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Visualizing the Biological Activity by Firefly Bioluminescence

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As a persistent sensitive, applicable and non-invasive approach on understanding in vivo biology that facilitates distinctive characteristics to be visualized, bioluminescence from firefly luciferase/luciferin system has been comprehensively applied for overseeing pathogen detection, tumor growth and response to therapy patterns of gene regulation, measuring protein–protein interactions and so on. Approximately, this bioluminescence system exclusively relies on the native substrate D-luciferin or its analogue, aminoluciferin which can emit realistic bioluminescent signal in the presence of firefly luciferase (Fluc), ATP, Mg2+ and O2 (Scheme 1).1 Therefore, a large pool of light emitters, such as firefly luciferase substrates2-4 and luciferin-based bioluminescence probes5-8, are demanded for various biological applications, such as probing or imaging biological processes9-11. In the current lecture, the author will present his recent progress on developing firefly luciferase substrates and inhibitors, as well as caged-luciferin bioluminescence probes. It's anticipated that these firefly luciferin-based substrates, inhibitors and probes will contribute to the broader utilization of bioluminescence in life science research.

Biography

Minyong Li had completed his Ph.D. in 2005 from Department of Medicinal Chemistry, China Pharmaceutical University, Nanjing, China. He is currently working as a Professor in Department of Medicinal Chemistry of School of Pharmacy in Shandong University, Jinan, China. His research interest is Medicinal Chemistry: Rational Design, Synthesis, Biological Evaluation and Structure-Activity Relationship Studies of Novel Therapeutic Agents Targeted on Various Enzymes, G-Protein Coupled Proteins (GPCRs) and Ion Channels.

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