

¹⁴C-Psilocin tissue distribution in pregnant rats after intravenous administration

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ABSTRACT

Background: Many species of hallucinogenic mushrooms have been found in the genus *Psilocybe*. The main psychoactive chemicals of *Psilocybe* mushrooms are psilocin and its phosphoryloxy derivative, psilocybin. In addition to its psychedelic effects, psilocybin is an effective agent to lift the mood of depressed patients with terminal cancers.

Objective: To study the dispositional kinetics of ¹⁴C-psilocin in pregnant rats after intravenous injection, to calculate tissue dose surrogates *i.e.*, tissue ¹⁴C concentration and area under the concentration-time curve using the experimental data, to quantify trans-placental passage of psilocin and/or its metabolites, and to identify new psilocin metabolite(s) in rat urine.

Methods: A group of 15 pregnant Wistar rats weighing between 0.30-0.36 kg was used in the study. Each rat was given a single dose of 7.5 mg/kg ¹⁴C-psilocin *i.v.* Three rats were randomly selected and sacrificed at 0.5, 1.0, 2.0, 4.0, and 8.0 hr post-dosing. The maternal and fetal tissues were quickly removed and the radioactivity in these tissues determined by liquid scintillation counting.

In a separate study, urine samples were collected from 6 male Wistar rats after administering 15 mg/kg of unlabeled psilocin *i.p.* The urine samples were collected and extracted by chloroform-methanol (9:1 v/v) and analyzed using a gas chromatograph/mass spectrometer.

Results: ¹⁴C-Psilocin crossed the placental barrier of pregnant rats readily after *i.v.* administration; maternal tissue ¹⁴C concentrations were found to be much higher than those in fetal tissues. The areas under the curve for maternal tissues also were much higher than the fetal tissues. In general, maternal tissues could be divided into the fast eliminating organ group, which

included the brain (elimination half-life <13 hr) and the slow eliminating organ group, which included all fetal tissues (elimination half-life >13 hr). A new psilocin metabolite tentatively identified as dihydroxyindoleacetic acid was found in the urine.

Conclusion: Our study showed that psilocin readily crossed the placental and blood-brain barriers of pregnant rats. Because psilocin was eliminated slowly from the fetal tissues of rats, human consumption of magic mushrooms should be avoided during pregnancy.

Key words: magic mushrooms, psilocin, placental barrier, pregnant rats