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Erinapyrones A and B from the Cultured Mycelia of *Hericium erinaceum*

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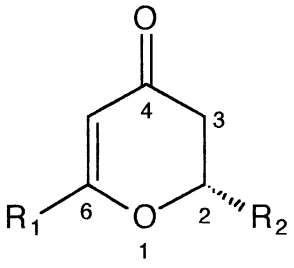
Novel γ-pyrones, erinapyrones A and B, were isolated from the culture-broth of *Hericium erinaceum* mycelia. These compounds had cytotoxicity toward HeLa cells.

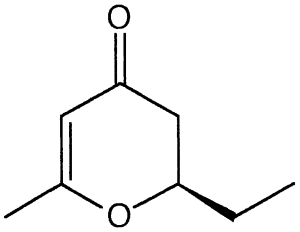
From the fruiting bodies of *Hericium erinaceum*, many biologically active compounds have been isolated,[1-6] and further investigation of the compounds is now in progress. In order to obtain large amounts of the compounds and to find the other new biologically active ones, we tried efficient production of the compounds by mycelia of the fungus. During the trials, two novel γ-pyrones, erinapyrones A (**1**) and B (**2**) possessing cytotoxicity toward HeLa cells, were isolated.



1 $R_1 = CH_2OH$, $R_2 = CH_3$

2 $R_1 = CH_3$, $R_2 = CH_2OH$

3 $R_1 = CH_2Ph(m\text{-}OH)(m\text{-}OMe)$, $R_2 = CH_3$



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The fungus cultivated by shaking at 30 °C for 4 weeks was centrifuged (10000 × *g*), and the resulting supernatant (1.5 l) was concentrated and fractionated by solvent partition between EtOAc and water. Repeated silica gel chromatography followed by HPLC on an ODS column of the EtOAc extract gave **1** (1.3 mg) and **2** (3.6 mg) as colorless oil.

The molecular formula $C_7H_{10}O_3$ of erinapyrone A (**1**) was assigned by high resolution EIMS of the molecular ion peak (*m/z* 142.0615, Δ -1.5 mmu). Acetylation of **1** by acetic anhydride and pyridine gave a monoacetate [^{1}H NMR; δ 1.40 (d, J = 6.59, 2-Me), 2.07 (s. Ac), 2.37 (dd, 16.85, 4.13, 3eq), 2.42 (dd, 16.85, 13.92, 3ax), 4.51 (ddq, 13.92, 4.13, 6.59, 2), 5.42 (s, 5)]. From ^{1}H NMR [δ 1.48 (d, 6.23, 2-Me), 2.36 (dd, 16.85, 4.76,

3eq) 2.40 (dd, 16.85, 12.07, 3ax), 4.18 (d, 15.93, 6-CH_2), 4.23 (d, 15.93, 6-CH_2), 4.57 (ddq, 12.07, 4.76, 6.23, 2), 5.61 (s, 5)], ^{13}C NMR [δ 20.4 (2-Me), 43.1 (3), 61.9 (2), 76.1 (6-CH_2), 102.4 (5), 174.9 (6), 192.8 (4)], and IR (1608, 1655, 3392 cm^{-1}) spectra of **1**, the plane structure was proposed. The absolute configuration of **1** was determined by comparison of its CD spectrum with those of citreovirenone (**3**)[7] and hepialone (**4**)[8] [**1**, Δε -1.14 at 316 (EtOH); **3**, Δε -1.02 at 316 nm (EtOH); **4**, Δε +0.89 at 312 nm (MeOH)]. Thus, the structure of **1** was concluded to be (2*S*)-2,3-dihydro-6-hydroxymethyl-2-methyl-4*H*-pyran-4-one.

Erinapyrone B (**2**) was determined to be (2*R*)-2,3-dihydro-2-hydroxymethyl-6-methyl-4*H*-pyran-4-one by interpretation of following spectral data; $C_7H_{10}O_3$ (*m/z* 142.0659, Δ +2.9 mmu), IR absorption (1606, 1655, 3394 cm^{-1}), ^1H NMR [δ 2.01 (s, 6-Me), 2.30 (dd, 16,85, 3.66, 3eq), 2.61 (dd, 16.85, 14.29, 3ax), 3.76 (dd, 12.46, 5.50, 2-CH_2), 3.87 (dd, 12.46, 3.30, 2-CH_2), 4.46 (dddd, 14.29, 3.66, 3.30, 5.50, 2), 5.32 (s, 5), ^{13}C NMR [δ 20.9 (6-Me), 36.7 (3), 63.7 (2-CH_2), 79.5 (2), 104.9 (5), 174.2 (6), 192.6 (4)], CD [Δε -0.56 at 315 nm (EtOH)].

Compounds **1** and **2** exhibited cytotoxicity against HeLa cells;[9] minimum concentration giving complete death of the cells for **1** was 0.88 mM, for **2** was 1.76 mM.

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