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Structures and biological activities of three new terpenes obtained from the fruiting body of a mushroom *Russula lepida*

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The genus of *Russula* is an important group in the subdivision of Basidiomycotina, and hundreds of species have been reported to grow in forests all over the world. Especially, *Russula lepida* has been utilized as a medicinal food in China.

In the course of our research on new types of protein tyrosine phosphatase 1B (PTP1B) inhibitors from terrestrial and marine natural resources, we found a variety of PTP1B inhibitors with unique structural features. Further screening bioassays revealed that an EtOH extract of the fruiting body of *R. lepida*, collected at Miyagi, Japan in 2012, inhibited the PTP1B activity. Bioassay-guided separation of the extract led to the isolation of a new seco-cucurbitane triterpene (**1**) and two new aristolane sesquiterpenes (**2** and **3**) together with two known terpenes (**4** and **5**). In this presentation, we describe the isolation, structural elucidation including the absolute configuration, and biological activities of **1–3**.

Compounds **1–5** were isolated from the fruiting body of *R. lepida* (1.2 kg) by the solvent extraction, ODS column, and preparative HPLC. Compounds **4** and **5** were identified by comparing their spectroscopic data with those of the reported values for (2*E*)-3,4-seco-cucubita-4,24-diene-3,26,29-trioic acid and aristlone, respectively.

The structures of **1–3** including the absolute configuration were assigned on the basis of their NMR and ECD spectra. Among these compounds, **1** and **4** exhibited the inhibitory activity against PTP1B with IC₅₀ values of 20.3 and 0.4 μM, respectively. Oleanolic acid, a positive control, inhibited the PTP1B activity at 0.7 μM (IC₅₀) in the same experiment.

This is the first study on the inhibitory activity of seco-cucurbitane triterpenes against PTP1B activity.