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Development of Superoxide Anion Sensing Compounds based on Chemiluminescent Coelenterazine

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Superoxide anion corresponds to a reactive oxygen species that acts as a signaling molecule within the organism, being that, in cases of pathologies, such as cancer, this species can be overexpressed, acting as a specific marker of the disease [1]. Considering this, it became of high priority to develop methods capable of detecting superoxide anion level variations with high sensitivity and specificity.

One emerging approach is the use of chemiluminescent compounds, such as the widely studied marine coelenterazine, as sensing probes, which can emit light upon contact with the anionic species [2]. However, a significant restriction was noted in terms of the emission intensity, which is reduced in aqueous environments [3].

With this in mind, our research team developed and characterized two novel coelenterazine analogues, known as MeOBr-Cla and FBr-Cla, displayed in Figure 1, which presented a chemiluminescent reaction that was triggered by the presence of superoxide anion, with longer-lived light-emission intensity, in aqueous solutions of various pH levels, being remarkably superior to native Coelenterazine [4, 5]. Therefore, the new molecules showcase the potential to be employed as superoxide sensing probes with enhanced chemiluminescence.

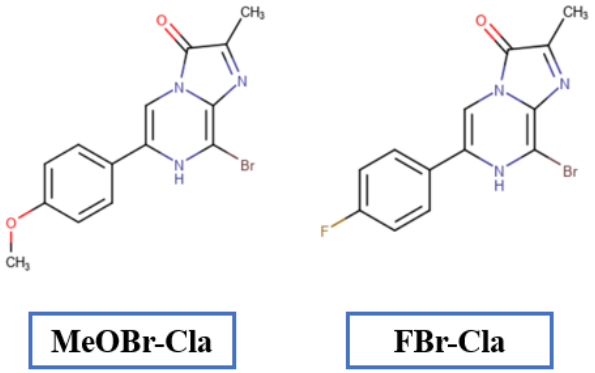

Figure 1. Schematic representations of the chemical structure associated to the novel coelenterazine analogues.

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