



# The Brightest, Red-Shifted Luciferase-Luciferin Bioluminescent Pairs

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## BACKGROUND

Bioluminescence imaging utilizes enzyme-substrate pairs to catalyze luminescence reactions, leading to photons at specific wavelengths using biocompatible reagents and without the need of excitation. Unfortunately, existing pairs have emissions orders of magnitude weaker than fluorescence due to low catalytic efficiency (such as Firefly Luciferase-Luciferin, or FLuc-D-luciferin). Other existing pairs such as NanoLuc-furimazine emit more photons than FLuc-D-luciferin, but mostly in the blue range, which is absorbed readily by mammalian tissues, limiting their usefulness for deep tissue imaging.

## BRIEF DESCRIPTION

Researchers at the University of California, Riverside, have developed several new luciferase-luciferin pairs that have superior brightness and excellent performance in vitro and in vivo. Through directed evolution of the existing NanoLuc Luciferase and the use of diphenylterazine (DTZ) as a substrate, the emission extensity is more than doubled compared to NanoLuc-furimazine. Moreover, red-shifted emission of teLuc-DTZ makes it an excellent tool for in vivo imaging. teLuc-DTZ streamlines a variety of applications to afford high sensitivity and reproducibility. Furthermore, fusing teLuc to a fluorescent protein creates the Antares2-DTZ pair, with emissions further red-shifted to the > 600 nm range and 65 times more photons emitted above 600 nm than FLuc-D-Luciferin.

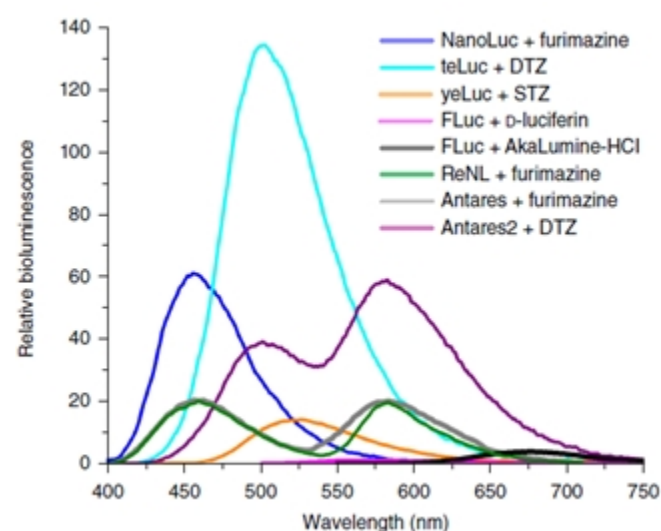


Fig. 1 shows the relative emission intensity and the range of emitted wavelengths of light

## SUGGESTED USES

These biocompatible, coenzyme free luciferase-luciferin pairs are able to emit orders of magnitude more light than common ones, while also being red-shifted, enabling the light to pass through thicker regions of mammalian tissue,

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## OTHER INFORMATION

### KEYWORDS

Luciferin, Luciferase, emission intensity, teLuc, Antares2, NanoLuc, furimazine, Fluc-D-luciferin, diphenylterazine, in vivo, imaging, deep tissue, assay, luminescence, bioluminescence, red-shifted

### CATEGORIZED AS

- ▶ [Biotechnology](#)
- ▶ [Other](#)
- ▶ [Imaging](#)
- ▶ [Molecular](#)
- ▶ [Research Tools](#)
- ▶ [Reagents](#)

### RELATED CASES

2016-710-0

enabling deeper and more reliable in vivo bioluminescence assays in medical applications

## PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	10,202,584	02/12/2019	2016-710

## RELATED MATERIALS

► Yeh HW, Wu T, Chen M, Ai HW. Identification of Factors Complicating Bioluminescence Imaging. *Biochemistry*. 2019 Mar 26;58(12):1689-1697. doi: 10.1021/acs.biochem.8b01303. - 03/25/2019

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