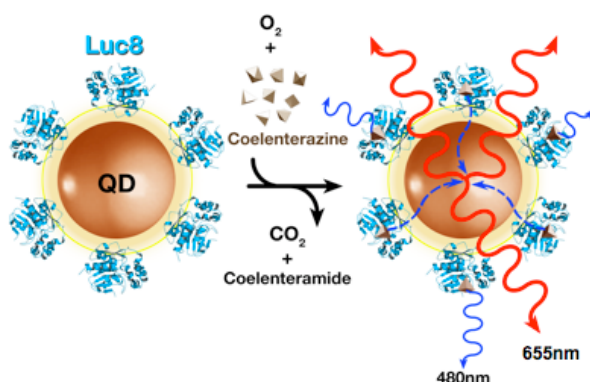


## Luciferase + Quantum Dot = Self-Illuminating Nanocrystal Technologies



**Figure 1.** Design of the Bioluminescence Resonance Energy Transfer–Quantum Dot (BRET-Qdot<sup>®</sup>) conjugate and the BRET-Qdot<sup>®</sup> catalytic reaction. Exposure to the luciferase substrate, coelenterazine, causes the emission of light of peak wavelength 480 nm from the luciferase molecule. The energy from this reaction couples non-radiatively to the Qdot<sup>®</sup> acceptor (shown by the arrows with blue dotted lines). In this example, the Qdot<sup>®</sup> emits light in the red to near-infrared regions (655 nm). The Luc8 enzyme is a mutant with 8 mutations that confer a 200-fold increase of stability in serum and a 4-fold improvement in light output over the native enzyme.

- BRET-Qdot<sup>®</sup> is a novel probe technology using luminescent nanocrystals and a recombinant bioluminescent enzyme that requires no external light source for light emission.
- BRET-Qdot<sup>®</sup> reagents emit long wavelength (red to NIR) bioluminescent light in cells and in deep tissues of animals with greatly enhanced sensitivity for *in vivo* imaging applications in small animals relative to existing quantum dots.
- Multiple colors for multiplexed *in vivo* imaging applications. Zymera provides BRET-Qdot<sup>®</sup> products conjugated with Qdot<sup>®</sup> (Life Technologies) nanocrystals with emission wavelengths of 605, 625, 655, 705 and 800 nm.
- BRET-Qdot<sup>®</sup> products conjugated with streptavidin for use with biotin-linked targeting molecules.
- Can be designed as *in vivo* molecular sensors; examples are proximity and activity-based reagents.
- BRET-Qdot<sup>®</sup> reagents can be conjugated at Zymera with biomolecular recognition molecules, such as antibodies and peptides.

**Working with Zymera.** Zymera is a privately held nanobiotechnology company pioneering the commercialization of self-illuminating red to near infrared (NIR) emitting quantum dot technologies for preclinical *in vivo* imaging and as an analytical platform for molecular detection. Zymera develops and produces self-illuminating Qdot<sup>®</sup> nanocrystal products; these Bioluminescence Resonance Energy Transfer-Qdot<sup>®</sup> (BRET-Qdot<sup>®</sup>) conjugates convert biochemical energy to detectable photon energy through the activity of luciferase, a recombinant bioluminescent enzyme. The BRET-Qdot<sup>®</sup> probes are active in serum and blood, can be multiplexed for *in vivo* imaging, and are designed as proximity- and activity-based biosensors. Zymera holds intellectual property rights to the technology and maintains leading-edge research in nanocrystal chemistries and applications. The company is based at the San Jose Biocenter, a state-of-the-art biotechnology incubator sponsored by the City of San Jose, California. Zymera is establishing collaborations with pharmaceutical and biotechnology companies for BRET-Qdot<sup>®</sup> probe development and applications. The company offers a broad spectrum of research services ranging from reagent and technology development to project and program management.

*Zymera, Inc. is a nanobiotechnology company dedicated to developing reagents, assays, applications, and technologies that catalyze fundamental change in our approach to solving important medical problems.*

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