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International Scientific Communications In The Field Of Breast Cancer Immunohistochemistry.

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ABSTRACT

The aim of the present investigation was to analyze scientometrically the dynamics of the international scientific communications in the field of breast cancer immunohistochemistry as reflected in four data-bases and to outline the scientists with most papers and citations, the countries, journals, and languages in this field. In December 2019, a retrospective problem-oriented, title-word based search was performed in *Web of Science Core Collection (WoS)*, *MEDLINE* and *BIOSIS Citation Index (BIOSIS)* of *Web of Knowledge* as well as in *Scopus* for 2003-2018. The following parameters were comparatively assessed: number, type and language of publications, journal titles and number of articles in them, author's names and countries and citations received in the data-bases. In *WoS*, 1187 publications were abstracted, in *BIOSIS* - 776, in *Scopus* - 711, and in *MEDLINE* - 616 in 16 languages by authors from 77 countries. In *WoS*, there were articles in 288 journals, in *MEDLINE* - in 234 journals, in *Scopus* - in 156 journals, and in *BIOSIS* - in 140 journals. The most prolific authors were David G. Hicks, Rohit Bhargava and Ian O. Ellis. This comprehensive data collection could help the researchers from smaller countries improving their international visibility on the world information market.

Keywords: breast cancer immunohistochemistry, scientometrics, internationalization of science, data-bases

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INTRODUCTION

Breast cancer is the most common malignant disease in women worldwide. Nowadays there is a constant interest in the applications of modern immunohistochemical methods as reliable tools in breast cancer prognostication.

A multidisciplinary international Expert Panel updates 2018 American Society of Clinical Oncology/College of American Pathologists clinical practice guideline recommendations and continues to recommend estrogen receptor testing of invasive breast cancers by validated immunohistochemistry as the standard for predicting which patients may benefit from endocrine therapy [1]. The implementation of these guideline recommendations in 1348 invasive breast cancers leads to a significant increase in human epidermal growth factor receptor 2 in-situ hybridization negative results compared to the 2013 guideline, mainly via reclassification of the in-situ hybridization equivocal cases to in-situ hybridization negative ones [2].

The aim of the present investigation was to analyze scientometrically the dynamics of the international scientific communications in the field of breast cancer immunohistochemistry as reflected in four data-bases and to outline the scientists with most papers and citations received, the significant countries, journals, and languages in this interdisciplinary field.

MATERIALS AND METHODS

In December 2019, a retrospective problem-oriented, title-word based search was performed in *Web of Science Core Collection (WoS)*, *MEDLINE* and *BIOSIS Citation Index (BIOSIS)* of *Web of Knowledge* (Clarivate Analytics, Philadelphia, PA, USA) as well as in *Scopus* (Elsevier, Amsterdam, Netherlands) for 2003-2018. The following scientometric parameters of the publication output and citation activity were comparatively assessed: i) annual and total number of abstracted publications; ii) types and languages of abstracted publications; iii) names, number of publications and country of occupation of authors, iv) number of citations to publications by single authors received in the data-bases during this period analyzed by the original computerized citation metrics of these data-bases.

Some scientometric distributions only were demonstrated in tables and figures.

RESULTS AND DISCUSSION

Our results revealed several essential peculiarities of the dynamic structure of the international publication and citation output on breast cancer immunohistochemistry during this 16-year period.

The analysis of the annual dynamics of publications on the topic abstracted in these data-bases revealed a relatively constant publication output as its reduction in 2018 was due to time lag between primary publishing and subsequent abstracting.

The main bibliometric parameters of four data-bases on breast cancer immunohistochemistry were systematized in Table 1.

Table 1: General bibliometric characteristics of four data-bases on this topic

Parameter	<i>WoS</i>	<i>BIOSIS</i>	<i>Scopus</i>	<i>MEDLINE</i>
total number of publications	1187	776	711	616
total number of journals	288	140	156	234
total number of journals with ≥ 10 articles each	18	14	10	13
percentage of these journals	6.25	10.0	6.41	5.56
total number of languages (n=16)	7	4	10	12
total number of countries of authors (n=77)	67	66	76	n.a.
number of countries with one publication only	18	20	18	n.a.
percentage of these countries	26.87	29.85	23.78	n.a.

There were considerable differences between these data-bases concerning the amounts of publications, journals and languages.

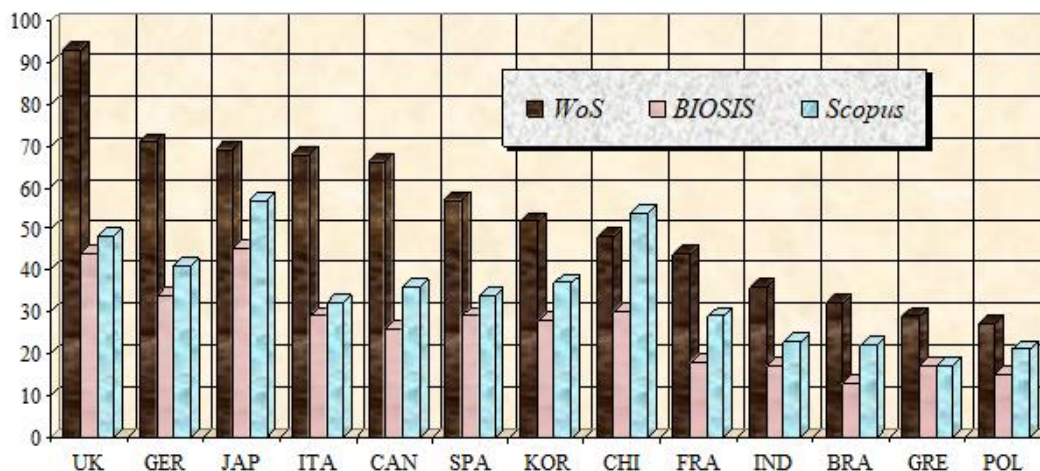
Original journal articles prevailed in *Scopus* and *MEDLINE* and occupied a second place after meeting abstracts in *WoS* and *BIOSIS* (Table 2).

Table 2: Document type distribution in four data-bases

Document type	<i>WoS</i>		<i>BIOSIS</i>		<i>Scopus</i>		<i>MEDLINE</i>	
	n	%	n	%	n	%	n	%
journal article	562	47.35	348	44.84	634	89.17	604	98.05
meeting abstract	568	47.85	421	54.25	-	-	-	-
review	18	1.52	-	-	19	2.67	15	2.43
congress proceedings	19	1.60	-	-	20	2.81	-	-
letter-to-the-editor	21	1.77	4	0.51	16	2.25	8	1.30
editorial	3	0.25	-	-	1	0.14	-	-
book chapter	4	0.34	3	0.39	4	0.56	-	-
evaluation study	-	-	-	-	-	-	27	4.38
case report	-	-	-	-	-	-	27	4.38
multicentre study	-	-	-	-	-	-	9	1.46

The distribution of some leading countries according to the number of the publications by their authors except for the USA authors abstracted in *WoS*, *BIOSIS* and *Scopus* was displayed in Figure 1.

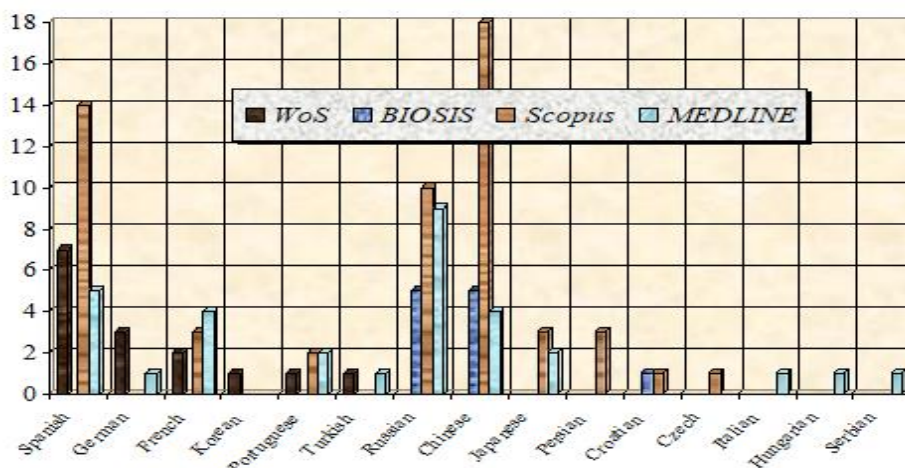
Figure 1: Country distribution according to the number of publications on the topic abstracted in three data-bases



The USA investigators dominated as in most medical scientometric distributions. The number and relative share of USA publications were 339 and 28.56% in *WoS*, 215 and 27.71% in *BIOSIS*, and 119 and 16.74% in *Scopus*, respectively.

English language considerably prevailed presenting with 98.74% in *WOS*, 98.58% in *BIOSIS*, 95.46% in *MEDLINE* and 92.55% of the publications in *Scopus*. The distribution of the rest languages of the publications on the topic abstracted in four data-bases was demonstrated in Figure 2.

Figure 2: Non-English language distribution of publications on the topic abstracted in four data-bases



The names, countries of occupation and number of publications of the most prolific authors on the topic abstracted in four data-bases were listed in Table 3.

Table 3: Most productive authors on the topic in four data-bases

Rank	Authors	Country	WoS	BIOSIS	Scopus	MEDLINE
1.	David G. Hicks	USA	22	12	10	8
2.	Rohit Bhargava	USA	20	17	6	8
3.	Ian O. Ellis	UK	20	14	12	13
4.	L. C. Goldstein	USA	18	11	-	2
5.	Allen M. Gown	USA	17	13	3	4
6.	David J. Dabbs	USA	16	15	7	9
7.	Andrew R. Green	UK	14	10	10	10
8.	Charles M. Perou	USA	14	10	6	4
9.	Torsten O. Nielsen	Canada	12	4	7	6
10.	P. H. Tan	Singapore	11	7	5	-
11.	Jacek Jassem	Poland	10	6	7	7
12.	Ja Seung Koo	Korea	10	7	9	5

The cumulative citation characteristics in the field of breast cancer immunohistochemistry based on the original computerized citation metrics of *WoS* and *BIOSIS* was systematized in Table 4.

Table 4: Cumulative citation patterns on the topic in *WoS* and *BIOSIS*

Citation parameter	WoS	BIOSIS
total number of publications	1187	776
sum of the times cited	16529	5744
sum of the times cited without self-citations	15873	5534
percentage of these times cited	96.03	96.34
citing articles	12652	4795
citing articles without self-citations	12315	4670
percentage of these citing articles	97.34	97.39
average citations per item	13.93	7.4
average citations per year	972.29	337.88
articles cited at least once	592	323
percentage of these articles	49.87	41.62
h-index	57	37

The percentages of the times cited without self-citations and of the citing articles without self-citations were very high. The so-called ‘h-index’ [3] was relatively high, especially in terms of WoS. The substantial differences concerning the papers most cited in these data-bases were due to the specific journal coverage by the editors in these information portals.

The brief bibliographic citations of ten most cited articles on the topic in four data-bases were presented in Table 5.

Table 5: Ten most cited articles on the topic in four data-bases

First author’s name	Journal title, year, volume & pages	WoS	BIOSIS	Scopus	MEDLINE
M. E. H. Hammond	<i>J Clin Oncol.</i> 2010;28:2784-95.	1527	-	1660	1527
M. E. H. Hammond	<i>Arch Pathol Lab Med.</i> 2010;134:E48-72.	533	342	560	533
F. M. Blows	<i>PLoS Med.</i> 2010;7:e1000279.	460	297	488	-
T. O. Nielsen	<i>Clin Cancer Res.</i> 2010;16:5222-32.	405	240	446	1782
J. Cuzick	<i>J Clin Oncol.</i> 2011;29:4273-8.	393	-	433	393
K. Subik	<i>Breast Cancer Basic Clin Res.</i> 2010;4:35-41.	382	-	398	382
J. Hugh	<i>J Clin Oncol.</i> 2009;27(8):1168-76.	368	-	402	368
M. E. H. Hammond	<i>Arch Pathol Lab Med.</i> 2010;134(6):907-22.	280	162	354	280
M. E. H. Hammond	<i>J Oncol Pract.</i> 2010;6(4):195-7.	279	-	314	279
M. Tischkowitz	<i>BMC Cancer.</i> 2007;7:art. No 134.	274	-	299	274

The analysis of 20 most cited papers in these data-bases identified two papers by international collectives which had already received a very large amount of citations by the world scientific community. There were 32 authors working in 232 institutions from eight countries.

DISCUSSION

Science internationalization includes not only direct research interaction between single scientists from different countries and their teams organized through official contracts or within informal collectives but also several essential components: i) continuous creation of new international scientific societies and international associations of national societies, of new international scientific journals and international publishers or publishing houses; ii) publishing of scientific papers, reviews and book reviews in foreign journals and periodicals; iii) translation and publishing of monographs by foreign authors; iv) organization of international scientific forums and participation in them of authors from numerous foreign countries; v) enrichment of the forms of immediate exchange of scientists from other countries; vi) unlimited dissemination of new scientific information through modern information-communication technologies; vii) introduction of electronic journals and monographs, etc. [4,5].

The discrepancies in the coverage, indexing and computerized processing of the recent primary scientific literature on breast cancer immunohistochemistry by these two widely recognized information centres in the USA and in the Netherlands require editorial policy refinements. Single significant publications are missing in at least one of these four data-bases although the corresponding journals are, usually, covered. The incorporation of proceedings from congresses, conferences and symposia could be further enhanced.

There is a stable research interests in the issues of a variety of peculiarities of the modern international scientific communications and collaboration worldwide.

The characteristics of international scientific production regarding the internationalization and university themes between 1989 and 2018 are analyzed by descriptive bibliometrics [6]. In 2017, China, the USA and England have the largest number of publications. Research, students, development, globalization, science, markets, culture and intercultural experience are possible hot topics related to internationalization and university.

Cancer research activity from the 29 countries across Central and Eastern Europe, Russian Federation and Central Asia is mapped between 2007 and 2016 using a standard scientometric approach [7]. There is a

relative paucity of research on lung, colorectal, gastric and pancreatic cancer, as well as research domains such as screening and palliative care. Poland is the most research-active country.

Dynamic research productivity and international collaboration of top Indonesian universities as reflected in *Scopus* is comprehensively assessed [8].

Amongst 5063525 oncology research records indexed in at least one of *PubMed*, *Scopus*, or *Web of Science Core Collection (WoS)* databases up to February 2019, Iranian publications account for about 24867 (0,49%) [9]. The USA is the most collaborative country.

International communication patterns are comprehensively assessed in various countries such as Brazil [10-12], Italy [13], etc. The dynamic internationalization of geosciences [12], social sciences [14,15] and social sciences and humanities [16-18] as well as of particular fields such as science communication research [10], colorectal tumour markers [5], Crohn's disease in childhood [19], and pediatric sleep apnea [20] is scientometrically investigated, too.

CONCLUSION

The usage of this comprehensive problem-oriented collection with purposefully systematized files containing the researchers' names, addresses and publications by specialists from smaller countries could help these researchers achieving an improved international visibility on the highly competitive world information market by further perfecting their research quality.

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