Recycling system of hispidin in luminous mushroom

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Abstract

Previously we showed that luminous fungi share a common mechanism in bioluminescence [1], and identified hispidin as a luciferin precursor in Vietnamese *Neonothopanus nambi* mycelium [2]. In luminous mycelium, hispidin is converted to 3-hydroxyhispidin and then oxidized to caffeylpyruvic acid. Light emission occurs during this oxidization process and the produced caffeylpyruvic acid is readily hydrolyzed to caffeic acid [3].
In this study, we showed the presence of hispidin as a bioluminescent active compound at 25-1,000 pmol/g in the fruiting body of the Japanese *Mycena chlorophos*, *Omphalotus japonicus*, and the Brazilian *Neonothopanus gardneri*. We also found that cell-free fruiting body extract of luminous mushroom *M. chlorophos* gradually emits the light by the addition of hispidin biosynthetic components, namely caffeic acid, ATP and malonyl-CoA [3]. These findings suggest that continuous weak glow of luminous mushroom is regulated by slow recycling biosynthesis of hispidin.

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Keywords: mushroom, fungi, bioluminescence, luciferin, biosynthesis

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