



Publication Analysis 1997-2008

# Rheumatology

European rheumatology research has recently performed very strongly, particularly when compared to the US. England contributed the most publications and citations to this “success”. The true European leader, however, is the Netherlands.

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“**R**heuma” as a medical term is more than 2,300 years old. The Greek physician Hippocrates actually introduced it when, in the fourth century B.C., he developed his medical theory called humoralism, which held that four humors (*liquids*) coursing through the human body determined one’s temperament and state of health. In this context, he used the term “rheuma”, which literally means “flowing”, to describe an excess of the watery humor thought to flow down from the brain. Since then the words “rheuma” and “catarrhos” (*flowing down*) were used interchangeably by ancient Greeks to describe a variety of illnesses, including joint problems. It wasn’t until 1642 that the term rheumatism was used by the French physician Bal-lonius, who sought to distinguish noxious humors that affected joints from those that caused catarrh (hay fever, head colds, sinusitis and the like).

What followed was a century-long and, at times, often confusing struggle to classify “the painful disorders affecting joints, muscles, connective tissues and soft tissues around the joints and bones” into all the subfields that constitute rheumatology, as we know it today. Examples are: gout and pseudogout, rheumatoid arthritis, rheumatic fever, osteoarthritis, ankylosing spondylitis, fibromyalgia, rheumatoid vasculitis, scleroderma ... “Rheumatoid arthritis”, for example, remained a controversial term until in the early 1940s, when the American Rheumatism Association finally adopted the name. Similarly, it wasn’t until 1963 that the Association agreed to officially use the term “ankylosing spondylitis”. And “fibromyalgia syndrome” even had to wait until 1990.

## Terminology chaos

One major cause for this long-lasting terminology chaos might be that, in the meantime, almost 400 distinct types of disorders and syndromes are ranked under “rheumatology”. And this, in turn, might also be at the root of a problem that, as the Harvard Special Health Report recently summarised, “For a disease that affects nearly one in five adults in their life time — it is remarkably misunderstood.”

This presumed “low level of understanding”, on the other hand, has apparently been the motor, which, in the recent two or three decades, has driven rheumatology to become a disproportionately fast-growing field among the medical research disciplines. The most obvious “symptoms” for this fact: more funding, more research centres explicitly devoted to rheumatology, more scientists studying rheumatology, more publications, higher citation rates, etc...

Which finally brings us to our analysis of European rheumatology publications that appeared between 1997 and 2008. As for other biomedical disciplines we have analysed to-date, we also had to restrict the analysis of the European countries’ publication performances in rheumatology research to the specialist journals listed in the subject category “Rheumatology” of Thomson Reuter’s database *Web of Science*, used for this analysis. Of course, a number of “top papers” in the field are instead published in multidisciplinary science journals like *Nature*, *Science* or *The Lancet*. Since, however, *Web of Science* doesn’t provide any tools to automatically extract relevant rheumatology articles with sufficient reliability, we weren’t able to include the articles from these journals in the performance analysis of individual countries (see tables p. 53).

## If only there wasn’t Australia...

Subsequently, some of the most prominent papers in the field were not included in this part of the analysis. Despite this limitation, however, we believe that a survey, restricted to the specialist journals only, nevertheless provides sufficiently valid indicators for the countries’ overall productivity in rheumatology research. On the contrary, rankings of the most-cited researchers and papers (see tables p. 54) could be analysed from publications in all journals.

Now for the results. “European rheumatology champion” — as in the vast majority of biomedical research disciplines — is England. More than 10,000 articles that appeared between 1997 and 2008 in the rheumatology expert journals listed at least one

co-author working at an English research facility. That's close to one-third more articles than the runner-up, Germany with almost 6,900 articles, and more than twice as many as France and the Netherlands in places 3 and 4.

Therefore, it's just a matter of course, that due to its overwhelming article quantity, England also collected by far the highest number of overall citations: more than 107,000. Nevertheless, the Netherlands are the real surprise of this analysis. With "only" 4,900 articles in the expert journals, the Dutch obtained more than 66,500 overall citations to-date. That's even 150 more than Germany, despite having published 2,000 articles less than their German colleagues.

As a logical consequence thereof, the Netherlands, together with Sweden, achieved the highest citations-per-article ratio of all European countries that had published more than 1,000 papers between 1997 and 2008. Articles with at least one co-author from the Netherlands obtained 13.8 citations on average (as did the articles with Swedish co-authorship). Next places on this list of average citation values were gained by Finland (13.2) and — another surprise — Austria (12.8).

When comparing those values to the research nations outside Europe, however, Australia's rheumatology even topped the Netherlands and Sweden by one-tenth of a citation — 13.9 citations per article on average. Apart from that, the whole of Europe published double the number of articles between 1997 and 2008 in the expert journals compared to their US counterpart. At the same time, the European articles achieved 65% more overall citations than the US papers. An extent of European predominance that has not been seen in any other of the 25 biomedical disciplines analysed by *Lab Times* so far.

### Even world leaders

Regarding the most-cited European papers that appeared between 1997 and 2008, two trends become immediately clear: apparently, you can currently gather the most citations in rheumatology research if (1) you are part of big multicentre studies (tab. p 54, places 1 and 2), or (2) if you present insights into the autoimmune and inflammatory aspects of rheumatic diseases (places 3-5).

The latter topic in broad terms also describes the research focus of the top trio of the most-cited European rheumatology researchers: Paul Emery (Leeds), Ferdinand Breedveld (Leiden and Josef Smolen (Vienna). Interestingly, exactly this trio (in that order) even emerged as the world's most-cited rheumatology researchers when, in November 2008, Thomson Reuters itself presented a citation analyses of rheumatology papers published between January 1998 and June 2008.

When analysing individual institutions, Thomson Reuters found Leiden University as the second most-cited rheumatology research location worldwide, only topped by Harvard University. From Europe, the Universities of Leeds, Nijmegen and Manchester followed in places 6, 13 and 20, respectively.

This English-Dutch citation dominance also finds its correspondence in our top 30 list of most-cited rheumatology researchers. Nine of them worked in England (five from London), eight in the Netherlands (four from Leiden) — followed by four from Germany and two from France.

Therefore, as an overall conclusion and closing remark, the Netherlands, given its size and capacity, have to be regarded as the true leaders in European rheumatology research.

RALF NEUMANN

## Europe...

Country	Citations	Articles	Cit./Art.
1. England	107,654	10,147	10.6
2. Netherlands	67,576	4,895	13.8
3. Germany	66,052	6,893	9.6
4. France	52,426	4,931	10.6
5. Italy	41,340	4,157	9.9
6. Sweden	30,734	2,230	13.8
7. Spain	26,503	2,917	9.1
8. Switzerland	21,800	1,759	12.4
9. Belgium	19,524	1,483	13.2
10. Austria	15,405	1,200	12.8
11. Finland	14,866	1,130	13.2
12. Israel	14,355	1,175	12.2
13. Denmark	13,100	1,022	12.8
14. Turkey	12,129	2,036	6.0
15. Greece	10,993	979	11.2
16. Norway	10,196	1,019	10.0
17. Scotland	9,028	800	11.3
18. Ireland	8,104	730	11.1
19. Czech Rep.	4,789	331	14.5
20. Hungary	4,765	468	10.2

Articles appearing between 1997 and 2008 in 'Rheumatology' journals as listed by Thomson Reuter's *Web of Science*. The citation numbers are accurate as of July 2010. 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 and programmes (EMBO, FP7 of the EU...).

## ... and the World

	Citations	Articles	Cit./Art.
Europe	398,537	44,139	9.0
USA	241,663	22,245	10.9
Canada	52,635	5,256	10.0
Japan	36,714	3,980	9.2
Australia	22,687	1,630	13.9
South Korea	6,440	1,023	6.3
China	5,643	646	8.7



## Publication Analysis 1997-2008 – Rheumatology

### Most Cited Authors...

	Cit-ations	Art-icles
1. <b>Paul Emery</b> , Acad. Unit. Musculoskeletal Dis. Univ. Leeds	16,952	320
2. <b>Ferdinand C. Breedveld</b> , Rheumatol. Med. Ctr. Univ. Leiden	16,230	298
3. <b>Josef S. Smolen</b> , Rheumatol. Med. Univ. Vienna	14,970	304
4. <b>Alan J. Silman</b> , Arthritis Res. Epidemiol. Unit Univ. Manchester	14,265	285
5. <b>Cyrus Cooper</b> , MRC Epidemiol. Ctr. Univ. Southampton Gen. Hosp.	12,953	342
6. <b>Joachim R. Kalden</b> , Dep. Med. Univ. Hosp. Erlangen-Nuremberg	12,527	259
7. <b>Yehuda Shoenfeld</b> , Chaim Sheba Med. Ctr. Tel Hashomer/ISR	12,359	524
8. <b>Maxime Dougados</b> , Rheumatol. Cochin Hosp. Univ. Paris	11,300	296
9. <b>Jean-Charles Piette</b> , Internal Med. Pitié-Salpêtrière Hosp. Paris	10,828	385
10. <b>Marc Feldmann</b> , Rheumatol. Imperial Coll. Sch. Med. London	10,577	151
11. <b>Ravinder N. Maini</b> , Rheumatol. Imperial Coll. Sch. Med. London	9,172	81
12. <b>Désirée van der Heijde</b> , Rheumatol. Leiden Univ. Med. Ctr.	8,742	214
13. <b>Lars Klareskog</b> , Rheumatol. Unit Karolinska Univ. Hosp. Stockholm	8,604	174
14. <b>Jürgen Braun</b> , Rheumazentrum Ruhrgebiet Herne/GER	8,322	245
15. <b>David A. Isenberg</b> , Ctr. Rheumatol. Univ. Coll. London	8,239	274
16. <b>Tom W.J. Huizinga</b> , Rheumatol. Leiden Univ. Med. Ctr.	7,896	224
17. <b>Gerd-R. Burmester</b> , Rheumatol. Charité Med. Univ. Berlin	7,852	236
18. <b>Munther A. Khamashta</b> , Lupus Unit St. Thomas Hosp. London	7,682	210
19. <b>Johannes W.J. Bijlsma</b> , Rheumatol. & Clin. Immunol. Univ. Utrecht	7,572	231
20. <b>Wim B. van den Berg</b> , Rheumatol. Univ. Nijmegen Hosp.	7,457	192
21. <b>Jochen Sieper</b> , Rheumatol. Charité Med. Univ. Berlin	7,441	214
22. <b>George Kollias</b> , Immunol. BSRC Alexander Fleming Vari, GRE	7,395	104
23. <b>René E.M. Toes</b> , Rheumatol. Leiden Univ. Med. Ctr.	7,373	123
24. <b>Foo Yew Liew</b> , Immunol. Infect. & Inflamm., Univ. Glasgow	7,266	119
25. <b>Deborah P.M. Symmons</b> , Arthritis Epidemiol. Unit Univ. Manchester	7,003	134
26. <b>Paul Peter Tak</b> , Rheumatol. Acad. Med. Ctr. Univ. Amsterdam	6,772	188
27. <b>Graham R.V. Hughes</b> , Lupus Unit St. Thomas Hosp. London	6,479	166
28. <b>Walther J. van Venrooij</b> , Biomol. Chem. Radboud Univ. Nijmegen	6,422	117
29. <b>Tore K. Kvien</b> , Rheumatol. Diakonhjemmet Hosp. Oslo Univ.	6,284	145
30. <b>Steffen Gay</b> , Ctr. Expt. Rheumatol. Univ. Zurich Hosp.	6,190	207



Citations of articles published between 1997 and 2008 were recorded up until Sept. 2010 using the *Web of Science* database from Thomson Reuters. The "most cited papers" had correspondence addresses in Europe or Israel.

### ... and Papers

	Citations
1. <b>Wellcome Trust Case Control Consortium (Burton, PR; Clayton, DG; [...] Worthington J)</b> Genome-wide association study of 14,000 cases of seven common diseases and 3,000 shared controls. <i>NATURE</i> , 447 (7145): 661-678 JUN 7 2007	2,117
2. <b>ATTRACT Study Grp. (Maini R; St Clair EW; [...] Feldmann M; Lipsky P)</b> Infliximab (chimeric anti-tumour necrosis factor alpha monoclonal antibody) versus placebo in rheumatoid arthritis patients receiving concomitant methotrexate: a randomised phase III trial. <i>LANCET</i> , 354 (9194): 1932-1939 DEC 4 1999	1,213
3. <b>Veldhoen, M; Hocking, RJ; Atkins, CJ; Locksley, RM; Stockinger, B</b> TGF beta in the context of an inflammatory cytokine milieu supports <i>de novo</i> differentiation of IL-17-producing T cells. <i>IMMUNITY</i> , 24 (2): 179-189 FEB 2006	1,010
4. <b>Fishman, D; Faulds, G; Jeffery, R; Mohamed-Ali, V; Yudkin, JS; Humphries, S; Woo, P</b> The effect of novel polymorphisms in the interleukin-6 (IL-6) gene on IL-6 transcription and plasma IL-6 levels, and an association with systemic-onset juvenile chronic arthritis. <i>JOURNAL OF CLINICAL INVESTIGATION</i> , 102 (7): 1369-1376 OCT 1 1998	956
5. <b>Maini, RN; Breedveld, FC; Kalden, JR; Smolen, JS; [...]; Woody, JN; Schaible, TF; Feldmann, M</b> Therapeutic efficacy of multiple intravenous infusions of anti-tumor necrosis factor alpha monoclonal antibody combined with low-dose weekly methotrexate in rheumatoid arthritis. <i>ARTHRITIS AND RHEUMATISM</i> , 41 (9): 1552-1563 SEP 1998	805