



SELF-ASSEMBLING, BIOCOMPATIBLE QUANTUM DOT BIOCONJUGATES

Advantages/Features

Requires no new techniques or equipment

Self-assembles rapidly through the use of polyhistidine tags

Controls the number of biomolecules per quantum dot

Produces a compact bioconjugate

Preserves existing chemical groups on the biomolecule and the quantum dot

Applications

Highly luminescent probes

Multi-labeled hybridization probes

Toxicological testing

Multiplex immunoassay

FRET-based sensing

For more information contact:

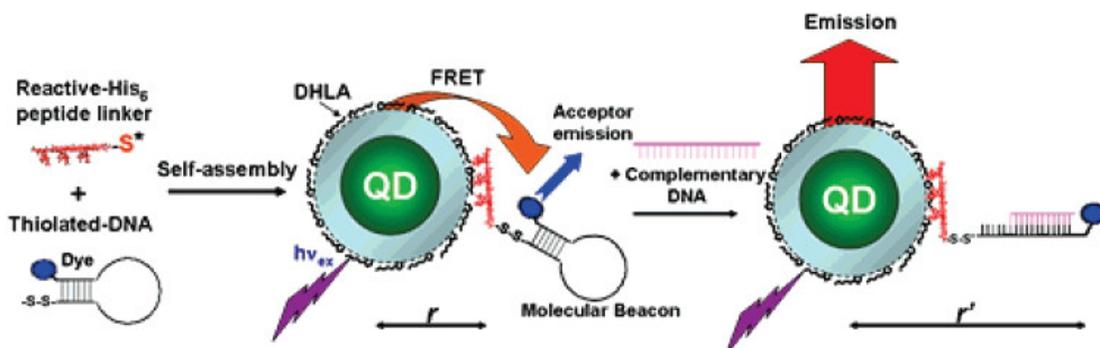
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The Naval Research Laboratory (NRL) has developed self-assembling quantum dot-biological molecule conjugates. The quantum dot-biological molecule hybrid displays water solubility, biofunctionality, and bioelectroconductivity. The conjugation strategy is based on metal-affinity-driven interactions between the quantum dot's CdSe-ZnS core-shell and proteins or peptides appended with polyhistidine tags. Each tag is attached to one end the biofunctional peptide linkers and the other end attaches to the biomolecule. Current methods of creating quantum dot bioconjugates require multiple purification steps and a large quantity of bioligands and result in temporal instability and a large size that is suboptimal for many applications. Additionally, current methods do not allow for easy control over the number of biomolecules attached per quantum dot. NRL's conjugation method solves the above issues, making it the preferred method when size, simplicity, and number of biomolecules are of importance. Applications that would benefit from this innovation include FRET analysis and multiplexing probes. There is potential to use this technology to create bioconjugates with surfaces that are similarly prepared, such as nanoparticle-to-biomolecule and biomolecules-to-biomolecule conjugates. The quantum dot-biomolecule conjugates address the commercial and Naval need for advanced biomolecular techniques.

References

"A Reactive Peptidic Linker for Self-Assembling Hybrid Quantum Dot-DNA Bioconjugates." *NanoLetters*. 2007, 7 (6), pp. 1741-1748.

"Biosensing with Luminescent Semiconductor Quantum Dots." *Sensors*. 2006, 6, pp. 925-953.

Available for License: US Patent Publication No. 2011-0098445 and other applications have been filed.

