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Medical publications: science or business?

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Introduction

In recent years there has been an enormous increase in the number of scientific publications[1,2], to such an extent that it is now impossible for us to read even 1% of what is coming out in our area of expertise or into the fields which interest us. The proliferation of scientific periodicals in general and medical journals in particular may be attributed to many factors. Among these we would highlight the Internet and changes in the very raison d'etre of such publications. Here we will comment on some aspects that have led to this situation.

What is the raison d'etre of scientific publications?

1st reason. The theory, what we believe it should be

The scientific publication must complement scientific research[3]. The journal is the way to report our research findings to the scientific community, whether they are positive and pose a significant advance in the knowledge concerning an issue, or, on the contrary, they are negative results, whose importance is increasingly accepted, especially to validate the usefulness of meta-analyses. Scientific journals offer the most common way to transmit and document scientific progress, especially in the biomedical field, which is subjected to constant change[4]. Progress in the field of medicine generated by the large number of research groups requires the timely publication of their findings, while it is required to verify their quality and rigor, generally supported in the prestigious journals by anonymous peer review of scientific articles. We cannot, therefore, conceive research without the support of the scientific journal as in the maxim "Science does not exist until it is published".[5]

2nd reason. The crude reality

Far from this erudite reasoning, which proclaims that we publish altruistically to offer our findings to the scientific community, there is another version of the story. Probably our eagerness to enhance a CV, either individually (our own) or as part of a team (research group) is the real reason why so much is being published today. Our byline, in turn, will be the tool to secure other benefits. The first aim would be to attract the prestige and recognition of the scientific community as experts in that field. Other reasons involve recognition of publications as part of the point scale. In our country, for example, where public tests offer regional health service posts, scientific publications have a certain value. The same is true in the merit accreditation scales to secure a university tenured professorship, whether for tenure or full professorship, currently under the control of the National Agency for Quality Assessment and Accreditation (ANECA)[6]. Universities can also be granted a so-called six-year research award based largely on scientific publications. Once this is granted, the researchers can expect greater financial reward. In the allocation of associate professorships for teaching practical lessons and in the scales for awarding research grants, one prized aspect is having a line of solid research that is cre-

dited precisely with the publication of scientific papers. Therefore, the researcher, teacher or just the public candidate, not because they have obtained results that they want to report to the scientific community, but rather because they hope to bolster their CV for any of the above objectives. This is, of course, quite reasonable. There are many examples in the literature of items of dubious interest to the general scientific community whose usefulness and application do not go beyond the local scope itself[7-16].

A bit of history. How we got scientific articles a few decades ago?

The emergence of the Internet some 20 years ago drastically changed scientific literature. Until then, access to some items was limited, especially those published in less "normal" journals. First, we subscribed to certain journals, either personally or through scientific societies to which we belonged. Then we had access to those journals which our hospitals or universities libraries received. Librarians often possessed contacts with other libraries with which an exchange was established, usually fast, free, by which the items could be fax (that was faster) with quite variable quality. There was also Current Contents, a small weekly booklet which featured the covers of journals selected by the editor, including the author's address for correspondence. We could contact this author using a standard form which requested a reprint of the article. Sometimes they replied, perhaps to tell us that the reprints had run out. Finally, some pharmaceutical companies offered a service, similar to Current Contents, through which, and from such journal covers, the laboratories themselves would secure reprints or photocopies of higher quality than faxes. It is true that this service was as good as it was ephemeral.

After the advent of Internet, scientific journals adapted to new technologies as best they could. Some did so immediately, adapting their format to the Internet to offer PDF versions of articles, the chance to watch videos and articles in audio format for the deaf, among other features. In this sense, the *New England Journal of Medicine* changed quickly and exemplary, adapting to new technologies offered and even improving its content. Other journals took over. Today the whole process involving the publication of a scientific article is done via the Internet, from obtaining publishing journal standards, the referral of the article, usually by a computer search engine designed ad hoc, through sending to the reviewers, article correction and finally its publication, which is usually conducted in a previously unknown format, which is the publication "online" (advance online) available on the journal's website, format that can remain even several months after the printing on paper. Now classic journals coexist with the publication in PDF or HTML form on the journal web page. A step further has been the emergence of scientific journals published only online in PDF format and not printed on paper.

Access to online journals

Today, all journals published on paper have a Web page that offers the same content but in PDF format. There are also journals that have chosen to be present only digitally, on their website. Access to articles published in these journals is varied:

a) First, there are paid subscriptions, either personally or by an institution: university, research institute or hospital. With your own password you can access the journal's entire contents even as far back as 20 years ago in most cases. There are usually no restrictions and the only drawback of this method is obviously the cost factor.

b) To pay for them directly: if you do not have a subscription, items are sold as any other merchandise online, with prices generally very high. For this service, subscribers do not have to be identified as health care providers. You simply pay.

c) Time lapse period: some journals offered free content access once a certain time has transpired. This varies from one to another and the time lapse ranges between six months and one year. In other words, one would only have to pay for access to the latest articles.

d) Subsidized articles such as open, journal subscription.

It is not uncommon for most of the classic journals to offer one or two articles in open format in each issue, which are clearly marked with an online or free link. These articles are published in this way either because the author has decided to pay to be published in this format (as discussed below, the free articles are read and referenced by payment), or because the laboratory responsible for the drug will benefit from the results of the product will pay, or because the editors deemed it very important for the interest of the scientific community. Some journals, such as the *British Medical Journal*, allow access to "reserved" articles if the reader signs in. The period of validity thereof and the number of items that can be found in this way are limited.

e) Some scientific social networks web pages such as *Research Gate* or *Edu Academy* have reached agreements with publishers for authors of scientific articles to include publications in them and that could be accessed freely or through a personal request. This is what has been called "repository" and that is very much in relation to open access movement which we will refer later.

The open-access journals. Transmitting science or business?

In recent years we have seen a plethora of so-called open access journals (open access) that could be loosely translated as free access to the reader. All these share a common features: a) they tend to be published in English; b) they exist only in electronic form and therefore are not published or distributed on paper; c) you can access all of their content for free and complete from the time

of publication, with no cut off period; d) most of them are not been indexed nor have impact factor; and e) in all the article, authors must pay to publish their articles.

The number of these journals has grown exponentially in recent years, so that today only in the field of medicine this number is several hundred journals. As indicated above, most of them are not included in the *Journal of Citation Reports* and therefore have no impact factor, and are not available in *PubMed*. Usually they are obtained from databases that share the journals' open access format. A non-exhaustive list of these databases is shown in table 1.

The open access phenomenon began to develop in this century, and the bases justifying it were set out in the so-called Budapest Open Access Initiative of 2002[17], which was eventually ratified in Bethesda and Berlin[18,19]. The principle underlying this initiative is literally: By open access [to peer scientific literature], we mean its free availability on the public Internet, which allows any user to read, download, copy, distribute, print, search or add a link to the full text of such items, to track them for indexing, incorporate them as data into software, or use them for any other purpose that is legal, without financial, legal or technical barriers other than those inseparable in Internet access itself. The only constraint on reproduction and distribution, and the unique role of copyright (property rights) in this area, control should be to give authors over the integrity of their work and the right to be properly acknowledged and cited[17].

The price for access to scientific articles and publishing in the field of bone mineral metabolism

In the classic journals that exist in paper format and have been subsequently adapted to digital format, publishing articles is often free. The exception is the *Journal of Bone and Mineral Research*, which charges $50 US for reviewing expenses. This is non-refundable should the manuscript be rejected. Other traditional journals do not charge for publishing articles. They usually offer the possibility to pay to be published in open access format. They generally cover their expenses by a combination of subscription readers combined with the support from the scientific society of which the journal is the official publication. One of the incentives offered by some scientific associations is journal subscription, which leads to journal subscription costs being higher than registration as an associate. A list of these journals is shown in table 2, in order of highest impact factor. It shows subscription price only in its online version.

The question is how much they are willing to pay the authors for the service they receive. Probably, if we consider that most open access journals operate exclusively online, eliminating the costs of printing and distribution, and that the authors of the articles do not receive financial remuneration for their work, current prices could be considered by most to be too high. Perhaps open access means good business for publishers, but there are still doubts as to the benefits and drawbacks of this model for authors. Probably in a few years all scientific studies subsidized with public money shall be published in open access, but between publishers and research centers a fair price should be negotiated for publishing according to the product received[21]. Current controversy on this issue has yet to be resolved[22-31].

The only specific journal on bone mineral metabolism with impact factor is *Bone Research*. Its characteristics are shown in table 3.

The burden generated by open access journals. Seeking to disseminate science or generate income?

It is little wonder that a few days after publishing an article in a journal that is indexed and has impact factor, we receive email invitations to publish a similar article in one of these journals[20]. Nor is it unusual that the invitation to go even further and coordinate of a special issue. Of course the invitation is made "because we are a reference and renowned in the publishing field". So do not forget that the invitation clearly reflects the obligation to pay for this publication. This information does not appear in the letter of invitation and it is only discovered when we read in detail the "instructions for authors" that are often hidden behind several links which require patient accessing. Not surprising considering we finish these spam or unwanted, or in some cases we should turn to the editors begging they remove us from a distribution list, which is not always done.

The Journal of Osteoporosis and Mineral Metabolism (ROMM)

The Journal of Osteoporosis and Mineral Metabolism is the only journal in open format that is completely free, not only of specific journals in bone mineral metabolism but in the field of medicine. Reading its articles and using their website is completely free, it does not require a subscription and there is no expiration period.

It is also absolutely free for authors. The cost involved in maintaining the journal is covered by the Spanish Society of Bone and Mineral Metabolism Research (SEIOMM). ROMM is its official scientific journal. Being completely free makes it a unique journal in the field of medicine.

ROMM is included in more than 20 databases related to current open access1 (Table 3) and recently in others, which do not share this philosophy, such as *Web of Science and Emerging Source Citation index*. It is still not included in the *Journal of Citation Reports or PubMed*, and so they have not recognized the impact factor. A new application for inclusion, corrected some existing defects, was taken in June 2016, which we hope will provide good news to all who participate actively in it.

Table 1. Databases that collect articles published in open access format

Acronym	Name	URL (Web address)	It includes ROMM
DOAJ	*Digital Open Access Journals*	https://doaj.org/	YES
e-journals	*Electronic Journals*	http://www.e-journals.org/	YES
Redalyc	*Red de Revistas Científicas de América Latina y el Caribe, España y Portugal*	http://www.redalyc.org/	YES
SciELO	*Scientific Electronic Library On Line*	http://www.scielo.org/php/index.php?lang=es	YES
Dialnet	*Dialnet*	https://dialnet.unirioja.es/	YES
Free Medical Journals	*Free Medical Journals*	http://m.freemedicaljournals.com/	YES
Latindex	*Sistema Regional de Información en Línea para Revistas Científicas de América Latina, el Caribe, España y Portugal*	http://www.latindex.org/latindex	YES
IBECS	*Índice bibliográfico español en ciencias de la salud*	http://ibecs.isciii.es	YES
Academic Keys	*Academic Keys*	http://medicine.academickeys.com/res_main.php	YES
SafetyLit	*Safetylit*	http://www.safetylit.org/index.htm	YES
EZ3	*Electronic Journals Library*	http://rzblx1.uni-regensburg.de	YES
WorldCat	*WorldCat*	http://www.worldcat.org/	YES

Table 2. Journals of bone mineral metabolism in closed-access format or subscription

Journal	Impact factor	Price annual subscription, only online version per person in €	Price for publishing article in open format	Editorial
Journal of Bone and Mineral Research	6,832	515	3.000 $*	*Wiley*
Osteoporosis International	4,169	151,50	2.200 €	*Springer*
Bone	3,973	337	2.150 $	*Elsevier*
Calcified Tissue International	3,272	2.433**	2.200 €	*Springer*
Current Osteoporosis Report	2,728	1.156**	2.200 €	*Springer*
Journal of Bone and Mineral Metabolism	2,460	76,25	2.200 €	*Springer*
Bone and Joint Journal	1,961	150	3.000 $	*British Editorial Society*
Journal of Clinical Densitometry	2,644	201,15	3.000 $	*Elsevier*

* Price if you want to publish the article in open access. If you choose to leave it closed or limit access only to subscribers, the publication of the article is free but always check charges $50 for the same, regardless of whether or not it is accepted.
** Institutional subscription. We could not find the rate for personal subscription.

Table 3. Journal of Bone Mineral Metabolism in open format

Journal	Impact factor	Price for article	Editorial
Bone Research	3,549	3.975 $	*Nature*
Journal of Osteoporosis	No	800 $	*Hindawi*
Journal of Bone Reports & Recommendations	No	919 $	*Imed.pub*
BoneKey Reports	No	2.200 €	*Nature*
Journal of Osteoporosis & Physical Activity	No	1.019 $	*OMICS International*
Journal of Bone Metabolism	No	70 $ per page	*Korean Society for Bone and Mineral Research*
Bone Reports	No	1.500 $	*Elsevier*
Osteoporosis and Sarcopenia	No	1.500 $	*Elsevier*
International Journal of Osteoporosis and Metabolic Disorders	No	625 $	*Asian Network for Scientific Information*

Competing interests: The authors declare no conflict of interest.

Funding: This work was funded by a Canary Osteoporosis Society grant (2016).

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