

Happy Theranostic Nuclear Medicine Day!!!
TABLE I AN ANALYSIS OF CASES

SERIES NO.	CASE-HOSP.NO.	BMR PRIOR TO I ¹³⁰	DOSAGE OF I ¹³⁰ and DATES OF ADMINISTRATIVE
1	ELIZABETH D. MGH-173954	+30	2.1 mC 3-31-'41 } 3.4 1.3 mC 4-16-'41 } mC

March 31, 2021

Dear Zvi,

We commemorate today the **80th Anniversary** of the first therapeutic use of radioactive sodium iodide (I-130) given to a young woman with Graves' Disease by Dr. Saul Hertz in 1941. The title banner is a clip from the table made by the legendary physician who conceived the idea, studied iodine kinetics on the animal model, and finally took it to the clinic by literally running a vial with radioactive iodine (RAI) from the cyclotron facility at the Massachusetts Institute of Technology (MIT) to the Thyroid Unit at the Massachusetts General Hospital (MGH) where he was the Clinical Director. The first patient, a young woman suffering from Graves' disease, was waiting for him to bring the novel radioactive medicine for her experimental treatment!

This remarkable story would not have happened if not for a eureka moment that occurred on November 11th, 1936 when Dr. Hertz set listening to a lecture at MIT on how elements can be made radioactive. He was taking a break from clinical work and the animal research on thyroid iodine metabolism that required tedious measurements of tiny amounts of stable iodine. Understandably, he could hardly wait till the end of the lecture to ask the burning question - can iodine be made radioactive? But the answer was not immediately available and the lector, Professor Compton, wrote back to Dr. Hertz on December 15th, 1936 that while radioactive iodine is not well defined yet, it can be done! But as it turns out, to get enough of it for animal experiments and possibly therapeutic trials, it would require a cyclotron! A novelty at the time, the only one available in the U.S.A. was located at the opposite coast of the country, the

University of California Berkeley. The chance of it all working out must have seemed daunting. The take-home message from what Dr. Hertz ended up doing is - recognize a great idea and don't waste time pondering the challenges but roll up your sleeves and get to work!

As we know, Dr. Hertz performed the impossible in less than 5 years - convinced the powers that be to hire a Nuclear Physicist for the production of experimental and therapeutic RAI, initiated an alternative method for producing I-129 for laboratory radiotracer experiments on rabbits, secured funding and initiated the cyclotron construction at the MIT, and published convincing evidence that it can be done! On March 31st, 1941 the first patient agreed to try it, becoming patient #1 in Table 1, titled "An Analysis of Cases "Not Cured" ...".

TABLE I AN ANALYSIS OF CASES "NOT CURED" BY Ra-I+KI (TO MARCH-'46)

The first treatment attempt failed and the patient ended up having a thyroidectomy for control of hyperthyroidism. Table 1 included 8 other patients who were "not cured". But Dr. Hertz pressed ahead with dosage escalation until he cured 20 patients - more than 2/3rd of the original cohort of 29 patients! The take-home message from Dr. Hertz to all of us is - turn a failure into an opportunity to succeed by analyzing and learning from it!

As we are celebrating this momentous accomplishment 80 years later, recognizing Dr. Hertz's intellectual brilliance which gave birth to the idea that radioactive iodine can be used to track the metabolic pathway of iodine from ingestion to its final accumulation in a normal and/or an abnormal thyroid. But Dr. Hertz took it further by inventing a novel therapy paradigm - giving a much greater amount of radioactive iodine to turn off a revved-up thyroid gland in a patient with hyperthyroidism! **This coupling of testing and treating with a targeted radioisotope-pairs is Dr. Hertz's gift to humanity that we call Theranostic Nuclear Medicine!**

Wishing everyone a scintillating celebration by using your skills in helping patients get better today and every day you get an opportunity to put **Theranostic Nuclear Medicine** to work!

Yours truly,

[Mark Tulchinsky, MD, FACNM, FSNMMI, CCD](#)

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Suggested Readings:

Fahey FH, Grant FD, Thrall JH. Saul Hertz, MD, and the birth of radionuclide therapy. *EJNMMI Phys.* 2017;4:15.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5407393/>

Hertz B. A tribute to Dr. Saul Hertz: The discovery of the medical uses of radioiodine. *World J Nucl Med.* 2019;18:8-12.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6357704/>

Suggested Historical Website:

<http://saulhertzmd.com/home>

President-Elect (2020), the **American College of Nuclear Medicine**