Journal Impact Factor and Self-Citations

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Despite criticism and withdrawal of some universities from using impact factor (IF) in hiring and promotion of staff, it still remains an accepted measure of scientific success at many academic and scientific institutions (Woolston 2021). Likewise, each year editors of scientific journals eagerly await the release of journals' IF by Journal Citation Report (JCR) which usually takes place in early summer (this year on June 30th).

It is well known that both scientists and journals' scientometric indices may be increased by self-citation (SC). Therefore, Scopus, Web of Science as well as JCR publish values of both total citations as well as values without SC. Obviously, journal SC may boost its IF (Fassoulaki et al. 2000; Yu and Li 2007). As pointed out by Yu and Li (2007), the smaller the total number of citations and IF, the closer the correlation between the IF and SC. Therefore, the effect of SC may be particularly relevant for journals with rather low IF, where high SC (especially for articles published in the last 2–3 years) may increase IF significantly. In addition, for SC of journals with high IF, a high number of total citations and a low number of SC have little influence on IF. However, for a journal with medium IF, a significant increase could be noted if the number of SC is high. The editors may, therefore, try to upgrade the position of their journals by suggesting to authors that they also include references to articles published in their journals. However, the authors have found no evidence of widespread deliberate manipulation to achieve that goal (Andrade et al. 2009). On the other hand, a number of journals have been accused of such unethical practices and some of them were temporarily withdrawn from coverage by JCR. In 2018, IF has been denied to 20 journals for excessive SC. Those journals represented different scientific fields including biology, law, engineering and medicine (Davis 2018).

The motivation and “psychology” of SC have already been discussed more than 20 years ago by Franck (1999). The author pointed out that success in science is rewarded mainly by attention, not money or curiosity (at least in the end of the last century). In the pursuit of this “attention income”, there are options for manipulation that can lead to the artificial augmentation of that income. This could be accomplished by the formation of “citation cartels”. The emergence and activities of those cartels have been described by Davis (2012). For example, a journal (A) scored almost a double increase in its IF during just 4 years. It turned out that in a review published in another journal (B), out of 490 references 445 were citations of articles published by journal A and all of them during 2 years from which the journal's IF was calculated. Incidentally, three of the four authors of that review were on the editorial board of journal A. While SC are very easy to identify, citation cartels are difficult to track and can do the most harm to scientometrics based on manipulated data.

Table 1 depicts the most recent data relevant for immunology journals (year 2020) derived from the JCR report. SC exceeded 10% in 14/81 journals (17%) and were exceptionally high (> 20%) in one case; how those SC contribute to the final IF can also be seen. Although the data included in the table constitute “a tip of an iceberg”, they also suggest that journal scientometrics in immunology appears to be rather immune to SC-related manipulation. Of note, SC of *Archivum Immunologiae et Therapiae Experimentalis* has been very low and stable for the last two decades (Krotkiewski et al. 2018). The most recent data confirm this situation.

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Table 1 Scientometric analysis of immunology journals

L.p	Journal	IF	IF without autocitations	Autocitations (%)
1	Arch Immunol Ther Exp	4.291	4.266	0.6
2	Adv Immunol	3.543	3.457	2.4
3	Allergy Asthma Immunol. Res	5.764	5.087	11.7*
4	Am J Reproductive Immunol	3.886	3.594	7.5
5	Ann Allergy Asthma Immunol	6.347	5.631	11.3*
6	Annu Rev Immunol	28.527	28.418	0.4
7	Autoimmun Rev	9.754	8.557	12.3*
8	Autoimmunity	2.815	2.519	10.5*
9	Biol Blood Marrow Transplant	5.742	5.041	12.2*
10	BMC Immunol	3.615	3.604	0.3
11	Bone-Marrow Transplant	5.483	4.761	13.2*
12	Brain Behav Immun	7.217	6.697	7.2
13	Cancer Immunol Immunother	6.968	6.742	3.2
14	Cell Immunology	4.868	4.773	1.9
15	Cell Mol Immunol	11.530	10.629	3.8
16	Clin Exp Allergy	5.018	4.389	12.5*
17	Clin Exp Immunol	4.330	4.273	1.3
18	Clin Infect Dis	9.079	8.465	6.8
19	Clin Immunol	3.969	3.846	3.1
20	Clin Rev Allergy Immunol	8.667	8.268	4.6
21	Clin Transl Immunol	6.161	5.839	5.2
22	Curr Opin HIV AIDS	4.283	4.188	2.2
23	Curr Topics Microbiol Immunol	4.291	4.262	0.7
24	Curr Opin Immunol	7.486	7.443	0.6
25	Cytokine	3.861	3.757	2.7
26	Dev Comp Immunol	3.636	3.141	13.6*
27	Eur J Immunol	5.532	5.027	9.1
28	Expert Rev Clin Immunol	4.473	4.348	2.8
29	Front Immunol	7.561	6.894	8.8
30	Front Cell Infect Microbiol	5.293	5.097	3.7
31	Genes Immunity	2.676	2.632	1.6
32	Human Immunol	2.850	2.600	8.8
33	Human Vaccines Immunother	3.452	2.992	12.3*
34	Immunity	31.745	31.033	2.2
35	Immun Ageing	6.400	6.117	4.4
36	Immunobiology	3.144	3.080	2.0
37	Immunogenetics	2.846	2.590	9.0
38	Immunol Allergy Clinics N Am	3.479	3.404	2.1
39	Immunol Cell Biol	5.126	4.928	3.9
40	Immunol Invest	3.657	2.649	27.6*
41	Immunol Lett	3.685	3.613	1.9
42	Immunologic Res	2.829	2.771	2.0
43	Immunol Rev	12.988	12.826	1.3
44	Immunology	7.397	7.238	2.1
45	Immunotherapy	4.196	4.053	3.4
46	Infect Immunity	3.441	3.240	5.8
47	Inflammation Res	4.575	4.538	0.8
48	Inflammation	4.092	3.922	4.2
49	Inflammopharmacology	4.473	4.324	3.3
50	Innate Immunity	2.680	2.629	1.9

Table 1 (continued)

L.p	Journal	IF	IF without autocitations	Autocitations (%)
51	Int Arch Allergy Immunol	2.749	2.656	3.4
52	Int Immunopharmacol	4.932	4.650	5.7
53	Int J Immunopathol Pharmacol	3.219	3.172	1.5
54	Int Rev Immunol	5.311	5.178	2.5
55	J Autoimmun	7.094	6.925	2.4
56	J Clin Immunol	8.317	7.230	13*
57	J Exp Med	14.307	14.082	1.6
58	J Immunol Methods	2.303	2.243	2.6
59	J Immunol Res	4.818	4.754	1.3
60	J Immunology	5.422	5.269	2.8
61	J Immunotherapy	4.456	4.437	0.4
62	J Infect Dis	5.226	4.983	4.6
63	J. Innate Immun	7.349	6.578	10.5*
64	J Interferon Cytokine Res	2.607	2.543	2.5
65	J Invest Allergol Clin Immunol	4.333	3.929	9.3
66	J Leukocyte Biol	4.962	4.784	3.6
67	J Microbiol Immunol Infection	4.399	3.821	13.1*
68	J Neuroimmunology	3.478	3.294	5.3
69	J Reproductive Immunol	4.054	3.849	5.0
70	J Innate Immun	7.349	6.578	10.5*
71	J Neuroinflamm	8.322	7.957	4.4
72	Med Microbiol Immunol	3.402	3.382	0.6
73	Mol Immunology	4.407	4.332	1.7
74	Nat Immunol	25.606	25.130	1.9
75	Nat Rev Immunol	53.106	52.731	0.7
76	Scand J Immunol	3.487	3.266	6.4
77	Sci Immunol	17.727	17.448	1.6
78	Semin Immunol	11.130	11.070	0.5
79	Trends Immunol	16.687	16.578	0.7
80	Vaccines	4.422	3.610	18.4*
81	Viral Immunol	2.257	2.150	4.7

Asterisks indicate journals with autocitations above 10.0%

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