

RADIOACTIVE IODINE AS AN INDICATOR IN THYROID PHYSIOLOGY

IODINE COLLECTION BY NORMAL AND HYPERPLASTIC THYROIDS IN RABBITS¹

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In previous papers (1, 2) we have described the techniques and advantages of the use of radioactive isotopes of iodine as indicators in the study of iodine distribution and have reported preliminary results obtained with this method. This paper is concerned with the detailed results of extended experiments on normal rabbits and on rabbits which had received previous treatment designed to influence the physiologic state of the thyroid. The majority of the experiments were conducted with the use of the radioactive isotope of iodine of mass 128, which has a half period of 25 minutes. We have also used a few samples of radioactive iodine with the half periods of 12.5 hours, 8 days and 13 days (mass numbers 130, 131 and 126 respectively) (3).

It was the purpose of these experiments to investigate the collection of iodine by normal and hyperplastic thyroid glands, in order to establish the normal and pathological behavior toward iodine under various circumstances, and in order to determine the conditions under which it might be possible to use radioactive iodine to administer internal irradiation of the thyroid. The experiments have therefore been concerned with the measurement of the percentage collection of known doses of labelled iodine by the thyroid, as a function of time of collection, quantity of iodine injected, previous history of iodine treatment, thyroidic hormone administration, cyanide injection, cabbage diet, sex, pregnancy, and certain combinations of these factors. The iodine was usually administered intravenously in the form of sodium iodide obtained by dissolving labelled silver iodide in sodium thiosulphate (2). In a few experiments in which long collection times were possible because of the availability of long-period iodine isotopes this research was conducted in the Physics Laboratories of the Massachusetts Institute of Technology, supported by grants from the Milton Fund, the Proctor Fund, and the Wellington Fund of Harvard University.