



Quantity does not equal quality: Scientific principles cannot be sacrificed

A recent retraction of two coronavirus papers in the Lancet and New England Journal of Medicine, one of which led to the World Health Organization halting a clinical trial, represents an unfortunate example of scientific misconduct that is axiomatic of deeper challenges, which are occurring during the COVID-19 pandemic [1]. These embarrassing events are representative of mounting problems currently faced by academic, publishing and clinical communities. Academics, overwhelmingly judged by their 'productivity', are impacted by the lack of key resources and access to research laboratories (lock-down), severely limiting their research efforts. This has disproportionately affected students, fellows and early-career researchers who have insufficient unpublished data, resulting in the writing of reviews and opinion pieces that are poorly supported by facts and knowledge. The topics for these efforts have focused on an enthusiasm for the novel pathobiology of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infections and the need for novel therapeutic strategies. These efforts, combined with the opportunity of rapid and open scientific publishing, often as 'prepublications' and, unfortunately, with minimal/insufficient peer-review, has flooded editors and reviewers. We posit that it is critical to avoid the devastating collateral effects of these problems, which will not be possible without self-restraint and restoring rigorous scientific standards and practices.

The rapid worldwide progression of COVID-19 was immediately targeted by the scientific community [2]. The first genomic data of its etiological agent, (SARS-CoV-2), was made public and became available as early as 10 January 2020 [3]. This has soon resulted in the emergence of essential research on diagnostic methods, followed by studies of seroconversion, viral pathogenicity and potential therapeutic targets [4,5]. Within the first four months of the outbreak, over 8000 papers – original research, reviews, case reports, perspectives, opinions, and commentaries – have been indexed in the established databases under the key terms “SARS-CoV-2”, “2019-nCoV”, and “COVID-19”. This unprecedented body of work indicates that modern science continues to have a crucial role in response to emerging global threats, and underlines the need for more support, both from public and government organizations. Much of these research efforts have focused on the development of vaccines to circumvent the need for social distancing and personal protective equipment [6,7]. The predominant focus has been on plasma exchange as a therapeutic strategy, antibody levels following seroconversion, and vaccines that induce B and T-cell immunity. Secondary to these studies is the identification of optimal antigens, vectors, antigen sources and adjuvants [8,9]. These efforts have resulted in

numerous opinion pieces without justification and practical application to coronavirus infections.

The early reports of this new viral infection were mostly exploratory, often not more than case reports, which is acceptable within the situation of an evolving public health threat. Once the nature of the pandemic became apparent, preliminary reports as to infectivity and pathogenicity provided essential information, even if not vigorously vetted. Therapeutic suggestions, originating from early clinical observations (e.g., cytokine storm), were useful for the further development of effective treatments. However, this is when papers and pre-prints prepared in a rushed manner, started to appear. Some were rapidly taken up by politicians for propaganda and had severe consequences [10,11]. Although science represents the core of modern responses to public health threats, as clearly evidenced during the COVID-19 pandemic, it is now the time to push back and reestablish the emphasis on rigorous quality standards [12,13].

Over the last few weeks, we have been invited to handle and/or review numerous submitted manuscripts and grant proposals concerning COVID-19 and SARS-CoV-2 from a wide range of biomedical journals and granting agencies. With regret, we report that we have encountered a great number of manuscripts that have been prepared hastily and in an unqualified manner, that use language inappropriate for science, that are based on incomplete research and claims unsupported by evidence. Selected manuscripts and clinical trial proposals have attempted to promote protocols for COVID-19 treatment that are not in agreement with current knowledge of the disease and could be harmful to patients. Other examples are rushed reviews that bring nothing beyond what has already been reported, which is already available and well-summarized. In many instances, the original studies were based on insufficient numbers of patients or employed flawed analyses, thereby not allowing any meaningful conclusions. Selected papers used potentially fear-promoting terms to describe SARS-CoV-2 and COVID-19 as 'killer virus' or 'deadly disease', which is more typical of tabloid journalism. All these examples lead us to the suggestion that some individuals are using COVID-19 as an excuse to increase their bibliometric record. There may be “predatory journals”, but there are also “predatory authors” who are capitalizing on the emergence of a new disease for self-gain. This is not welcomed and we view it as unethical.

Although the peer-review process is designed to separate the wheat from the chaff, the flood of poorly-prepared manuscripts, in our opinion and experience, entails substantial risks. First, it overwhelms editors

and reviewers who are already facing other challenges related to the pandemic. Second, it puts high-quality manuscripts, also those related to other fields than COVID-19, in an increasingly longer queue, possibly delaying essential data from being publicly available. In the present pandemic scenario, the dissemination of data is of paramount importance, but unfortunately includes statements not limited to rigorous, independent peer-review assessment. Third, poor science or unknowledgeable reviews/opinions undertaken only for the sake of improving the author's bibliometric record, and without substantially contributing to the field, increases the risk that unsupported or even harmful claims will become accepted by less well-informed media outlets. Considering the voracious appetite of mass and social media for research on COVID-19, and how quickly information is presently disseminated [14], these erroneous reports may have devastating effects that will be difficult to eradicate. Fourth, the impact on peer review and editorial rights has the potential to reduce the acceptable standards of journals, as editor/reviewer fatigue is a reality, and decision-making under stress can adversely affect internal quality measures. Sadly, this can lead to a ripple effect where the inappropriate perception that scientific journals, like media, are willing to competitively publish COVID-19 manuscripts "to be first", validating the deluge of low-quality submissions from predatory or inexperienced authors.

Science bears a great responsibility in handling the crisis and counteracting panic [15]. Quantity does not equal quality. This is no more the time for rushed science, attempting to publish "anything" on COVID-19, providing loose suggestions on treatment, battling to be the first to report new data or competing over citation indexes. We, therefore, call on the global scientific community - scientists, their supervisors, and institutions - to restrict COVID-19 research to those individuals who can contribute high-quality and knowledgeable work. The submitted manuscripts shall undergo a rigorous, not raced against the clock, peer-review process. This is essential for further understanding of the clinical features and epidemiologic factors, allowing the proposal of evidence-based options for treatment and prevention of COVID-19. This can only be for everyone's benefit.

Declaration of Competing Interest

The authors declared that there is no conflict of interest.

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Piotr Rzymiski^{a,*}, Michał Nowicki^b, Gerard E. Mullin^c, Ajith Abraham^{d,e}, Eduardo Rodríguez-Román^{f,g}, Moritz B. Petzold^h, Antonia Bendauⁱ, Kamal Kant Sahu^j, Amber Ather^k, Anne-Frédérique Naviaux^{l,m}, Pascal Janneⁿ, Maximilien Gourdin^{m,n}, Joris R. Delanghe^o, Hans D. Ochs^{p,q}, James E. Talmadge^r, Manish Garg^s, Michael R. Hamblin^{t,u}, Nima Rezaei^{v,w,x,*}

^a Department of Environmental Medicine, Poznan University of Medical Sciences, Poznań, Poland

^b Department of Histology and Embryology, Poznan University of Medical Sciences, Poznań, Poland

^c Division of Gastroenterology and Hepatology, The Johns Hopkins University School of Medicine, Baltimore, MD 21224, USA

^d Machine Intelligence Research Labs (MIR Labs), Scientific Network for Innovation and Research Excellence, Auburn, WA 98071, USA

^e Universal Scientific Education and Research Network (USERN), Washington, USA

^f Center for Microbiology and Cell Biology, Instituto Venezolano de Investigaciones Científicas, Caracas, Venezuela

^g Universal Scientific Education and Research Network (USERN), Caracas, Venezuela

^h Department for Psychiatry and Psychotherapy - Charité – Universitätsmedizin Berlin, corporate member of Freie Universität Berlin, Humboldt-Universität zu Berlin, and Berlin Institute of Health, Berlin, Germany

ⁱ Department of Internal Medicine, Saint Vincent Hospital, Worcester, MA, USA

^j Universal Scientific Education and Research Network (USERN), Worcester, MA, USA

^k Department of Endodontics, University of Texas Health Science Center at San Antonio, San Antonio, TX, USA

^l College of Psychiatrists of Ireland and Health Service Executive (HSE) Summerhill Community Mental Health Service, Summerhill, Wexford, Y35 KC58, Ireland

^m Faculty of Medicine, Université catholique de Louvain, Avenue Emmanuel Mounier 50, B-1200 Woluwé-Saint-Lambert, Belgium

ⁿ Faculty of Psychology, Université catholique de Louvain, Place Cardinal Mercier 10, 1348 Ottignies-Louvain-la-Neuve, Belgium

^o Department of Diagnostic Sciences, Ghent University, Ghent, Belgium

^p Department of Pediatrics, and Seattle Children's Research Institute,

University of Washington, Seattle, WA, USA

^q Universal Scientific Education and Research Network (USERN), Seattle, WA, USA

^r Department of Pathology and Microbiology, University of Nebraska Medical Center, 986495 Nebraska Medical Center, Omaha, NE 68198-6495, USA

^s Weill Cornell Medicine & Columbia University Vagelos College of Physicians and Surgeons, New York, NY, USA

^t Wellman Center for Photomedicine, Massachusetts General Hospital, Harvard Medical School, Boston, MA 02114, USA

^u Laser Research Centre, Faculty of Health Science, University of Johannesburg, Doornfontein 2028, South Africa

^v Research Center for Immunodeficiencies, Children's Medical Center, Tehran University of Medical Sciences, Tehran, Iran

^w Department of Immunology, School of Medicine, Tehran University of Medical Sciences, Tehran, Iran

^x Network of Immunity in Infection, Malignancy and Autoimmunity

(NIIMA), Universal Scientific Education and Research Network (USERN), Tehran, Iran

E-mail addresses: rzyskapiotr@ump.edu (P. Rzymiski),
mnowicki@ump.edu.pl (M. Nowicki),
gmullin1@jhmi.edu (G.E. Mullin),
ajith.abraham@ieee.org (A. Abraham),
moritz.petzold@charite.de (M.B. Petzold),
antonia.bendau@charite.de (A. Bendau),
ather@livemail.uthscsa.edu (A. Ather),
annefrederique.naviaux@hse.ie (A.-F. Naviaux),
pascal.janne@uclouvain.be (P. Janne),
maximilien.gourdin@uclouvain.be (M. Gourdin),
joris.delanghe@ugent.be (J.R. Delanghe),
hans.ochs@seattlechildrens.org (H.D. Ochs),
jtalmadg@unmc.edu (J.E. Talmadge),
hamblin@helix.mgh.harvard.edu (M.R. Hamblin),
rezaei_nima@tums.ac.ir (N. Rezaei).

* Corresponding authors at: Department of Environmental Medicine, Poznan University of Medical Sciences, Poznań, Poland (Piotr Rzymiski). Research Center for Immunodeficiencies, Children's Medical Center, Tehran University of Medical Sciences, Tehran, Iran (Nima Rezaei).