



Publication Analysis 2000-2006

Immunology

England is Europe's number one for overall citations, whereas Switzerland collected the most citations per article. The most frequently cited paper comes from Paris, practically just around the corner from Europe's most cited immunologist.

The new millennium commenced with a shock for Europe's immunology community. On 5 June 2000 pharma giant Hoffmann-La Roche announced it would close down its world-famous Basel Institute of Immunology (BII). For more than 30 years Roche had been supporting the institute's self-directed programme of basic immunology research and had thereby helped create what many today remember as a "mecca for immunology" and as an "ideal of a basic research institute".

Many great discoveries in immunology were achieved at the BII, not least documented by the institute's three Nobel awards. Likewise, it became the breeding ground for numerous young scientists most of whom cover leading positions in immunological research today. "There are metastases from the institute all over the world," *Science* quoted former BII member Klaus Karjalainen.

On that particular day in June, Roche announced that it would be converting the institute into a centre for genomics research. However, that was only half the truth. At the same time Roche took direct control over the institute, thus putting an end to its unique example of research culture aiming to provide the greatest possible independence for the individual scientist.

How did Europe's immunology research recover from that "shock"? Our analysis shows that, at least in terms of publication and citation numbers, the European performance in immunology has maintained its high level throughout the years 2000-2006.

A shock for Europe's immunology community

Even Switzerland has not yet experienced a major reduction since, apparently, the legacy of the BII is still visible to this day. This might, in part, be due to the fact that several papers still appeared denoting BII as the corresponding address until long after its closure. Another possibly more significant factor, however, is the relatively high number of BII alumni who, over the years, have continued with their projects at various other institutes in Switzerland, thereby creating a sustainable impact on Swiss immunology, in general.

Whatever the deeper reasons might be, the fact remains that articles, which appeared in immunology journals between 2000

and 2006 with at least one author from Switzerland, were cited most frequently on average when compared to all the other research nations (see "blue" table, p33).

As already indicated, however, this analysis is only restricted to the performance in the 117 specialist journals listed under the category "immunology" in Thomson Scientific's citation database "Web of Science". Regrettably, we had to exclude multidisciplinary journals such as *Nature* and *Science* because "Web of Science" provides no tools to exclusively extract the immunology articles from them with sufficient reliability. Indeed, the most prominent papers in the field could thus have been omitted from this part of the analysis. However, we believe that the countries' performances in the expert immunology journals suffice to provide valid indicators for their overall productivity in immunology research between 2000 and 2006.

The phalanx of apoptosis researchers

Applying this approach, England emerged as Europe's number one immunology country. Researchers from English institutes (co-)signed the most articles in immunology journals between 2000 and 2006 and these articles also collected the most citations overall. Their colleagues from Germany, however, followed closely on their heels, whereas the gaps to and between the following three – France, Italy and the Netherlands – were considerably larger.

As already mentioned, small Switzerland attained an extraordinary sixth place among the European countries – well-earned due to the excellent average ratio of 16.8 citations per article. Another "small" country was able to impress in a similar manner by its surprisingly high average citation ratio; Ireland (14.2) came in second worldwide leaving even the "big" USA (13.5; see "yellow" table, p33) behind in third place. France (12.7) and Scotland (12.5) followed in fourth and fifth places respectively.

More surprises? Perhaps Spain, which performed considerably weaker when compared to other biomedical disciplines. Indeed, authors from Spanish institutes were the fifth most frequently mentioned in the immunology journals; however, their

articles were only cited 7.3 times on average pushing them down to eighth place in terms of overall citations.

Altogether, researchers from Europe (co-)authored almost 10% more articles in the immunology journals than their colleagues from the USA. These, however, in turn collected almost 22% more citations than the “European” papers.

And Japan? Between 2000 and 2006 Japanese authors had slightly more articles in the immunology journals than their German counterparts. In terms of citations, however, Japan actually slipped a notch and, if integrated, would finally land at third place in the European chart, just ahead of France.

Let's now turn to the second part of our analysis, individual papers and names (p34). For this part, of course, we were no longer restricted to the “immunology journals” but could take into account publications in any journal – as long as the research in the paper was of immunological relevance, or the respective scientist was doing research in immunology.

This last point, however, wasn't easy to judge in some cases. The reason being that today, research “with more or less immunological relevance” is being performed under the umbrella of a whole bunch of other disciplines, for example microbiology, virol-

... and the world			
	Citations	Articles	Cit./Art.
Europe	728,374	71,890	10.13
USA	887,863	65,542	13.46
Japan	148,894	12,736	11.69
Canada	77,088	6,512	11.84
Australia	65,772	5,464	12.04
China	13,523	2,640	5.12

ogy or cell biology on the basic research side, or allergy, infectiology, rheumatology or dermatology on the clinical side.

So, for example, the most-cited European immunology paper published between 2000 and 2006 came from the clinical group around Alain Fischer at the Necker Hospital for Sick Children in Paris. It was one in a series of papers by the French team describing gene therapy trials of human immunodeficiency diseases. Another one of these made it to fifth place among the most-cited articles and Alain Fischer himself finally climbed to the same rank among the most-cited European immunology researchers.

Fischer was topped by three researchers all of whom are studying (at least in part) apoptosis: Jürg Tschopp from Lausanne (4th), Josef Penninger from Vienna (3rd) and Guido Kroemer from the Institut Gustave Roussy near Paris, whose publications during the years 2000-2006 collected the most citations of all European immunology researchers by far. (Peter Krammer from Heidelberg, another apoptosis expert, followed in 9th place.)

Kroemer and Penninger met one another at the University of Innsbruck. In 1999 they published the identification of the Apoptosis Inducing Factor (AIF) together, a paper cited more than 1,500 times so far. Only recently they were among the winners of the Descartes prize awarded by the European Commission for their European network project APOPTOSIS.

Many more hot topics

Hermann Wagner from the Technical University of Munich was the only person able to force his way between Kroemer and Penninger into second place. The main subject of his team was the Toll like receptor (TLR) family of innate immune cells and its role in pathogen sensing.

Apart from apoptosis, the innate immune system and gene therapy of immunodeficiency diseases, some further “hot” topics can be inferred from the Top 30 cited researchers of European immunology. Take, for example, T cell development which is represented by the former BII researchers Antonio Lanzavecchia (6th) and Federica Sallusto (11th), now in Bellinzona/Switzerland. Others are HIV immunology (Andrew McMichael, 8th; Sarah Rowland-Jones, 22nd), dendritic cells (Yvette van Kooyk, 12th; Gerold Schuler, 13th), natural killer cells (the Moretta brothers Alessandro, 14th, and Lorenzo, 17th), chemokines and their receptors (Alberto Mantovani, 7th) or autoimmune diseases (Jochen Kalden, 23th, or Yehuda Shoenfeld, 26th).

The best citation-per-article ratio, by the way, was achieved by a woman; Federico Sallusto's 49 papers from 2000-2006 were cited almost 95 times on average.

RALF NEUMANN

Europe...

Country	Citations	Articles	Cit./Art.
1. England	161,811	13,140	12.31
2. Germany	153,030	12,537	12.21
3. France	118,571	9,373	12.65
4. Italy	82,625	8,615	9.59
5. Netherlands	65,816	5,313	12.39
6. Switzerland	64,131	3,849	16.80
7. Sweden	46,249	4,395	10.52
8. Spain	41,703	5,711	7.30
9. Belgium	29,199	2,421	12.06
10. Denmark	24,013	2,132	11.26
11. Scotland	22,413	1,787	12.54
12. Israel	22,133	2,139	10.35
13. Austria	21,498	1,917	11.21
14. Finland	18,124	1,571	11.54
15. Norway	13,917	1,302	10.69
16. Ireland	8,738	616	14.19
17. Poland	7,772	1,800	4.32
18. Greece	5,881	792	7.43
19. Czech Rep.	4,806	771	6.23
20. Hungary	4,756	742	6.41

Articles which appeared between 2000 and 2006 in immunology journals as listed by Thomson Scientific. Their citation numbers were recorded up until July 2007. A country's figures are derived from articles where at least one author working in the respective European nation is included in the author's list. Israel is included because it is a member of many European research organisations (EMBO, FEBS etc.), as well as participating in the EU Research Framework Programmes.



Publication Analysis 2000-2006 – Immunology

Most Cited Authors...

	Citations	Articles
1. Guido Kroemer , Inst. Gustave Roussy, CNRS, Villejuif	11,598	220
2. Hermann Wagner , Microbiol. & Immunol. Tech. Univ. Munich	7,735	126
3. Josef Penninger , Austrian Acad. Sci., Inst. Mol. Biotechnol. Vienna	7,333	186
4. Jürg Tschopp , Biochem Univ Lausanne	6,894	126
5. Alain Fischer , Ped. Immunol.- Hematol. Univ. Paris Hosp. Necker	6,739	239
6. Antonio Lanzavecchia , Inst. Biomed. Res. Bellinzona	6,139	76
7. Alberto Mantovani , Immunol. & Cell. Biol. Mario Negri Inst. Milan	5,815	233
8. Andrew J. McMichael , J. Radcliffe Hosp., MRC, Oxford	5,484	148
9. Peter H. Krammer , Tumor Immunol. Ger. Canc. Res. Ctr. Heidelberg	5,394	173
10. Stephen T. Holgate , Infect. & Inflamm. Southampton Gen. Hosp.	5,326	266
11. Federica Sallusto , Inst. Biomed. Res. Bellinzona	4,628	49
12. Yvette van Kooyk , Tumor Immunol. Univ. Nijmegen	4,621	106
13. Gerold Schuler , Dermatol. Univ. Hosp. Erlangen Nuremberg	4,555	145
14. Alessandro Moretta , Expt. Med. Univ. Genoa	4,453	136
15. Francoise Le Deist , Ped. Immunol.- Hematol. Univ. Paris Hosp. Necker	4,384	108
16. Jean-L. Casanova , Hum. Genet. & Infect. Dis. Univ. Paris Hosp. Necker	4,180	186
17. Lorenzo Moretta , Inst. Giannina Gaslini Genoa	4,056	126
18. Giorgio Trinchieri , Schering Plough Res Inst Dardilly	4,034	72
19. Jean Bousquet , Immunopathol. Inflamm., INSERM, Montpellier	3,940	227
20. Rino Rappuoli , Novartis Vaccines Siena	3,914	178
21. Siamon Gordon , Sir William Dunn Sch Pathol Univ Oxford	3,902	160
22. Sarah Rowland-Jones , J. Radcliffe Hosp., MRC, Oxford	3,891	95
23. Jochen R. Kalder , Clin. Immunol. Univ. Hosp. Erlangen Nuremberg	3,846	293
24. Carl G. Figdor , Tumor. Immunol. Univ. Nijmegen	3,784	102
25. Carsten J. Kirschning , Microbiol. & Immunol. Tech. Univ. Munich	3,751	67
26. Yehuda Shoenfeld , Chaim Sheba Med. Ctr. Tel Hashomer	3,633	446
27. Adrian V.S. Hill , Wellcome Trust Ctr. Hum. Gen. Oxford	3,534	159
28. Naoufal Zamzani , Inst. Gustave Roussy, CNRS, Villejuif	3,490	35
29. Marc Feldmann , Rheumatol. Imperial Coll. Univ. London	3,483	102
30. Philippe J. Sansonetti , Pathogen. Microb. Unit Inst. Pasteur Paris	3,403	113



Guido Kroemer (1.)



Hermann Wagner (2.)



Josef Penninger (3.)



Jürg Tschopp (4.)



Andrew McMichael (8.)



Federica Sallusto (11.)



Yvette van Kooyk (12.)



Y. Shoenfeld (26.)

Citations of articles published between 2000-2006 were recorded until July 2007. The "most cited papers" had corresponding addresses in Europe or Israel.

... and Papers

	Citations
1. Cavazzana-Calvo M, Hacein-Bey S, Basile, CD, Gross F, Yvon E, Nusbaum P, Selz F, Hue C, Certain S, Casanova JL, Bousso P, Le Deist F, Fischer A Gene therapy of human severe combined immunodeficiency (SCID)-X1 disease. <i>SCIENCE</i> , 288 (5466): 669-72 APR 28 2000	814
2. Read S, Malmstrom V, Powrie F Cytotoxic T lymphocyte-associated antigen 4 plays an essential role in the function of CD25(+)CD4(+) regulatory cells that control intestinal inflammation. <i>JOURNAL OF EXPERIMENTAL MEDICINE</i> , 192 (2): 295-302 JUL 17 2000	813
3. Jonuleit H, Schmitt E, Schuler G, Knop J, Enk AH Induction of interleukin 10-producing, nonproliferating CD4(+) T cells with regulatory properties by repetitive stimulation with allogeneic immature human dendritic cells. <i>JOURNAL OF EXPERIMENTAL MEDICINE</i> , 192 (9): 1213-22 NOV 6 2000	677
4. Geijtenbeek TBH, Kwon DS, Torensma R, van Vliet SJ, van Duijnhoven GCF, Middel J, Cornelissen ILMHA, Nottet HSLM, KewalRamani VN, Littman DR, Figdor CG, van Kooyk Y DC-SIGN, a dendritic cell-specific HIV-1-binding protein that enhances trans-infection of T cells. <i>CELL</i> 100 (5): 587-97 MAR 3 2000	671
5. Hacein-Bey-Abina S, Von Kalle C, Schmidt M, [...], Le Deist F, Fischer A, Cavazzana-Calvo M LMO2-associated clonal T cell proliferation in two patients after gene therapy for SCID-X1. <i>SCIENCE</i> , 302 (5644): 415-419 OCT 17 2003	586