

## **CITATION ANALYSIS OF THE BULGARIAN AUTHORS AND LITERATURE IN THE PROCEEDINGS OF "IMMUNOLOGY OF REPRODUCTION"**

**D. Tomov**

Key-words: citation analysis — self-citation — Bulgarian publications — symposia "Immunology of Reproduction"

It is a noteworthy fact that the interest in the problems of immunology of reproduction increases rapidly nowadays. The citation analysis could be considered as a new information language for the scientists indeed. One of the most important applications of this analysis is in studies of science policy and research evaluation (5). It contributes successfully to remark the significant scientific achievements of the current theory and practice concerning various actual problems. Recently the citations of the Bulgarian scientists have been studied, too (1, 2, 4). The role of the international scientific forums (congresses, conferences, symposia etc.) for the exchange of most actual information arises ceaselessly (3 a. oth.). The participants at scientific meetings choose the most relevant and valuable publications in the literature available and then include some of them in their reference lists. That's why the citation analysis of congress proceedings could reveal the most frequently cited authors, publications and their primary information sources which play a significant role in the development of science. It delineates the leading directions and tendencies of both national and worldwide importance.

The purpose of this work is to present the results from the citation and self-citation analysis of the Bulgarian authors and literature in the proceedings of "Immunology of Reproduction" (IR).

### **Material and methods**

Our investigation covered the Proceedings of the 1<sup>st</sup>—5<sup>th</sup> International symposia of IR held in Varna in 1967, 1971, 1975, 1978 and 1982. The scientometric method after P. L. K. Gross and E. M. Gross (6) was applied. There were 4 groups of publications: by Bulgarian authors only, foreign authors only and by international collectives with or without Bulgarian participations. The references of all items were analysed according to all names of Bulgarian scientists and titles of the primary information sources of their publications cited. The self-citation analysis was made according to all Bulgarian authors of correspond items in the proceedings only. The Bulgarian scientists have been either cited by foreign and Bulgarian authors, or self-cited (directly or indirectly) by themselves. The citations of the Proceedings of IR were demonstrated separately. Some of the numerous data received are summarized on tables.

## Results and discussion

The number of authors, publications and citations in the symposia is shown on table one. Bulgarian publications are cited in 157 items. According to the intensity of citation the publications of Bulgarian and foreign authors are divided into

Table 1

Number of authors, articles and citations in the symposia proceedings

Authors (Articles) Citations	Symposium number					Total
	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	
Bulgarian only	81	105	103	165	137	—
articles	29	26	27	43	43	168
citations	189	327	313	428	258	1515
Foreigners only	95	205	330	355	368	—
articles	51	78	99	110	127	465
citations	464	982	1469	1004	508	4427
Bulg. a. foreign	19	42	52	63	25	—
articles	3	5	10	6	5	29
citations	62	55	115	54	15	301
Articles with cited Bulg. publications	20	30	40	42	25	157

3 groups: items with 1—10 citations — 286 (56,30 %); items with 11—30 citations — 194 (38,19 %), and with more citations — 28 (5,51 %) only. 508 of 662 publications (76,74 %) contain reference lists only. According to the primary information sources of cited publications the journals are most-frequently cited (59 titles with 211 citations) followed by the group of congress proceedings (51 titles with 151 citations), by the books (20 titles with 34 citations), and theses (12 titles with 18 citations, respectively self-citations).

The mean citation rate per citing article is shown on table 2. It differs in the single symposia and in Bulgarian and foreign articles. The lowest rate is in the 5<sup>th</sup> but the highest — in the 2<sup>nd</sup> symposium proceedings. It is higher in articles by foreign authors than in these by Bulgarian ones: 12,98 to 10,59 citations per item respectively.

Table 2

Mean number of citations per article in I R

Publications of	Symposium number					Total
	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	
Bulg. authors	9,95	13,08	12,04	10,19	8,32	10,59
Foreign authors	14,06	15,59	15,30	10,79	9,07	12,98
Collectives of Bulg. a. foreign authors	20,67	11,00	12,78	10,80	7,50	12,54
T o t a l	13,00	14,67	14,44	10,61	8,78	12,29

The self-citation analysis has established that self-citations occur in 103 of 167 Bulgarian publications with citations. The total number of self-cited items is 288 (15,86 %). The citations of the articles in the Proceedings of IR (1 —5th symposia) in themselves are summarized on table 3. There are 86 self-citations

Table 3  
Citation of publications from the symposia I R

Citing publications	Cited publications			
	Bulgarian		Foreign	
	u	%	n	%
Bulgarian	57	22,8	43	17,2
Foreign	22	8,8	128	51,2
Total cited publications	79	31,6	171	68,4

of all 250 citations — 34,4 %. The foreign authors have cited 22 Bulgarian publications in the IR proceedings. Bulgarian articles and books are cited in 41 (12,02 %) of 341 items with citations by foreign authors. The number of these citations is 71 — 1,60 %) of all citations in foreign items only.

The distribution of journal articles by Bulgarian authors cited according to year of publication is presented on fig. 1. The interest in publications in different years varies in the single symposia. The journals articles published 2—4 years ago are predominantly cited in the year of corresponding symposium. The most cited articles are published in the following years: 1964 — 23 citations; 1962 — 20; 1960 — 17, and 1968 — 16 ones. In the last 18 years the lowest citation rates for articles are in 1972 — 1 and in 1969 — 3 only, although 3, respectively 4 symposia were held in this period. The immediacy factor (number of articles cited in the same year of symposium to all published articles in this year) is quite low and due almost exceptionally to self-citation. Our data received reveal some aspects of the dynamics of the communications in the field of reproductive human and animal immunology. The total number of cited, respectively self-cited Bulgarian authors is 167. They can be divided into following groups: a) cited by Bulgarian and foreign authors and self-cited, too — 15 (8,98 per cent); b) cited by Bulgarian authors — 82 (49,10 per cent) or foreign ones only — 7 (4,20 per cent); c) cited by Bulgarian and foreign authors both — 5 (2,99 per cent); d) cited by Bulgarian authors and self-cited — 24 (14,37 per cent) and e) self-cited only — 34 (20,36 per cent). 12 authors have been cited more than 20 times and 114 — 1—2 times only. The citation rates for the immunologists, biologists and obstetricians are quite higher than these ones for the histologists and biochemists. Citations of scientists from other scientific fields are rare exceptions only, which gives evidence for the unenviable state of interdisciplinary communications of Bulgarian immunologists working on the problems of reproduction.

In the spirit of the tradition of citation-appraisal, let us point out the most frequently cited Bulgarian scientists on the pages of IR: R. Popivanov (total 105 times; 37 — by Bulgarian authors, 17 — by foreign ones, and 51 — self-citations); K. Bratanov (89; 27, 40 and 22 respectively); V. Vulchanov (84; 26, 11 and 47); V. Dikov (58; 11, 26 and 21); T. Evrev (45; 16, 6 and 23); S. Zhivkov

(41; 13, 6 and 22); L. Nakov (32; 7, 6 and 19); A. Tornjov (32; 7, 4 and 21); Ju. Vasileva-Popova (26; 4, 2 and 20) and T. Ananiev (23; 11, 1 and 11). The following 5 Bulgarian journals are most frequently cited: C. R. Acad. Bulg. Sci. — 47 times; Akush. i ginekol. — 28; Veterinarnomed. nauki — 19; Izv. Inst. Phy-

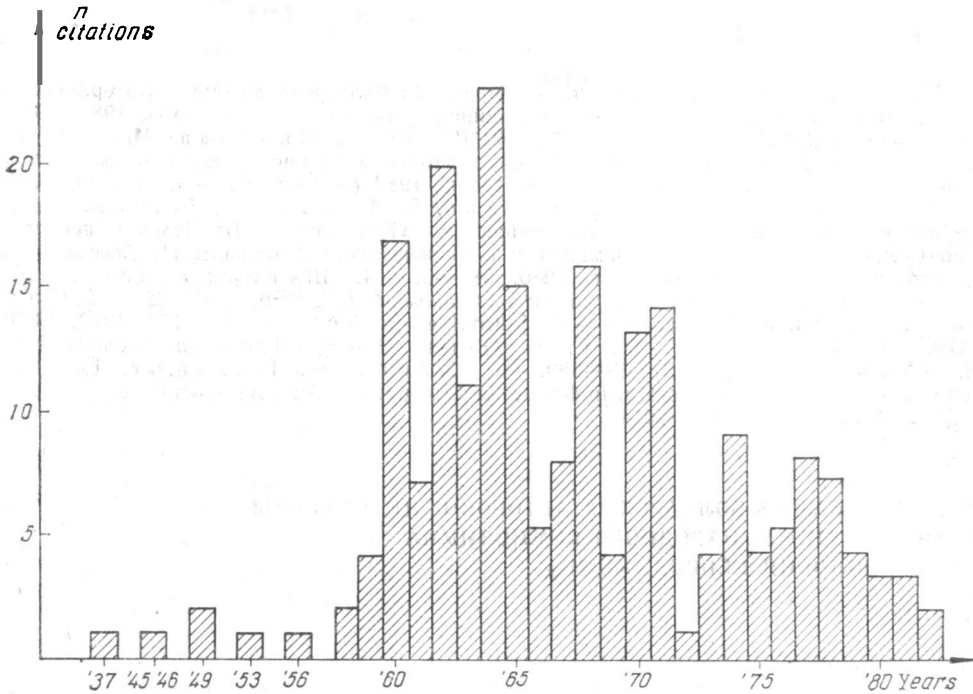


Fig. 1

siol. — 11, and Izv. NII BPRNB — 10 times. The Bulgarian—Russian book “Actual topics of cellular immunology and immunogenetics — Sofia, BAS, 1973” is the most frequently cited one — 8 times (in two symposia only).

Our present results show similar quantitative and qualitative bibliometric characteristics in comparison with another international symposium — “Verhandlungen der Anatomischen Gesellschaft” (69—73. Versammlung) (7). The average number of citations per article is 9,56; the self-citation rate is 17,67 per cent. The citations of the items of these proceedings in themselves are 44,26 per cent for the “Vern. Anat. Ges.” and 52,32 per cent for the IR of all proceedings’ citations. Our investigation establishes the growth of international authority of the Bulgarian authors and their publications from year to year. This fact is apparent from their increasing citation rates, from the publishing of papers by foreign authors in the profile Bulgarian journal “Biol. et Immunol. Reprod”, and from the increasing number of participants from different countries all over the world at this symposium. The foreign authors use more frequently their own or other results published in the IR in their investigations.

We conclude that the citation analysis of IR reflects partially some interesting peculiarities of the current exchange of scientific information between the

immunologists of reproduction from many other countries and Bulgaria. It could contribute to more intensive development of the scientific communications and help the fundamental and practical research on this actual field nowadays and in the future.

#### REFERENCES:

1. Иванова, М., Д. Томов. Цитирани на български автори и литература в пристатийната библиография на съветски медицински списания. Варна, ВМИ, 1980. 59 с. Депон, ръкопис в ЦИНТИ — София, № Нд 1821/1981 г. — 2. Иванова, М., Д. Томов, Ж. Годорова. Цитирани българов, докторов медицинских наук, в болгарских медицинских журналах и в Science Citation Index. 1982 (под печат). — 3. Киселев, А. К., Г. А. Кутин, В. И. Платоненко, В. П. Усачев. Некоторые аспекты разработки информационно-поисковой подсистемы «Конгресс». — В: Итоги и перспективы по научной медицинской информации и науковедению. Материалы II. Всесоюзного съезда историков медицины. Ташкент, 1980, 58—60. — 4. Шекерджийска, Й., Н. Матеев. Има ли значение цитирането? — *Социол. пробл.*, 1980, 4, 51—62. — 5. Gaffield, E. Citation analysis as a tool in journal evaluation. — *Science*, 178, 1972, 4060, 471—479. — 6. Gross, P. L. K., E. M. Gross. College libraries and chemical education. — *Science*, 66, 1927, 1713, 385—389. — 7. Nаnov, S., D. Tomov. Uber das Zitieren von Autoren und von Literatur in den Verhandlungen der Anatomischen Gesellschaft. — *Verh. Anat. Ges.*, 76, 1982, 613—614.

#### ЦИТАТА-АНАЛИЗ БЪЛГАРСКИХ АВТОРОВ И ЛИТЕРАТУРЫ В ТРУДАХ МЕЖДУНАРОДНОГО СИМПОЗИУМА «ИММУНОЛОГИЯ РЕПРОДУКЦИИ»

*Д. Томов*

#### РЕЗЮМЕ

Проведено наукометрическо исследование цитирования и самоцитирования публикаций болгарских авторов в трудах I—V Международных симпозиумов «Иммунология репродукции». Среднее число цитат на одну публикацию составляет 12,29. Самоцитирование болгарских авторов составляет 15,86 %. Болгарские публикации цитировались в 157 статьях, из которых 41 статья опубликована за границей. Указывается на наиболее цитированных болгарских авторов и на наиболее часто цитированные болгарские журналы. Обсуждается вопрос о значении цитаты-анализа конгрессных материалов для развития международных научных коммуникаций.