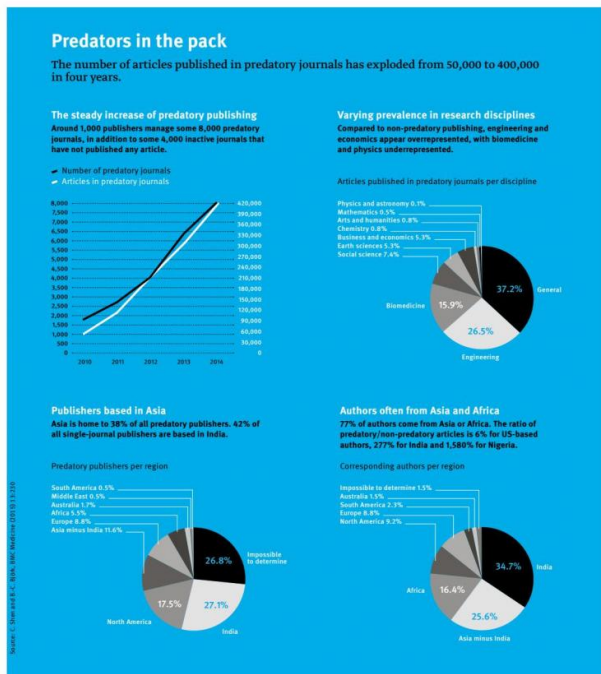


Science's spam epidemic

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Animal Research – is part of a rising tide of academic spam arriving at researchers' computers the world over. Aguzzi, who receives about half a dozen such messages from various [publishers](#) every day, says it is impossible to stop the e-mails at source – "you can write back inflammatory e-mails but they are just disregarded," he says – and adds that spam filters are not much use. "In the good old days, people offered you Viagra pills or some shady business deal in Nigeria," he says. "But scientific spam is different, it is very hard to weed out."

The e-mails are not merely a nuisance, however. They are sent by organisations that are ostensibly set up to exploit the potential offered by the Internet for rapid and free dissemination of scientific results, but which in practice appear to be just after a quick buck. Anyone heeding a call for submissions usually finds that their manuscript is accepted after just a few weeks, or even days, having undergone little or no peer review and coming with a bill of several hundred dollars or more. Should the unwitting academic then ask for their paper to be withdrawn – to avoid any dent to their reputation – they could be presented with a withdrawal fee.

Credit: Swiss National Science Foundation

"Hope this email finds you in superior spirits." So began a message that recently arrived in the inbox of Adriano Aguzzi, a neuropathologist at the University of Zurich. Although an apparently innocuous, even friendly, opening line, Aguzzi knew what would follow. There would be an invitation by some obscure company located who knows where on the planet to submit a paper to a journal he had never heard of, or to participate in a conference that might well never take place. As such, he had no hesitation about what to do. He hit 'delete.'

That email – sent by the firm MedCrave to ask for submissions to Journal of Dairy, Veterinary &

These practices have earned such publishers the label 'predatory'. But the organisations in question often do more than just publish (fake) journals. Three years ago James White, a plant scientist at Rutgers University in the US, accepted an invitation to be a board member of a [journal](#) published by OMICS International in India (see box on p. 44). White said he saw nothing fishy about the journal, but he subsequently found out that OMICS had, without him knowing, listed him as a speaker at a conference on insects that the company was organising. White says he was outraged that his name could have been used to lure other (paying) scientists to the meeting. "My understanding is that people are being duped," he concludes.

Keeper of the blacklist

According to Jeffrey Beall, an academic librarian at

the University of Colorado in the US, predatory publishers also pose a broader danger. Beall says that they undermine the trust fundamental to maintaining rigour within science, and that they are starting to flood scientific literature with erroneous results. In fact, he and a couple of colleagues have argued that predatory journals pose an 'existential threat' to science.

Beall is famous for a blog, Scholarly Open Access, where he maintains an up-to-date list of "potential, possible, or probable" predatory publishers. Indeed, it was he who coined the term 'predatory publisher'. To decide who should go on the list he makes a subjective judgement based on some 30 criteria he has drawn up concerning bad editorial and business practices. He also maintains a list of individual predatory journals without a specific publisher, and provides general information (but no list) regarding questionable upcoming conferences.

Having started up in 2010, the list now contains the names of over 1,000 dubious publishers. One of the most infamous of these is the aforementioned OMICS. Among the other notable inclusions is an outfit known as Cardiology Academic Press, which in 2013 bought the journal *Experimental & Clinical Cardiology* from a respected publisher in Canada and then started charging authors for publication. The number of published papers then skyrocketed – from 63 to over 1,000 in the space of a year (the company appears to be no longer active).

Hijacking journals

Other predatory publishers go one step further and 'hijack' journals. They do this by setting up fake websites bearing the names of established journals, and then simply collect the article processing charges provided by hoodwinked authors. For instance, Mexico-based *Revistas Académicas* says it publishes the *Cahiers des sciences naturelles* of the Nature Museum in Sion, Valais, with a hard-to-identify Dr. D. Nowack, Switzerland, as editor-in-chief. Other hijacked publications include a 200-year-old forestry journal from Poland, an Icelandic life sciences journal and a South African botanical journal.

Keeping tabs on predatory journals is a time-

consuming and often thankless undertaking. While praised by many scientists for his vigilance, Beall has also been accused of tarring different types of publisher with the same brush – from the potentially criminal to the merely amateurish. Indeed, the principle of charging authors to have their work published has been adopted by many legitimate, respected open-access journals. The idea here is to make scientific papers free to access online, rather than having them locked behind the paywalls of traditional subscription publishers. In fact, open-access publishing has been gaining significant ground in recent years, with many governments now requiring publicly-funded research to be made freely available.

But Beall believes that charging authors creates an inherent conflict of interest, with publishers motivated to accept as many papers as possible – in order to increase profits – and therefore to lower their standards. He contrasts this with traditional scholarly publication, in which, he argues, the possibility of libraries withdrawing their subscriptions means that publishers are forced to maintain high standards. "Now," he says, "you can publish anything you want as long as you can afford to pay a publisher."

The white list

Faced with the bad press of predatory journals, open-access publishers have raised standards. The Directory of Open Access Journals (DOAJ), sponsored in part by open-access publishers, maintains a currently 9,000-strong list of what it considers to be bona fide journals. In the years following its creation in Sweden in 2003, the DOAJ did not use strict criteria for drawing up its list, but since 2014 it has required applicants to provide detailed information on licensing, transparency, peer review and other areas. It now accepts less than 40% of new applications, and also regularly removes substandard journals from the list.

The DOAJ managing director Lars Bjørnshauge contrasts their approach with that of Beall, whom he describes as "just stigmatising" publishers. "We spend quite a lot of time with publishers," he says. "We are trying to help them do a better job."

Others also take issue with Beall. Bo-Christer Björk, an information scientist at the Hanken School of Economics in Helsinki, says that he is "not overly" worried about the potential conflict of interest that arises with author-paid publishing. He argues that the possibility of having their impact factors listed by Thomson Reuters, alongside those of long-established journals, strongly motivates open-access publishers to keep standards high. "It is all about reputation," he says.

400,000 articles a year

Last year, Björk published a study along with the doctoral student Cenyu Shen on the rise in predatory publishing (see charts on p. 43). They worked out that the total number of papers published worldwide in predatory journals rose from about 50,000 in 2010 to more than 400,000 in 2014, which compares with the 1-to-1.5 million papers published yearly by journals indexed by Thomson-Reuters. However, the pair found that there were big variations from one field to another. They also identified huge geographical differences, both in terms of where publishers are based and where authors live. In both categories the developing world dominates, with India by far the largest offender.

As such, argues Björk, predatory publishing is not a huge problem in the West. He believes the reason that dubious journals and their authors proliferate in the developing world is because there is "a market for academics who are desperate to publish their papers," a phenomenon that he says is amplified by governments in India and elsewhere insisting that scientists publish in international journals, while not monitoring the quality of such publications. Not everyone is so relaxed about predatory journals. Aguzzi agrees with Beall that unscrupulous publishers undermine trust within "the edifice of science" and that the author-payment scheme – known as gold open access – lies at the root of the problem. "The open-access model is not tenable as it stands," he says.

Aguzzi points out that there continues to be some overlap between journals in the DOAJ and publishers on Beall's list, including even quite well-established Western publishers such as Frontiers.

Set up in 2007 by Henry and Kamila Markram, both neuroscientists at EPFL, Frontiers today publishes several of the world's most-cited, [open-access journals](#), according to its website. However, it has been sharply criticised by many researchers, including 31 editors of three of its medical journals, who last year wrote a manifesto expressing grievances about the company's peer-review processes and alleged editorial interference. Frontiers responded by rebutting the objections and sacking the editors.

Platinum instead of gold

Aguzzi advocates what is known as platinum, rather than gold open access. Used at the Swiss Medical Weekly, of which he is editor-in-chief, this involves ditching author payments and instead financing the costs of publication via funding from research agencies, university libraries, scientific academies or philanthropic organisations. He acknowledges that this approach requires "a lot of fundraising to make it work," but he nevertheless thinks it will become the main source of funding for scientific publishing in the long term, and in the process pull the rug from under predatory publishers.

Björk, however, is not convinced. He notes that a consortium designed to fund [open-access](#) publishing in particle physics, known as Scoap3, took several years of negotiation to set up and even then the biggest journal in the field backed out at the last minute. "The idea is nice in principle but so very difficult to set up in practice," he says.

For White, there is no easy solution. "The scientific publishing world has changed and we have to live in this reality," he says. "I think we just have to be careful. We have to be much more conservative and discriminating about where we publish."

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