
Biosynthesis of firefly luciferin

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Abstract

Biosynthesis of firefly luciferin remains one of the challenging subjects in the field of bioluminescence. Previously we revealed that firefly luciferin is biosynthesized from two molecules of cysteine and single molecule of hydroquinone by the incorporation studies using stable isotopes, and also showed that the hydroquinone may be stored as less toxic form, arbutin, in the Japanese firefly, *Luciola lateralis* [1]. During the further studies on biosynthesis of firefly luciferin, we discovered a strange phenomenon: firefly luciferin is produced by stirring of *p*-benzoquinone, the oxidized form of hydroquinone, and cysteine in a neutral buffer for a few hours at room temperature (without any synthetic catalysts and enzymes) [2]. By the detailed analysis of the reaction mixture, we identified other reaction products. Recently, one of the product was confirmed to be an *in vivo* biosynthetic intermediate of firefly luciferin by the incorporation studies. Based on these findings, we proposed biosynthetic pathway of firefly luciferin.

Oba et al. (2015) *PLoS ONE* 8, e84023.

Kanie et al. (2016) *Sci. Rep.* 6, 24794.

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