

MEDICINAL FUNGI MAY BE SUITABLE FOR IDENTIFYING NOVEL DRUGS

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An analytical study of medicinal fungi carried out by researchers from the Institute of Mathematical Sciences, Chennai (IMSc), shows that some chemicals they secrete may find use as novel drugs. They used a database, MeFSAT (Medicinal Fungi Secondary Metabolites And Therapeutics), which compiles information on 184 medicinal fungi, including mushrooms.

The researchers analysed the structure of 1,830 secondary metabolites of medicinal fungi.

Secondary metabolites are chemical compounds that fungi produce when they are stressed. These are not strictly essential and hence the name 'secondary'. They enhance the fungus' ability to survive. The work has been published in the preprint server *BioRxiv*.

Cordycepin, a secondary metabolite produced by *Cordyceps* species of fungus, is known to have anti-tumour properties. "Not only cordycepin, in general, several secondary metabolites are known to be beneficial for humans in terms of both therapy and health," says R.P. Vivek Ananth, a PhD student from IMSc, who has contributed to this research.

In their analysis, the researchers, guided by Areejit Samal from IMSc, found that the secondary metabolites were structurally distant from existing drugs. Also, their 'scaffolding' or core chemical composition was different from known drugs. About 94% of the chemical scaffolds identified in secondary metabolites of medicinal fungi were not present in approved drugs. As for the complete chemical structure, the secondary metabolites were quite dissimilar to the approved drugs.

This alone cannot tell that there are metabolites in fungi that can be used as drugs. However, the secondary metabolites of medicinal fungi have molecular properties, which are important for drug likeness, similar to approved drugs. "This makes the secondary metabolites of the medicinal fungi suitable for identifying novel drugs with hitherto unknown chemical scaffolds," explains Dr. Samal.

Medicinal fungi belongs to two taxonomic divisions namely, *basidiomycota* and *ascomycota*. Mushrooms belong to the *basidiomycota* division. An example is *Agaricus bisporus*, the button mushroom, which can be consumed. Fungi belonging to the *ascomycota* division are generally not mushrooms. Among these are *Isaria cicadae* and *Shiraia bambusicola* which are used in traditional Chinese medicine.

"In future, we plan to map the scaffolds to their biological targets, which will further pave the way for identifying potential lead molecules for drug discovery," says Mr. Ananth.

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