A genetically encodable fungal bioluminescence system

Ilia Yampolsky*[1,2]

[1]Pirogov Russian Nat. Res. Med. Univ., Moscow – Russia
[2]Institute of Bioorganic Chem., Russian Acad. Sci., Russia – Russia

Abstract

In this talk, discussed will be the identication and cloning of fungal luciferase and two enzymes of the biosynthesis pathway of fungal luciferin.
Fungal luciferase was found to represent a new protein family with no known homologues. We veried the function of fungal luciferin biosynthesis pathway by introducing the identied genes into the genome of Pichia pastoris, creating a strain that is autoluminescent in standard medium with light intensity visible to the naked eye. Also, we tested the potential of fungal luciferase as a reporter gene in heterologous systems by its expression in E. coli, P. pastoris, Xenopus laevis embryos, and human cells. In all tested conditions, fungal luciferase proved functional, positioning itself as a promising new reporter gene. The availability of a complete eukaryotic luciferin biosynthesis pathway together with a new family of luciferases represent a new molecular playground holding numerous opportunities for basic and applied research.
This work was supported by the Russian Science Foundation grant 17-14- 01169.

Keywords: fungal luciferin, fungal luciferase, luciferin biosynthesis pathway, luciferin recycling

*Speaker