

# Chemical studies on bioactive secondary metabolites from mushrooms

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## Abstract

The fruiting body of basidiomycetes and ascomycetes is known as “mushroom”. It produces spores, and the spores germinate and create mycelium. The mycelium eventually produces a primordium, which grows into a new whole mushroom, and the life cycle continues. Each stages of the cycle may be controlled by specific compounds such as hormones. However, nobody knows whether mushrooms produce their own hormones or not. The current study has focused on searching for fruiting body-inducing compound(s) (candidates for fruiting body-inducing hormone) in mushrooms on the basis of the following hypotheses.

**Hypothesis 1: “Fruiting liquid as a new source of hormones”** In general, mushroom-forming fungi secrete liquid on the surface of mycelia just before fruiting-body formation. However, no researchers in mushroom science have paid attention to the liquid until now. We formulated a hypothesis that the liquid plays important role(s) in formation of fruiting-body and produces various bioactive compounds, and named it “fruiting liquid (FL)”. Four novel compounds were isolated from FL of *Hypholoma lateritium* and *Hericiium erinaceus*.

**Hypothesis 2: “Mushroom produce steroid hormones”** Most of mushrooms produce many kinds and large amounts of steroids, therefore we speculate that mushrooms also use steroid as a hormone like plants and animals. Previously, we reported the discovery of novel steroids having unprecedented steroid skeletons, strophasterols A to D from the mushroom *Stropharia rugosoannulata*, and chaxines A to E from the mushroom *Agrocybe chaxingu*. These steroids are candidates of the hormone.

**Hypothesis 3: “Fairy chemicals” (FCs) play a role as hormones in mushroom”** The natural phenomenon “fairy rings” are zones of stimulated grass growth owing to the interaction between a fungus and a plant. We discovered “fairy chemicals” (FCs) from the culture broth of *Lepista sordida*. Our group demonstrate that FCs are a new family of plant hormones. Since FCs were originally isolated from mushroom, we speculate that they also play a role like hormone in mushroom.

**Conclusion.** In this study, we tried to prove these three hypotheses. As a result, we found several compounds that regulated mycelium growth and induced fruiting bodies of a few mushrooms.

## 引用文献

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