Variability of Cadmium-109 Uptake in Rats as Affected by Route of Administration and Manner of Expressing Results

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In studies on the uptake of cadmium in certain rat tissues in our laboratory, there was a high variability in the measured cadmium content. This variability was seen even among the same type of tissues from different animals. Other investigations in our laboratory indicate that high variability is common in certain types of tracer work.

It was thought that the route of administration may affect the variability. Also, the manner in which the results are expressed, either uptake for the total organ or uptake per gram, may be important. Consequently an experiment was designed to test the effect of the route of administration, both intraperitoneal and intravenous, and the manner of expressing the results. Although cadmium was used, the findings may apply to other tracer work of a similar type.

EXPERIMENTAL

The experiment was replicated twice at times about 2 months apart. Each replicate was run with a different group of animals.

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For each replicate, 24 female rats weighing 195 to 205 g. were assigned randomly to two groups, one containing 10 animals for intraperitoneal injection and one containing 14 animals for intravenous injection into the tail vein. The number of animals in the group for intravenous injection was greater to allow for elimination in case of a bad injection; this was not necessary. Animals in each group were then assigned randomly to two subgroups to allow for injections on 2 consecutive days since 24 animals could not be conveniently handled on a single day.

Prior to experimentation the animals were housed individually in metal cages under laboratory conditions for 1 week. They were allowed free access to food and tap water.

To ensure uniformity of dosage, animals with a small range in weight were used. The dose consisted of exactly 0.25 ml. of a solution containing about 15 μCi. of $^{109}$Cd and 0.0625 mg. of cadmium ion as cadmium acetate in water. The $^{109}$Cd was found to be radionuclidically pure.

On day 1 of the experiment, the order of all injections was randomly assigned and all were completed within about 0.5 hr. All animals were sacrificed by decapitation with a small guillotine 12 hr. later. Sacrificing and removal of organs were completed within 1.5 hr. The liver, kidney, and spleen were removed and washed quickly with cold water to remove surface blood. This

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1 Sprague Dawley descendants, Laboratory Supply Co., Indianapolis, IN 46241.
2 Wayne Lab-Blox, Allied Mills, Inc., Chicago, IL 60606.