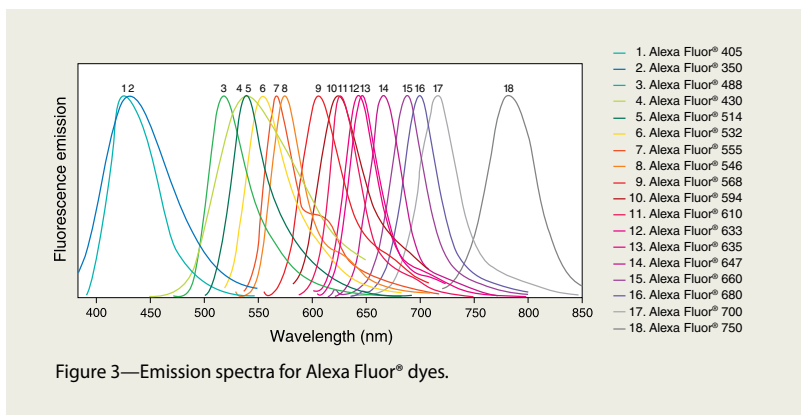
Alexa Fluor® dyes are a series of extremely bright, photostable, pH-insensitive, organic fluorophores that span the spectrum from blue to infrared fluorescence (emission maxima from 421 to 775 nm, Figure 3). These dyes have been carefully selected and optimized to be very water soluble, minimizing dye-to-dye interactions and allowing a higher degree of labeling of a monoclonal or polyclonal primary antibody. If you choose to optimize your own antibody labeling and purification reactions, seventeen Alexa Fluor® dyes are available as amine-reactive fluorophores. We also offer three types of kits for covalently labeling antibodies with Alexa Fluor® dyes—Alexa Fluor® Microscale Protein Labeling Kits, Alexa Fluor® Monoclonal Antibody Labeling Kits, and Alexa Fluor® Protein

Labeling Kits, each of which is optimized for labeling a different amount of antibody, from 20 µg to 1 mg (Tables 1 and 2). These labeling kits contain premeasured amine-reactive Alexa Fluor® dyes, along with the reagents and materials needed to quickly and easily purify the resulting antibody conjugates from any unreacted label. Alternatively, custom antibody labeling services are available at [probes.invitrogen.com/customantibodies](http://probes.invitrogen.com/customantibodies).

#### covalent antibody labeling with violet-excited Pacific Blue™ and Pacific Orange™ dyes

When excited by the 405 nm spectral line of the violet diode laser, the Pacific Blue™ and Pacific Orange™ dyes brightly fluoresce at 455 and 551 nm, respectively. The nonoverlapping emission spectra of these dyes facilitate two-color analysis using a violet laser-equipped flow cytometer or fluorescence microscope and multiparameter analysis using, for example, green and





red fluorophores in the other flow cytometer channels. Furthermore, with its strong blue fluorescence, Pacific Blue™ dye is fully compatible with longer-wavelength members of the Alexa Fluor® dye series. We offer the amine-reactive succinimidyl ester of the Pacific Blue™ and Pacific Orange™ dyes, as well as protein labeling kits designed for covalently labeling either 100 µg or 1 mg of IgG antibody and purifying the resulting Pacific Blue™ or Pacific Orange™ conjugate.

**10-minute antibody labeling with Zenon® technology**

As an alternative to direct chemical labeling of your primary antibody, Zenon® technology provides a versatile, easy-to-use method for noncovalently labeling mouse, rabbit, goat, and human IgG with Alexa Fluor® dyes, Pacific Blue™ dye, or Pacific Orange™ dye, even with submicrogram amounts of starting material. Zenon® technology takes advantage of the immunoselectivity of the antibody binding

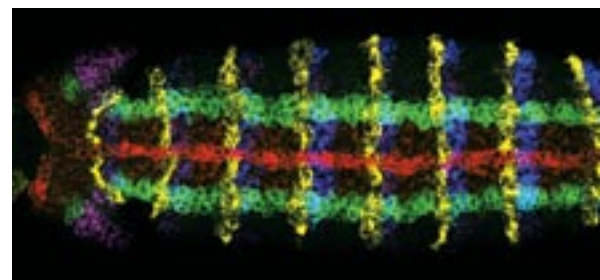
reaction by forming a complex between an intact primary IgG antibody and a fluorophore-labeled Fab fragment directed against the Fc portion of the IgG. Once prepared, this labeled primary antibody is ready to stain cells or other targets in the same manner as a covalently labeled primary antibody (Figure 4).

As with other directly labeled primary antibodies, Zenon® antibody labeling greatly simplifies time-consuming immunocytochemical

Table 1—Comparison of antibody labeling kits.

Kit	Sample requirements	Number of labelings	Covalent attachment?	Total time	Use
Alexa Fluor® Microscale Protein Labeling Kits	20–100 µg of protein; stabilizing proteins must be removed before labeling	3	Yes	2–3 hours	Optimized for proteins between 10 and 150 kDa, including IgG antibodies
Alexa Fluor® Monoclonal Antibody Labeling Kits	100 µg of IgG; stabilizing proteins must be removed before labeling	5	Yes	1.5–2 hours	Optimized for IgG antibodies
Alexa Fluor® Protein Labeling Kits	1 mg of IgG; stabilizing proteins must be removed before labeling	3	Yes	2–3 hours	Optimized for IgG antibodies
Pacific Blue™ and Pacific Orange™ Monoclonal Antibody Labeling Kits	100 µg of IgG; stabilizing proteins must be removed before labeling	5	Yes	1.5–2 hours	Optimized for IgG antibodies
Pacific Blue™ and Pacific Orange™ Protein Labeling Kits	1 mg of IgG; stabilizing proteins must be removed before labeling	3	Yes	2–3 hours	Optimized for IgG antibodies
Qdot® Antibody Conjugation Kit	600 µg of IgG; stabilizing proteins must be removed before labeling	2	Yes	4–5 hours	Optimized for IgG antibodies
Zenon® IgG Labeling Kit	<1 µg of IgG; compatible with stabilizing proteins such as BSA	10–50	No	10 minutes	Small amounts of IgG; isotype specific; fast noncovalent labeling

**Figure 4—Simultaneous detection of expression of five genes in a whole-mount *Drosophila* embryo by fluorescence *in situ* hybridization (FISH) with five RNA probes.** Red: *sog* labeled using aminoallyl UTP and Alexa Fluor® 647 succinimidyl ester. Green: *ind* labeled with DNP, followed by rabbit IgG anti-dinitrophenyl-KLH antibody pre-labeled with the Zenon™ Alexa Fluor® 555 Rabbit IgG Labeling Kit. Blue: *en* labeled with biotin and detected with HRP streptavidin and Alexa Fluor® 405 tyramide (TSA Kit #39). Yellow: *wg* labeled with digoxigenin and detected with sheep IgG anti-digoxigenin antibody and Alexa Fluor® 594 donkey anti-sheep IgG antibody. Magenta: *msh* labeled with fluorescein and detected with mouse anti-fluorescein/Oregon Green® IgG2a antibody and Alexa Fluor® 488 goat anti-mouse IgG antibody. Image contributed by Dave Kosman and Ethan Bier, University of California, San Diego.



applications such as the simultaneous use of multiple primary antibodies derived from the same species. For example, Rastaldi and coworkers used the Zenon® Alexa Fluor® 488 and Zenon® Alexa Fluor® 568 Mouse IgG Labeling Kits to allow double-staining of mouse sections with two labeled monoclonal primary antibodies.<sup>21</sup> For simultaneous labeling of tissue sections with two monoclonal or two polyclonal antibodies, Rissman and coworkers used a standard fluorescent secondary antibody to detect one primary antibody and Zenon® labeling to detect the second primary

antibody.<sup>22</sup> Additionally, because of the ease of labeling and the small antibody sample requirements, Zenon® antibody labeling provides a means of experimenting with many different dye-antibody combinations in order to find the right one for a particular multicolor flow cytometry or imaging experiment.

Each Zenon® Antibody Labeling Kit (Tables 1 and 2) provides an isotype-specific labeled Fab fragment as well as a blocking reagent to quantitatively prepare labeled primary IgG from less than 1 µg of starting material in

under 10 minutes. No pre- or post-labeling purification steps are required. Several of our most popular Zenon® Antibody Labeling Kits for labeling mouse IgG1 antibodies are listed in Table 2; please check our Zenon® product portal at [probes.invitrogen.com/zenon](http://probes.invitrogen.com/zenon) for a complete listing of all available Zenon® Antibody Labeling Kits.

#### covalent antibody labeling with Qdot® nanocrystals

Qdot® semiconductor nanocrystals (also called quantum dots) are protein-sized particles that generate “tunable” and photostable fluorescence (Figure 5). Their intrinsic brightness is often many times that observed for other classes of fluorophores, and their photostability is many orders of magnitude greater than that associated with traditional fluorescent molecules. These properties enable real-time imaging of low-abundance molecules—even individual receptor molecules on live neurons<sup>23</sup>—as well as long-term imaging under conditions that would lead to the photo-induced deterioration of organic fluorophores. In fact, cells and tissues stained with Qdot® nanocrystals can be archived permanently and re-analyzed with the same level of sensitivity achieved in the first assay.



**Table 2—Alexa Fluor® and Pacific Blue™ Antibody Labeling Kits.**

Dye emission color*	Fluorophore	Ex/Em †	Microscale Protein Labeling Kit	Protein Labeling Kit	Monoclonal Antibody Labeling Kit	Zenon® Mouse IgG1 Labeling Kit
Blue	Alexa Fluor® 350	346/442		A10170	A20180	Z25000
Blue	Pacific Blue™	410/455		P30012	P30013	Z25041
Green	Alexa Fluor® 488	495/519	A30006	A10235	A20181	Z25002
Yellow	Pacific Orange™	400/551		P30016	P30014	Z25256
Yellow	Alexa Fluor® 532	531/554		A10236	A20182	Z25003
Orange	Alexa Fluor® 555	555/565	A30007	A20174	A20187	Z25005
Red-orange	Alexa Fluor® 568	578/603		A10238	A20184	Z25006
Red	Alexa Fluor® 594	590/617	A30008	A10239	A20185	Z25007
Far-red	Alexa Fluor® 647	650/668	A30009	A20173	A20186	Z25008
Far-red	Alexa Fluor® 680	679/702		A20172	S30041 ‡	Z25010
Infrared	Alexa Fluor® 750	749/775		S30040 ‡	S30042 ‡	

\* The observed fluorescent color depends not only on the emission maximum, but also on the shape of the emission spectrum and the optical filters used. Compared with the Qdot® nanocrystals, the organic dyes generally have broader emission spectra with longer tails, leading to slightly red-shifted colors when observed through longpass optical filters.  
 † Approximate excitation (Ex) and emission (Em) maxima, in nm. ‡ These kits are specifically designed to label antibodies and proteins for use in small animal *in vivo* imaging.

What's more, the peak emission wavelengths of Qdot® nanocrystals are determined by the engineered physical size of the quantum dots. This "tunability" has been exploited to develop a series of Qdot® products that emit different fluorescent colors for multicolor applications. With their broad excitation and narrow emission properties, Qdot® nanocrystals require only a single excitation source (typically <450 nm), enabling multiplex analysis of multiple targets or events in a sample; simple color filtering can be used to resolve the individual signals. Moreover, because these inorganic nanocrystals are particle-based fluorophores, they are electron dense, delivering powerful multimodality for correlative light and electron microscopy and for imaging studies that utilize both fluorescence and X-ray or computerized tomography (CT).

For applications requiring this high level of sensitivity and photostability, we offer the Qdot® Antibody Conjugation Kits, which are available with reactive Qdot® nanocrystals in six different fluorescent colors. These kits contain all the reagents needed to covalently label 600 µg of antibody and purify the labeled conjugate (Tables 1 and 3). For more information on Qdot® nanocrystal products, visit us at [probes.invitrogen.com/products/qdot](http://probes.invitrogen.com/products/qdot).

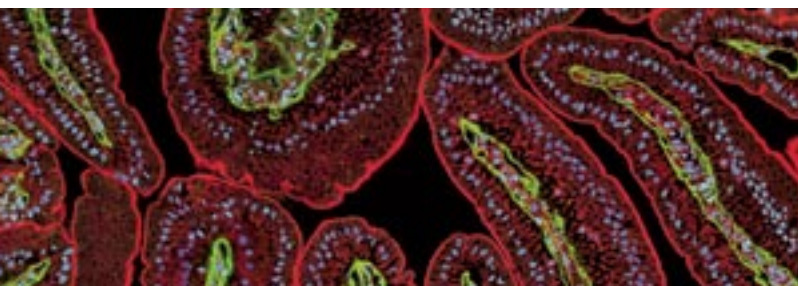
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**alternatively, amplify your signal with a labeled secondary antibody**

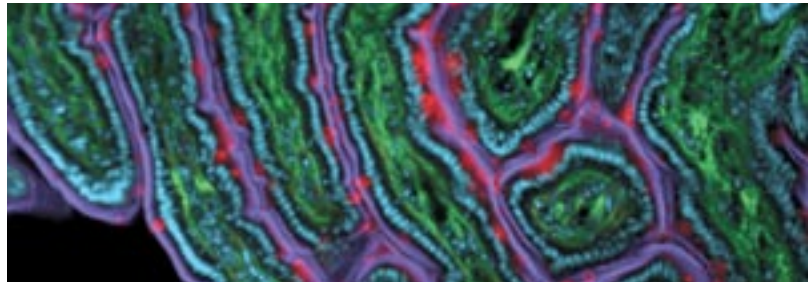
If preparing a labeled primary antibody either isn't practical or doesn't provide enough sensitivity, then a high-quality secondary antibody can often be the solution. Secondary detection also offers an additional degree

of flexibility by allowing different detection modes for any given primary antibody using different fluorescent, biotinylated, or enzyme-conjugated secondary antibodies. Although background levels may increase due to nonspecific binding of both the primary and secondary antibody, a well-chosen labeled secondary antibody often provides significant signal amplification that can overcome any increased background fluorescence.

However, not all commercially available secondary antibodies are created equal. To prepare Molecular Probes™ secondary antibody conjugates, Invitrogen begins with the highest-quality proteins, then optimizes the degree of labeling to achieve the brightest conjugates, and ends with stringent testing on cell samples to ensure low nonspecific



**Figure 5—A mouse intestinal section visualized using fluorescent Qdot® nanocrystal conjugates.** Actin was labeled with a mouse monoclonal anti-actin antibody and visualized using red-fluorescent Qdot® 655 goat F(ab)<sub>2</sub> anti-mouse IgG antibody. Laminin was labeled with a rabbit polyclonal anti-laminin antibody and visualized using green-fluorescent Qdot® 525 goat F(ab)<sub>2</sub> anti-rabbit IgG antibody. Nuclei were stained with blue-fluorescent Hoechst 33342. Image contributed by Thomas Deerinck and Mark Ellisman, The National Center for Microscopy and Imaging Research, San Diego, CA.



**Figure 6—Multicolor fluorescence labeling of a mouse intestine cryosection.** Basement membranes were labeled with a chicken IgY anti-fibronectin antibody and Alexa Fluor® 488 goat anti-chicken IgG antibody (green). Goblet cells and crypt cells were labeled with Alexa Fluor® 594 wheat germ agglutinin (red). The microvillar brush border and smooth muscle layers were visualized with Alexa Fluor® 680 phalloidin (pseudocolored purple). The section was counterstained with DAPI (blue).

binding and high specific staining. While all of our secondary antibodies are affinity purified and adsorbed against the sera of a number of species to minimize crossreactivity, we also offer highly cross-adsorbed goat anti-mouse IgG and goat anti-rabbit IgG antibodies for multilabeling experiments in which extremely low background levels are critical.

Fluorophore choice for your labeled secondary antibody is again dependent on the

requirements of your application. The same factors discussed previously for choosing a primary antibody label also apply to choosing a secondary antibody label. Invitrogen provides one of the largest selections of fluorescent secondary antibodies available anywhere, including an extensive set of Molecular Probes™ secondary antibodies labeled with an Alexa Fluor® dye, the violet-excited Pacific Blue™ or Pacific Orange™ dyes, or a Qdot® nanocrystal. Alexa Fluor® dye con-

jugates outperform conventional fluorescent secondary reagents across the spectrum and are rapidly becoming the preferred secondary reagents in all fluorescence-based immunoassays (Figure 6). The brightly fluorescent Pacific Blue™ and Pacific Orange™ dye conjugates not only provide additional color choices but also a means of performing two-color immunochemical analysis using the violet diode laser (see page 23 for a complete product list). Qdot® secondary antibody conjugates are ideal for imaging experiments requiring very long integration times to achieve the desired sensitivity (for example, when detecting very low-abundance targets), and for experiments that call for prolonged storage with repeated analysis of the specimen (Figure 5).

Tables 4 and 5 show a sampling of our most popular secondary antibody conjugates; please see [probes.invitrogen.com](http://probes.invitrogen.com) for a complete list of our species- and isotype-specific anti-IgG and species-specific anti-IgM antibodies, each conjugated to one of more than 40 fluorophores.



**Table 3—Qdot® antibody labeling kits.**

Dye emission color*	Fluorophore	Ex/Em †	Qdot® Antibody Conjugation Kit
Green	Qdot® 525	<450/525	Q22041MP
Yellow-green	Qdot® 565	<450/565	Q22031MP
Yellow	Qdot® 585	<450/585	Q22011MP
Red-orange	Qdot® 605	<450/605	Q22001MP
Far-red	Qdot® 655	<450/655	Q22021MP
Far-red	Qdot® 705	<450/705	Q22061MP
Infrared	Qdot® 800	<450/800	Q22071MP

\* The observed fluorescent color depends not only on the emission maximum, but also on the shape of the emission spectrum and the optical filters used. Compared with the Qdot® nanocrystals, the organic dyes generally have broader emission spectra with longer tails, leading to slightly red-shifted colors when observed through longpass optical filters.  
 † Approximate excitation (Ex) and emission (Em) maxima, in nm. Qdot® antibody conjugates absorb efficiently anywhere below approximately 450 nm.

**in conclusion**

We know that no two immunodetection applications are the same and that the reagents you choose can be critical to your research. If you need more information than that provided in this guide, contact the expert team of scientists in our Technical Support Department to discuss your particular requirements, or visit us at [probes.invitrogen.com](http://probes.invitrogen.com) for more detailed product information. ■

**References**

1. Yue, X. et al. (2005) *Proc. Natl. Acad. Sci. U S A* 102:19198.
2. Kao, S.-C. et al. (2004) *J. Biol. Chem.* 279:1942.
3. DiNapoli, L. et al. (2006) *Development* 133:1519.
4. Damian Medici, D. et al. (2006) *Mol. Biol. Cell* 17:1871.
5. Ozawa, R. et al. (2006) *Am. J. Pathol.* 168:907.
6. Chang, A.S. et al. (2006) *Endocrinology* 146:2445.
7. Stamatovic, S.M. et al. (2006) *J. Biol. Chem.* 281:8379.
8. Inagaki, T. et al. (2006) *Proc. Natl. Acad. Sci. U S A* 103:3920.
9. Tiefenbach, J. et al. (2006) *Mol. Biol. Cell* 17:1643.
10. Dellaire, G. et al. (2006) *J. Cell Sci.* 119:1026.
11. Magadán, J.G. et al. (2006) *Mol. Cell. Biol.* 26:2595.
12. Pierchala, B.A. et al. (2006) *J. Neurosci.* 26:2777.
13. Carteron, C. et al. (2006) *J. Cell Sci.* 119:898.
14. Liu, Y. and Chang, A. (2006) *J. Cell Sci.* 119:360.
15. Hirose, T. et al. (2006) *Development* 133:1389.
16. Weyand, N.J. et al. (2006) *Infect. Immun.* 74:2428.
17. Giepmans, B.N. et al. (2005) *Nat. Methods* 2:743.
18. Mattheakis, L.C. et al. (2004) *Anal. Biochem.* 327:200.
19. Makrides, S.C. et al. (2005) *Biotechniques* 39:501.
20. Lidke, D.S. et al. (2004) *Nat. Biotechnol.* 22:169.
21. Rastaldi, M.P. et al. (2003) *Am. J. Pathol.* 163:889.
22. Rissman, R.A. et al. (2004) *J. Clin. Invest.* 114:121.
23. Howarth, M. et al. (2005) *Proc. Natl. Acad. Sci. USA* 102:7583.

**Table 4—A sampling of available Alexa Fluor® dye–labeled secondary antibody conjugates.**

Antibody	Host	Alexa Fluor® 350	Alexa Fluor® 488	Alexa Fluor® 532	Alexa Fluor® 555	Alexa Fluor® 568	Alexa Fluor® 594	Alexa Fluor® 647	Alexa Fluor® 680	Alexa Fluor® 750
Anti–mouse IgG	Goat	A11045 A21049*	A11001 A11029*	A11002	A21422 A21424*	A11004 A11031*	A11005 A11032*	A21235 A21236*	A21057 A21058*	A21037
Anti–mouse IgG	Rabbit	A21062	A11059		A21427	A11061	A11062	A21239	A21065	
Anti–mouse IgG	Donkey		A21202		A31570		A21203	A31571		
Anti–rabbit IgG	Goat	A11046 A21068*	A11008 A11034*	A11009	A21428 A21429*	A11011 A11036*	A11012 A11037*	A21244 A21245*	A21076 A21109*	A21039
Anti–rabbit IgG	Donkey		A21206		A31572		A21207	A31573		
Anti–chicken IgG	Goat		A11039		A21437	A11041	A11042	A21449		
Anti–goat IgG	Rabbit		A11078		A21431	A11079	A11080	A21446	A21088	
Anti–goat IgG	Donkey		A11055		A21432	A11057	A11058	A21447	A21084	
Anti–rat IgG	Goat	A21093	A11006		A21434	A11077	A11007	A21247	A21096	
Anti–sheep IgG	Donkey	A21097	A11015		A21436	A21099	A11016	A21448	A21102	

\* These antibodies have been cross-adsorbed against additional species to further reduce the possibility of nonspecific interactions. Don't see what you need? Additional hosts, targets, anti-IgM antibodies, and isotype-specific anti-mouse antibodies can be found at [probes.invitrogen.com](http://probes.invitrogen.com).

**Table 5—Qdot® nanocrystal secondary antibody conjugates.\***

Antibody	Qdot® 525	Qdot® 565	Qdot® 585	Qdot® 605	Qdot® 655	Qdot® 705	Qdot® 800
Anti–mouse IgG	Q11041MP	Q11031MP	Q11011MP	Q11001MP	Q11021MP	Q11061MP	Q11071MP
Anti–rabbit IgG	Q11441MP	Q11431MP	Q11411MP	Q11401MP	Q11421MP	Q11461MP	Q11471MP
Anti–rat IgG		Q11631MP		Q11601MP	Q11621MP		
Anti–human IgG		Q11231MP		Q11201MP	Q11221MP		
Anti–goat IgG					Q11821MP		
Anti–chicken IgG		Q14431MP			Q14421MP		

\* Except for the Qdot® 655 anti–goat IgG antibody, which is offered as labeled rabbit F(ab')<sub>2</sub> fragments, Qdot® nanocrystal secondary antibody conjugates are available as labeled goat F(ab')<sub>2</sub> fragments.