EVALUATION OF THE INTERNAL EXPOSURE DUE TO VARIOUS ADMINISTERED DOSAGES OF URETHANE TO MICE

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1. Introduction

This is a companion paper to that of Margaret R. White [1]. Using Miss White's data, the purpose is to develop the methodology needed to evaluate internal exposure to urethane following the injection of this chemical into mice, administered in varying doses measured in milligrams of urethane per gram of body weight (mg/g). Experimental details, including the use of urethane labeled in two ways, ethyl (1-^{14}C) carbamate and ethyl carbamate (carbonyl-^{14}C), denoted E and C labeled, respectively, will be found in Miss White's paper. Here a brief description illustrated by Figure 1 must suffice.

2. Experimental setup

Each of the 70 separate experiments (or runs) performed by Miss White consisted of: (1) injecting a randomly selected group of four mice with the same dose D of ^{14}C labeled urethane (D measured in mg/g); (2) placing the mice in the metabolism cage I (see Figure 1); (3) establishing a flow of fresh air, at a constant rate F, through chamber I, then through chambers II and III; and (4) measuring the radioactivity in the ionization chamber III. These measurements, made every 20 seconds, were automatically recorded giving the values that will be called $Y_3(t)$. This quantity is supposed to be proportional to the number of atoms of the radioactive carbon ^{14}C present in chamber III at time t. Chamber II in Figure 1 was filled with water absorber.

The arrangement of the experiments was based on the premise that, after being injected into mice, the urethane molecules are catabolized into at least two daughter molecules. Further catabolism results in practically all the labeled ^{14}C atoms being incorporated into CO_2 molecules which are gradually exhaled. Calculations performed at the Donner Laboratory (University of California,

This investigation was partially supported by USPHS Research Grant No. GM-10525-08, National Institutes of Health, Public Health Service.