



## Product Specifications

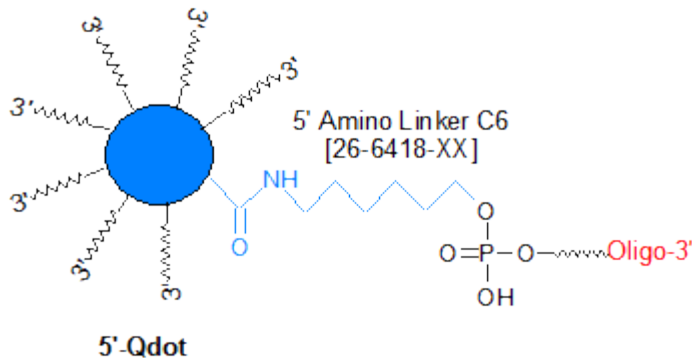
Custom Oligo Synthesis, antisense oligos, RNA oligos, chimeric oligos, Fluorescent dyes, Affinity Ligands, Spacers & Linkers, Duplex Stabilizers, Minor bases, labeled oligos, Molecular Beacons, siRNA, phosphonates Locked Nucleic Acids (LNA); 2'-5' linked Oligos

## Oligo Modifications

For research use only. Not for use in diagnostic procedures for clinical purposes.

### Qdot 545

Category	Fluorescent Dyes
Modification Code	Qdot 545
Reference Catalog Number	26-6932
5 Prime	Y
3 Prime	Y
Internal	Y
Molecular Weight(mw)	0



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Qdot modification is a post synthesis conjugation to a primary amino group. The amino group can be placed at the 5' and 3' and for internal positions an amino modified base is used, e.g Amino dT C6.

As there are a large number of active carboxy groups on the Qdot surface there may be 10 - 80 oligos conjugated to a single Qdot.

- Yield for 50 and 200 nmol scale synthesis is ~20 nmol oligo conjugated to 1 nmol Qdot. Supplied reconstituted as 10  $\mu$ M Qdot solution in sterile TE pH 7.5. DO NOT FREEZE. STORE at 4 degrees C.
- Yield for 1 umol scale synthesis is ~50 nmol oligo conjugated to 2 nmol of Qdot. Supplied reconstituted as 10  $\mu$ M Qdot solution in sterile TE pH 7.5. DO NOT FREEZE. STORE at 4 degrees C.

Qdot ITK Carboxyl Quantum Dots (Qdot ITK Carboxyls) are a set of nanometer-scale semiconductor crystalline fluorophores that emit light in the visible and near-IR electromagnetics spectrum (525-800 nm). Qdots are composed of a crystalline CdSe semiconductor core and an outer ZnS semiconductor shell for improved chemical and optical properties. Qdots have several important advantages over traditional organic fluorophore dyes. For organic dyes, the optimal absorption and emission wavelengths are close together. By contrast, for Qdots, the absorption efficiency is shifted far away from and towards the blue (shorter wavelength) side of the emission peak. Because Qdots can be excited at wavelengths far from their emission peak, can inherently absorb more energy in the blue-violet than organic dyes, and can be excited with a single, short-wavelength source irrespective of emission peak, Qdots are much brighter and more photostable, and thus more sensitive, than organic fluorescent dyes. Furthermore, because their emission peaks are significantly narrower than those of organic dyes, Qdots are better suited to applications requiring multiplex detection of several colors simultaneously (1-2).

Qdot ITK Carboxyls are coated with a polymer shell derivitized with a large number of carboxylic acid groups, within a range of 50-100 per Qdot. In order to attach oligonucleotides to such Qdots, the former first must be synthesized with an Amino Linker modification (either at the ends or internally).The appropriate Qdot ITK Carboxyl is then manually attached to the oligo through the amino group in a separate reaction post-synthesis. However, given the large number of active carboxy groups on the Qdot surface, Qdots are unsuitable for any application requiring a 1:1 mole ratio of Qdot:oligo.

Qdots are best suited to applications requiring probes in which many oligos are attached to the Qdot surface.

The list of currently available Qdots include Qdot-525, -565, -585, -605, -625, -655, -705, -800, with the number indicating the appropriate maximum emission wavelength for the particular Qdot. Qdots are suitable for a variety of in vitro and in vivo applications (3-5). However, for in vivo experiments, users should note that Qdots are excited in the higher-energy, blue-violet part of the visible spectrum. Researchers who wish to use Qdot-labeled probes should confirm that the higher energy required for excitation does not damage the relevant cells or tissues being used in the in vivo experiments. For more information visit ThermoFisher website Qdot Technology Overview.

#### References

1. Willard, D.M., Carillo, L.L., Jung, J., Van Orden, A. CdSe-ZnS Quantum Dots as Resonance Energy Transfer Donors in a Model Protein-Protein Binding Assay. *Nano Lett.* (2001), **1**: 469-474.
2. Clapp, A.R., Medintz, I.L., Mauro, J.M., Fisher, B.R., Bawendi, M.G., Mattoussi, H. Fluorescence Resonance Energy Transfer Between Quantum Dot Donors and Dye-Labeled Protein Acceptors. *J. Am. Chem. Soc.* (2004), **126**: 301-310.
3. Medintz, I.L., Uyeda, H.T., Goldman, E.R., Mattoussi, H. Quantum dot bioconjugates for imaging, labelling and sensing. *Nat. Mater.* (2005), **4**: 435-446.
4. Robelek, R., Niu, L., Schmid, E.L., Knoll, W. Multiplexed hybridization detection of quantum dot-conjugated DNA sequences using surface plasmon enhanced fluorescence microscopy and spectrometry. *Anal Chem.* (2004), **76**: 6160-6165.
5. Cody, N.C., Strickland, A.D., Batt, C.A. Optimized linkage and quenching strategies for quantum dot molecular beacons. *Mol. Cell. Probes.* (2007), **21**: 116-124.