

Theragnostics: A neologism that generates schism. The Hellenic thesis

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Kyrie,

Theragnostics, not as euphonic as theranostics, from the Hellenic “therapevein” and “diagnosis”, harmonise as well “gnosis” and “prognosis” [1]. The glossological chasm that can be synthesized by the chresis of the symbol “g” has been emphasized by the giant of Hellenic orthography and etymology Academic George Babiniotis: In theranostics “nostics” refer more to the pathology than diagnostics. Glossologically the ideal is a synergy of the two words: therapo-agnostics [2].

In an epoch characterized by a plethora of polymorphous diagnostic and therapeutic methods, theragnostics becomes the base of modern clinical practice. However, the history of theragnostics as the mastery of the synthesis of personalized biological characteristics to generate the required diagnostic icons with the dynamics to practice analogous therapies, is not new. It has its genesis in the 1940s’ with radioiodine in diagnostic and therapeutic thyroidology. Since, November 1936, when Karl Compton, president of Massachusetts Institute of Technology (MIT) was called for a presentation at of the Medical School of Harvard. His theme was “What Physics Can Do for Biology and Medicine.” Saul Hertz who was there, asked “Could iodine be made radioactive technically?”. The dialogue and the epistles between them set the base not only for the diagnosis and therapy of thyroid pathologies, but also the epoch of theragnostics [3].

Since then, radioactive iodine has been used for the scopes of pretherapeutic dosimetry, for the therapy of thyroid pathologies including hyperthyroidism and carcinoma, as well as for post-therapeutic diagnosis and its characteristics, personalized. In this sphere, the parallel acme of a plethora of radiopharmaceuticals and diagnostic methods, have generate a gigantic number of theragnostic radioisotopes and techniques. We will emphasize only some paradigms of the numerous radioisotope theragnostic practices.

Radiolabeled somatostatin receptor (SSTR) analogues such as ¹¹¹In-octreotide, [DOTA0,Tyr3]-octreotide (DOTATOC) and [DOTA0, Tyr3]-octreotate (DOTATATE) labelled with ¹⁷⁷Lu or ⁹⁰Y as well as Positron Emission Tomography (PET) isotopes such as ⁶⁸Ga DOTATOC/DOTATATE are critical for staging, therapy planning, therapy and post-therapy monitoring of neuroendocrine neoplasia (NEN). Peptide receptor

radionuclide therapy (PRRT), the systemic therapy in advanced metastatic NEN and has altered oncological clinical practice in gastroenteropancreatic (GEP) NENs. [2]

Radiopharmaceuticals which are synthesized by radiolabeling prostate-specific membrane antigens (PSMA) such as [⁶⁸Ga]Ga-PSMA-HBED-CC, [¹⁷⁷Lu]Lu/[⁹⁰Y]Y-J591, [¹²³I]I-MIP-1072, [¹³¹I]I-MIP-1095 and [⁶⁸Ga]Ga/[¹⁷⁷Lu]Lu PSMA-I&T and DKFZ-PSMA-617 (PSMA-617) are basic radiopharmaceuticals for the personalized diagnosis and therapy of prostate carcinoma [4].

Our scope was not to analyze all the bibliographic and clinical practiced nuclear theragnostic techniques and radiopharmaceuticals. Our epithymia is to dynamitize the dialogue among epistemologists, academicians, physicians and physicists, in order to synchronize and harmonize more and more our theragnostic techniques.

Instead of an epilogue, we would like to apologize for tyrannizing you with the Hellenic phraseology in our epistle and emphasize our eucharistia to the philoxenous JNM

PS

The numerousness of paragraphs in this epistle was synthesized with the orthe chresis of a plethora of Hellenic lexis. The first to practice the rhetoric of Hellenic lexicon was Academic Xenophon Zolotas back to 1957 and 1959, who presented his lecture, using only Greek words with exeresis of articles and prepositions, for the International Monetary Found (<http://users.sch.gr/akouts/docs/Zolotas.pdf>)

References

- 1 Frangos S, Buscombe JR. Why should we be concerned about a "g"? *Eur J Nucl Med Mol Imaging*. 2019;46(2):519.
- 2 Verburg FA, Heinzl A, Hänscheid H et al. Nothing new under the nuclear sun: towards 80 years of theranostics in nuclear medicine. *Eur J Nucl Med Mol Imaging*. 2014 Feb;41(2):199-201.
- 3 Fahey FH, Grant FD, Thrall JH. Saul Hertz, MD, and the birth of radionuclide therapy. *EJNMMI Phys*. 2017 Dec;4(1):15. doi: 10.1186/s40658-017-0182-7.
- 4 Yordanova A, Eppard E, Kürpig S et al. Theranostics in nuclear medicine practice. *Onco Targets Ther*. 2017;10:4821-4828. doi: 10.2147/OTT.S140671.