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THERAPEUTIC RADIOMETALS: GLOBAL TRENDS ANALYSIS OF SCIENTIFIC LITERATURE (2008 -2018)

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BACKGROUND-AIM

Academic journals have published a large number of papers in the therapeutic NM research field in the last ten years. Despite this, a literature analysis has never been made before to point out the research interest in therapeutic radionuclides (RNs). For this reason, the present study has the aim to specifically analyze the research output on therapeutic radiometals from 2008 (January) to 2018 (October) with the aim to quantify and identify the global trend of scientific literature and emphasize the interdisciplinary nature of this research field.

METHODS

The data search has been targeted on conventional (I-131, Y-90, Lu-177, Re-188, Re-186, Sm-153, Sr-89, Er-186) and emergent (Cu-67, Sc-47, Ra-223, Ho-166, Tb-161, Tb-149, Pb-212/Bi-212, Ac-225, Bi-213, At-211, Sn-117) RNs. Authors, starting from this time frame data, have been quantitatively first, and qualitatively after, analyzed and interpreted the scientific trend of this topic. Bibliometric data have been exported from Scopus database and elaborated with Excel. The number of article, article in press, note, short survey, review and letter, have been divided per year and RN with the aim to make perceptible the trend of the last decade. Data have been categorized also in terms of Journal Subject Areas in order to bring out the multidisciplinary nature of the research in this field. Finally, for each publication, authors country provenience have been extrapolated and elaborated to map the global researcher interest and involvement of human and financial resources.

RESULTS

A total of 12.717 publications have been analyzed. 81.3% of the publications regards conventional RNs while 18.7% regards emergent RNs. The most investigated therapeutic RNs are I-131, Y-90, Lu-177 among conventional, Ra-223, followed by Sn-117, Bi-213 and Ac-225 among emergent RNs. From the analysis, it is evident the multidisciplinary contribution to this field but in particular, as expected, in the case of conventional RN most publications comes from preclinical and clinical fields while for the emergents the contribution is unbalanced for Physics, Engineering, Material Science fields mainly focused on emergent RNs production studies. From the geographical point of view we can see how almost half of the total works have been published by European in both conventional and emergent RNs categories. It is also evident the high collaboration grade between countries characteristics in line with the multidisciplinarity of this medical sector. Moreover, we extrapolated a countries top 20 for each category. On the podium for the conventional RNs are USA, Germany and China, while for emergent RNs are USA, Germany, United Kingdom. And much more.

CONCLUSIONS

From this analysis arise that the success of NM has been intimately linked to the availability of new RNs and the radiopharmaceuticals field is constantly evolving thanks to the contribution of specialists coming from different disciplines and the collaboration between countries. In recent years the focus of the research shifted on the field of emergent therapeutic radioisotope production and application, such as Cu-67, Sc-47, for the interest in new treatment strategies such as the theranostics personalized approach. Alpha emitters, in particular Ra-223 and Ac-225 are also gaining attention in particular in USA and Germany. Instead, among conventional radionuclides the research on Lu-177 is constantly growing.