higher than the uptakes of "extraneous" I^{131}. These results clearly show that "extraneous" I^{131} is not immediately converted to NaI^{131} because of its dilution by body iodide or because of the presence of reducing agents in the tissues in accordance with the suggestion of Pitt-Rivers and Wolff(6). The results on the rate of uptake of NaI^{131} by rat organs and body fluids confirm an earlier report by Perlman *et al.*(8). Further, a close similarity between the rate of uptake curves for "extraneous" I^{131} and NaI^{131} may indicate that the 2 compounds are closely related and that there may be a gradual conversion of "extraneous" I^{131} into NaI^{131}. Fifty percent of the total I^{131} present in the one hour urine samples of rats receiving "extraneous" I^{131} was in the form of "extraneous" I^{131}. This would indicate that "extraneous" I^{131} is not completely reduced to iodide in a manner similar to that reported for iodate(9).

Summary. An "extraneous" I^{131} component identical with component "S" of Ahn and Rosenberg or "U" of Taurog was isolated from cysteine-free radioiodide preparations (obtained from E. R. Squibb & Sons) by a chromatographic separation and elution procedure described earlier.

One microcurie of NaI^{131} or of "extraneous" I^{131} were injected intraperitoneally into adult female rats. At the end of 1, 3 and 24 hours after injection, the animals were killed and the uptake of radioactivity in various organs and body fluids was measured. The results show that at one and 3 hours following injection, the uptake of NaI^{131} by stomach, thyroid, liver, intestine and plasma was significantly higher than the uptake of "extraneous" I^{131}. However, during the same period, urinary excretion of both the compounds remained the same. At 24 hours following injection of either NaI^{131} or "extraneous" I^{131} there was a significant lowering of radioactivity in stomach, liver, intestine and plasma and there were no significant differences in uptake of NaI^{131} or "extraneous" I^{131}. However, the thyroid gland continued to show an increased uptake of both NaI^{131} and "extraneous" I^{131} at 24 hours and also a significantly higher uptake of NaI^{131} in comparison to "extraneous" I^{131}. The results on the radioautography of one-hour urine samples from rats receiving an injection of "extreneous" I^{131} showed the presence of "extraneous" I^{131} to the extent of 50% of total I^{131} excreted. This would indicate that "extraneous" I^{131} is not rapidly reduced to iodide in a manner similar to that reported for iodate.

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Effect of Stable Cesium on the Retention of Cesium^{137} by Rats.* (27461)

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Because Cs^{137} is one of the potentially more hazardous products of nuclear fission, many attempts have been made to accelerate its excretion from animals. The list of materials tested with varying degrees of success or failure includes stable potassium(1,2), stable potassium and sodium(3), hormones and diuretics(4), enzyme inhibitors(5), ver-

* Work performed under the auspices of U.S. Atomic Energy Commission.

miculite, bentonite, and ion-exchange resins (6), and alfalfa(7).

One might hopefully expect to increase Cs^{137} excretion by administering stable cesium as the isotope dilution effect has been used successfully to enhance excretion of certain elements (*e.g.*, hydrogen, sodium, potassium, and iodine). Increasing the dietary level of zinc(8) and magnesium(9) also appears to reduce the body burden of acutely administered Zn^{65} and Mg^{28}, respectively. This effect, however, is one of reduced gastrointestinal absorption and might not be applicable to a material such as cesium which is known to be absorbed virtually quantitatively from the gut.

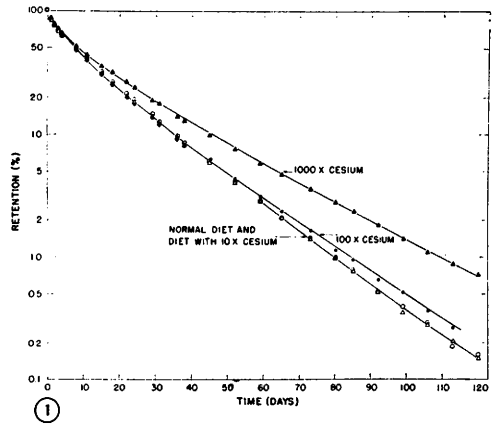
Materials and methods. Thirty-four male Sprague-Dawley rats, 84 days old with an average weight of 318 g, were divided into 4 equal groups. All groups were maintained on ground commercial† rat food and water *ad libitum* for one week prior to Cs^{137} administration. Spectrographic analysis showed the cesium content of the food to be about $6.5 \times 10^{-5}\%$. Stable cesium was added as chloride to the basal diet of 3 groups to make cesium concentrations of 6.5×10^{-4}, 6.5×10^{-3}, and $6.5 \times 10^{-2}\%$, respectively. These concentrations approximated 10-, 100-, and 1000-fold increases over the basal diet cesium level. The experimental groups were maintained on their respective diets during the 4-month experimental period. A commercial‡ twin-shell laboratory blender was used to facilitate mixture of the ground commercial food and the supplemental triturated cesium chloride.

The groups were placed on their respective dietary regimens immediately after each animal was injected intraperitoneally with 0.65 μc carrier-free Cs^{137} Cl. At 30 minutes following injection and at suitable intervals thereafter, the individual animals were counted in a 4π whole-body liquid scintillation detector(10). Fractional biological retention was then calculated from the following expression:

$$\text{Biological } R_t = \frac{\left(\dfrac{\text{Animal count rate}}{\text{Standard count rate}}\right)_n}{\left(\dfrac{\text{Animal count rate}}{\text{Standard count rate}}\right)_o}$$

in which the subscripts n and o refer to times after administration, and R_t is the biological retention on any day t. This expression corrects for minor day-to-day fluctuations in the counting system.

Results and discussion. Fig. 1 shows the mean % whole-body biological retention of Cs^{137} as a function of time for each group. Cesium^{137} excretion was not increased by the dietary levels of stable cesium used. On the contrary, Cs^{137} excretion was decreased by the highest cesium intake level. After an analysis of variance of the data for each day, Duncan's test(11), as modified by Kramer



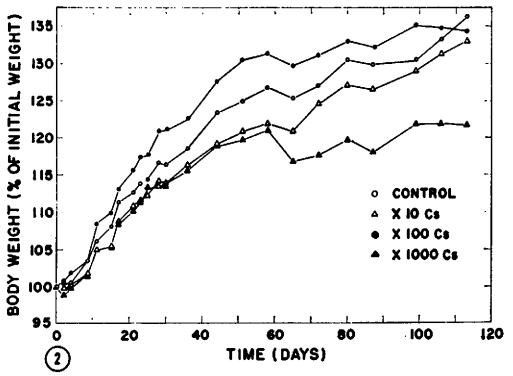


FIG. 1. Retention of Cs^{137} by rats maintained on diets with 0, 10, 100, and 1000 times normal cesium concentrations.

FIG. 2. Weight change (% of initial wt) in rats maintained on diets with 0, 10, 100, and 1000 times normal cesium concentrations.

† Ralston-Purina Co., St. Louis, Mo.

‡ Patterson-Kelley Co., Inc., East Stroudsburg, Pa.

(12), showed that at no time did Cs^{137} retention of animals maintained on 10- and 100-fold cesium intake levels differ significantly from the Cs^{137} retention of the control animals. However, significant differences ($P = <0.01$) between retention of animals on the 1000-fold cesium intake level and all other groups were found on day 23 and every day thereafter. Periodic weighings showed that 10-fold and 100-fold cesium intake levels had no deleterious effects on the growth pattern of the animals, but after 50 days there was no increase in body weights of animals on the 1000-fold cesium intake level (Fig. 2).

Computer analysis of the biological retention data for the control group gave the following retention equation:

$$R_t = 12.81\, e^{-0.90541\, t} + 39.21\, e^{-0.06734\, t} + 47.97\, e^{-0.048741\, t}$$

where R_t is the average biological retention for cesium on any day t; the coefficient and exponent of each term are the intercept and rate constant, respectively; and e is the base of natural logarithms. Integration of this function from 0 to ∞ times gives the total area which, in turn, is proportional to the equilibrium level attained during continuous ingestion to a constant dietary level of stable cesium. For example, the equilibrium level for stable cesium in the control animals would be about 14 times the daily cesium intake. Similar calculations show that the equilibrium concentration of cesium in the highest cesium intake group would be approximately half the LD_{50} toxicity value(13) for a single intraperitoneal injection of cesum chloride. Presumably, the increase in retention and perhaps the disruption of growth pattern are responses to cesium toxicity. These observations suggest the possible application of whole-body counting technics to studies of metabolic responses to materials in sublethal toxicity ranges.

Summary. Increased dietary cesium does not enhance excretion of parenterally administered Cs^{137} by rats and, because of apparent toxic action, may decrease normal Cs^{137} excretion at dietary concentrations exceeding $6.5 \times 10^{-3}\%$.

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Identification of a New Metabolite of Imipramine.* (27462)

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Recent studies indicate that imipramine (Tofranil), which is employed for the relief of anxiety neurosis, undergoes substantial metabolic changes in the body. According to Herrmann *et al.*(1,2), imipramine is subject to oxidative hydroxylation of the aromatic nucleus

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