Publication Analysis 2007-2013

Trypanosome in hepatic vessel of mouse

Photo: G. Vanwalleghem, D. Monteyne and D. Pérez-Morga, CMMI, Laboratory of Molecular Parasitology, Université Libre de Bruxelles, Belgium

Parasitology

England stands head and shoulders above the rest of Europe, dominating both the nations' as well as the most-cited authors' ranking. Unsurprisingly, the hottest topic is malaria.

There must be something about the parasitic way of life. Not wasting a single thought on acquiring food and solely focussing on the important thing in life – reproduction – must, somehow, be very attractive. In return, giving up independence is apparently a price parasites are willing to pay. Hence, quite a number of creatures from all branches of the tree of life have opted for it – there are parasitic plants, fungi, worms, crustaceans, protozoa, bacteria – you name it.

As always, there are individuals with more or less harmless intentions – for instance, the tongue-eating louse, *Cymothoa exigua*, replaces a fish's tongue, without the fish noticing any difference. But there are also those with more sinister plans. They take control over their host and its behaviour. *Toxoplasma gondii*, an intracellular protozoan, is one such critter. Infected rodents lose their natural fear of cats – you can imagine the rest. But what happens in the brains of these mice? Researchers from the Indiana University School of Medicine studied the acetylome of *T. gondii*-infected cortical astrocytes, glial cells that make up the blood-brain barrier, and found that the level of acetylation was changed in a number of proteins (*PLoS ONE*, 10(3): e0117966). "We don't know the impacts of these changes yet, but these discoveries could be particularly significant in understanding how the parasites persist in the brain and how this 'rewiring' could affect behaviour in both rodents and humans," lead author William Sullivan stated in a press release.

All these are fascinating stories and we haven't even mentioned the parasites that turn their hosts into zombies. But apparently, to make it big in Parasitology and secure a spot in the *Lab Times* 'list of honour', studying malaria and its associated protozoan parasite, *Plasmodium* spp., seems to be a big advantage.

Former colonial powers perform strongly

Before we get started with the nations ranking, a few more words about the procedure. As mentioned before, we use Thomson Reuters' *Web of Science* database for our publication analysis and the numbers for the nations' ranking is based on so-called "expert journals", as it's impossible to retrieve parasitologically-themed papers from multi-disciplinary journals, like *Nature* or *Science*. The expert journals, filed under "Parasitology" by Web of Science, include titles such as *Trends in Parasitology*, *PLoS Neglected Tropical Diseases* and *Ticks and Tick-Borne Diseases*. For our top 30 most-cited authors, however, all journals and papers were permitted, no matter where they had been published. For simplicity and to avoid overlapping, we decided to leave out all virus researchers from our publication analysis. Virus researchers are referred to the virus research ranking, which we last did in 2012 (*LT* 7-2012).

So, what papers, from which nation gathered the most citations? This time, the answer is pretty clear. With more than 60,000 citations and 3,800 papers, the number one spot is firmly in English hands. Runner-up, France, and Germany, in third place, can't even remotely keep up. Parasites, especially the malaria parasite, prefer tropical climates and hence, it's hardly surprising that former colonial powers like England and France perform strongly in this publication analysis. Some old connections must still exist. Nordic countries, in contrast, play only a minor role. Sweden (10th) is the North's best, while Finland (22nd) didn't even make it into the top 20 this time. Portugal (13th), also a former colonial power, did remarkably well, as did the Czech Republic (12th). When it comes to citations-per-article, no nation stands out that clearly. The best here are The Netherlands, Switzerland and Ireland.

Brazil: breeding ground for top parasitology research

Worldwide, European parasitologists published more articles, gathering more citations, than their US peers. But the citation-per-article ratio, once again, argues for the colleagues from across the pond (13.3 vs 16.0). In third spot is not one of the usual suspects like Australia or China but Brazil. The Amazon rainforest is well-known for its biodiversity, this, of course, also applies to parasites: *Plasmodium*, *Leishmania*, *Schistosoma*, *Trichuris*, they are all there, waiting for a new victim. By the way, the most common parasitic infection in the area is soil-transmitted helminthiasis (234 million cases in 2002) and Chagas disease (8 to 9 million cases between 2002 and 2007) (*PLoS Negl Trop Dis*, 2(9): e300).

Let's move on to the top 5 papers in Parasitology research. For this top list, we had to exclude quite a number of articles co-authored by European parasitologists. Their reprint address was either in the USA or in tropical countries like Thailand, Kenya or Malaysia. Inconsistent with our earlier statement, malaria is the topic of only one top paper (4th place). And it's not even the principal topic of the article that deals with a genetic variant that protects against pneumococcal disease, bacteremia, malaria and tuberculosis. Other highly-cited research includes genomic analysis of the blood fluke, *Schistosoma mansoni*, and the three protozoan

Leishmania species, *L. infantum*, *L. braziliensis* and *L. major*. The top five is completed by two studies, describing the best ways to treat leishmaniasis and soil-transmitted helminth infections.

Parasites are found everywhere but those that need the most scientific attention because they kill people, often call the tropics home. Hence, many parasitologists spend at least part of their research life on-site, in Africa or Asia, to observe their research subject in its natural habitat. Intimate research collaborations also exist. For over two decades, the Wellcome Trust and the University of Oxford has been partner to the Kenya Medical Research Institute (KEMRI), for instance. Starting with only 12 people in 1989, the KEMRI-Wellcome Trust Research Programme now has several hundred staff, among them two of our top 30 most-cited parasitologists, Kevin Marsh (6th) and Robert Snow (8th).

Marsh and Snow are only two of altogether 18 researchers based at Universities and Institutes in England – demonstrating England's superiority in Parasitology once more. Half of these 18 researchers are affiliated with the University of Oxford. Also, five scientists at the London School of Hygiene and Tropical Medicine made it into our top 30. As did parasitologists, working at Imperial College London, the Liverpool School of Tropical Medicine and the Wellcome Trust Sanger Institute, at Hinxton. Rather unusually, another tropical institute is situated in Switzerland. Founded in 1943, the Swiss Tropical and Public Health Institute in Basle has become a major player in parasitology research – four scientists made it into our top 30. In addition, there are four parasitologists from Spain, and one each from The Netherlands, Belgium and Germany.

Malaria researchers outnumber worm and tick experts

As mentioned earlier, malaria and the malaria-causing parasite, *Plasmodium*, is the hottest topic in Parasitology research in Europe. Or at least, the one that got researchers studying it the most citations. Malaria researchers do everything in their power to get a grip on the disease. They look at epidemiology, pathophysiology and treatment of the disease (White, 1st; Day, 2nd; Nosten, 4th), they develop better drugs (Brun 5th) or vaccines (Greenwood, 9th; Sauerwein, 17th; Kremsner, 25th), study its transmission dynamics (Drakeley, 15th; Ghani, 20th), investigate protective immune responses (Marsh, 6th; Riley, 19th; Conway, 30th) or work on plans to eradicate it once and for all (Alonso, 11th; Tanner, 16th).

Eight of our top 30 most-cited parasitologists in Europe are not that interested in malaria, though. Jürg Utzinger (3rd) and Jennifer Keiser (18th), both at the above mentioned Swiss Tropical and Public Health Institute, and Matthew Berriman (7th) are more into parasitic worms. The former pair study the diseases caused by, for instance, *Schistosoma* and *Trichuris*. Berriman looks into the wormy parasites' genomes. Parasites do not only cause disease in humans, that's why Jose de la Fuente (23rd) and Christian Gortazar (28th) specialised in veterinary parasitology, with a focus on tick-borne diseases in wildlife.

Although it might not garner as many citations as other disciplines, like cancer or cardiovascular research, understanding parasites and the diseases they cause is not less important, given the fact that so many people are affected worldwide. Clearly, a lot of work still lies ahead for parasitologists worldwide, especially regarding the so-called neglected tropical diseases, like leishmaniasis, sleeping sickness, schistosomiasis and soil-transmitted helminthiasis. Because even for the well-researched malaria, the battle is still far from being won.

Kathleen Gransalke

Europe...

Country	Citations	Articles	Cit./Art.
1. England	62,507	3,842	16.3
2. France	37,209	2,540	14.7
3. Germany	30,548	2,009	15.2
4. Switzerland	25,079	1,434	17.5
5. Netherlands	15,799	890	17.8
6. Spain	15,156	1,387	10.9
7. Italy	14,062	1,006	14.0
8. Scotland	13,849	944	14.7
9. Belgium	12,836	793	16.2
10. Sweden	7,926	479	16.6
11. Denmark	6,992	487	14.4
12. Czech Rep.	5,845	708	8.3
13. Portugal	4,630	424	10.9
14. Ireland	4,389	263	16.7
15. Israel	3,876	271	14.3
16. Austria	3,510	269	13.1
17. Poland	2,719	393	6.9
18. Norway	2,437	221	11.0
19. Turkey	2,273	306	7.4
20. Greece	1,997	146	13.7

Articles appearing between 2007 and 2013 in 'Parasitology Research' journals as listed by *SCImago* and Thomson Reuters' *Web of Science*. The citation numbers are accurate as of March 2015. A country's figures are derived from articles, where at least one author working in the respective European nation is included in the authors' 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	200,466	15,032	13.3
USA	152,462	9,548	16.0
Brazil	38,991	5,580	7.0
Australia	27,701	1,892	14.6
China	17,326	1,861	9.3
Canada	15,608	977	16.0
Japan	15,404	1,432	10.8

Publication Analysis 2007-2013 – **Parasitology**

Most Cited Authors...

		Citations	Articles
1.	**Nicholas J. White,** Trop Med, Univ Oxford	8,271	257
2.	**Nicholas P. J. Day,** Trop Med, Univ Oxford	6,961	255
3.	**Jürg Utzinger,** Epidemiol & Publ Hlth, Swiss Trop Inst, Basle	6,323	237
4.	**François Nosten,** Trop Med, Univ Oxford	5,549	176
5.	**Reto Brun,** Med Parasitol & Infect Biol, Swiss Trop Inst, Basle	4,720	246
6.	**Kevin Marsh,** Trop Med, Univ Oxford	4,690	127
7.	**Matthew Berriman,** Wellcome Trust Sanger Inst, Hinxton	4,651	86
8.	**Robert W. Snow,** Trop Med, Univ Oxford	4,478	106
9.	**Brian Greenwood,** Infect & Trop Dis, London Sch Hyg & Trop Med	4,152	142
10.	**Simon J. Brooker,** Dis Control, London Sch Hyg & Trop Med	3,932	88
11.	**Pedro L. Alonso,** Barcelona Ctr Int Hlth Res, Univ Barcelona	3,919	171
12.	**Arjen M. Dondorp,** Trop Med, Univ Oxford	3,874	105
13.	**Simon I. Hay,** Zool, Univ Oxford	3,848	76
14.	**Ric N. Price,** Trop Med, Univ Oxford	3,371	88
15.	**Chris Drakeley,** Infect & Trop Dis, London Sch Hyg & Trop Med	3,357	94
16.	**Marcel Tanner,** Epidemiol & Publ Hlth, Swiss Trop Inst, Basle	3,345	142
17.	**Robert W. Sauerwein,** Med Microbiol, Radboud Univ Nijmegen	3,084	123
18.	**Jennifer Keiser,** Med Parasitol & Infect Biol, Swiss Trop Inst, Basle	3,015	126
19.	**Eleanor M. Riley,** Infect & Trop Dis, London Sch Hyg & Trop Med	2,985	68
20.	**Azra C. Ghani,** Sch Publ Hlth, Imperial Coll London	2,904	68
21.	**Paul A. M. Michels,** Sch Biol Sci, Univ Edinburgh	2,888	58
22.	**Malcolm E. Molyneux,** Parasitol, Liverpool Sch Trop Med	2,804	129
23.	**Jose de la Fuente,** Res Game Resourc, Ciudad Real	2,678	173
24.	**Marleen Boelaert,** Inst Trop Med, Univ Antwerp	2,622	130
25.	**Peter G. Kremsner,** Trop Med, Univ Tübingen	2,537	161
26.	**Peter W. Gething,** Zool, Univ Oxford	2,532	52
27.	**Ivo Müller,** Barcelona Ctr Int Hlth Res, Univ Barcelona	2,492	123
28.	**Christian Gortazar,** Res Game Resourc, Ciudad Real	2,432	156
29.	**Maria-Gloria Basanez,** Infect Dis Epidemiol, Imperial Coll London	2,399	57
30.	**David J. Conway,** Pathogen Mol Biol, London Sch Hyg & Trop Med	2,398	75

Citations of articles published between 2007 and 2013 were recorded up until March 2015 using the *Web of Science* database from Thomson Reuters. The "most-cited papers" had correspondence addresses in Europe or Israel.

... and Papers

	Citations
1. Berriman, M; Haas, BJ; LoVerde, PT; [...] Fraser-Liggett, CM; Barrell, BG; El-Sayed, NM The genome of the blood fluke *Schistosoma mansoni*. *NATURE 460(7253):352-U65 JUL 16 2009*	425
2. Chappuis, F; Sundar, S; Hailu, A; [...] Peeling, RW; Alvar, J; Boelaert, M Visceral leishmaniasis: What are the needs for diagnosis, treatment and control? *NATURE REVIEWS MICROBIOLOGY 5(11):873-882 NOV 2007*	423
3. Peacock, CS; Seeger, K; Harris, D; [...] Mottram, JC; Smith, DF; Berriman, M Comparative genomic analysis of three *Leishmania* species that cause diverse human disease. *NATURE GENETICS 39(7):839-847 JUL 2007*	366
4. Khor, CC; Chapman, SJ; Vannberg, FO; [...] Berkley, JA; O'Neill, LAJ; Hill, AVS A Mal functional variant is associated with protection against invasive pneumococcal disease, bacteremia, malaria and TB. *NATURE GENETICS 39(4):523-528 APR 2007*	266
5. Keiser, J; Utzinger, J Efficacy of current drugs against soil-transmitted helminth infections - Systematic review and meta-analysis. *JAMA-JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION 299(16):1937-1948 APR 23 2008*	263