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Review

Science communication in the field of fundamental biomedical research (editorial)

Sam Illingworth[a,*], Andreas Prokop[b,*]

[a] School of Research, Enterprise & Innovation, Manchester Metropolitan University, Chester Street, Manchester M1 5GD, UK
[b] The University of Manchester, Manchester Academic Health Science Centre, Faculty of Biology, Medicine and Health, School of Biology, Michael Smith Building, Oxford Road, Manchester M13 9PT, UK

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ABSTRACT

The aim of this special issue on science communication is to inspire and help scientists who are taking part or want to take part in science communication and engage with the wider public, clinicians, other scientists or policy makers. For this, some articles provide concise and accessible advice to individual scientists, science networks, or learned societies on how to communicate effectively; others share rationales, objectives and aims, experiences, implementation strategies and resources derived from existing long-term science communication initiatives. Although this issue is primarily addressing scientists working in the field of biomedical research, much of it similarly applies to scientists from other disciplines. Furthermore, we hope that this issue will also be used as a helpful resource by academic science communicators and social scientists, as a collection that highlights some of the major communication challenges that the biomedical sciences face, and which provides interesting case studies of initiatives that use a breadth of strategies to address these challenges. In this editorial, we first discuss why we should communicate our science and contemplate some of the different approaches, aspirations and definitions of science communication. We then address the specific challenges that researchers in the biomedical sciences are faced with when engaging with wider audiences. Finally, we explain the rationales and contents of the different articles in this issue and the various science communication initiatives and strategies discussed in each of them, whilst also providing some information on the wide range of further science communication activities in the biomedical sciences that could not all be covered here.

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* Corresponding authors.
E-mail addresses: s.illingworth@mmu.ac.uk (S. Illingworth), Prokop@manchester.ac.uk (A. Prokop).

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"The wise see knowledge and action as one" (Bhagvad Gita)

1. Introduction

This special issue has primarily been put together for scientists from the biomedical research field. However, we envisage that it will be useful also to scientists from other fields who are taking part or are planning to take part in science communication, as well as to professional/academic science communicators or social scientists (from now on referred to as 'science communicators'). The motivation for editing this special issue was born out of the observation that there are many excellent science communication initiatives by biomedical scientists (from now on referred to as 'scientists'), yet very few of them are publicised in biomedical journals or in science communication journals. We believe this to be due to the fact that few biomedical journals seem to appreciate the importance of these initiatives for their own scientific field, whilst most journals in the science communication field seem not to consider the work by these initiatives sufficiently academic to suit their readership.

This issue intends to bridge this apparent gap between scientists and science communicators, by providing a forum in a biomedical journal for both groups. For scientists this is an opportunity to publish outstanding science communication work without having to provide in-depth research for every statement they make, or to refer to science communication concepts and use terms and phrases unfamiliar to them. Rather, we asked the authors to describe their initiatives, rationales, good and bad experiences, strategies and resources. This will hopefully inspire other scientists to start communicating their science or improve the strategies they use. For science communicators this special issue is an opportunity to reach out to scientists and use plain language to explain and raise awareness of concepts, strategies and helpful practices developed in the field of academic science communication – hopefully also raising awareness amongst science communicators that the actual strategies they study have to be similarly applied to their own ways of communication by reaching out to non-specialists who can then benefit. Furthermore, we hope that science communicators will feel inspired to capitalise on the resources provided in this issue and use them as potential case studies for their own research.

Writing articles at the interface of biology and science communication is a challenge, and we are most grateful to the authors, all of whom were prepared to engage in this experiment. Therefore, we encourage scientists and science communicators to step back from their usual expectations for publications in their own fields, and to instead use this special issue as an inspiration to how the gap between the different disciplines could be narrowed or closed, thereby paving the way to more effective interdisciplinary collaboration and cross-fertilisation.

We believe that such interdisciplinary collaborations between scientists and science communicators would be of mutual interest and benefit. For scientists, engaging the public with their fundamental research is of enormous importance to address adverse views about science in society and to help improve science literacy (*e.g.* through the advisory and collaborative involvement of scientists in the design of school science curricula [1,2]). Unfortunately, as explained in Section 4, communicating fundamental science is a particularly challenging task, and scientists could enormously benefit from the collaboration with science communication experts to improve their effectiveness. For science communicators, interdisciplinary collaborations with scientists provide an opportunity to look beyond the usual examples commonly referred to in their field (*e.g.* climate change, fracking, genetic crops, *etc.*) and to study the enormous wealth of excellent science communication initiatives developed by those working in the field of fundamental biomedical research – often doing so without any pre-knowledge of science communication strategies.

In this editorial, we will first explain why more scientists should take part in science communication, but also address and explain two barriers that may hamper such activities: the lack of knowledge most scientists have about concepts and strategies of science communication, and the specific challenges that scientists face in engaging with the public. We will then explain the rationale and content of the articles in this issue and how they may help those scientists that are taking part or want to take part in science communication.

2. Why should biomedical scientists engage in science communication?

Science and science education are of important benefit to society, not only through promoting economic gain but also through promoting and sustaining social values [1–3]. Accordingly, the British Science Association (BSA) states as their vision "a future where science is seen as a fundamental part of culture and society at large, instead of set apart from it" [4]. Whilst these arguments might be too abstract to provide an incentive for scientists to engage with the public, others have more immediate relevance; for example, the development of dialogue between scientists and the wider public as well as policymakers, is an important strategy to counteract mutual misconceptions and may have important implications for future directions of science funding [1,2,5–9,131]. It has been suggested that scientists might perhaps no longer have a choice as to *if* they should communicate but should rather focus on *how* to do so effectively ([10] and references therein). Those who are taking part in science communication already, likely do so for a number of reasons; for example, they respond to expectations from their funders, have a passion for their subject and a desire to communicate and inspire, hold a belief that their science is of interest to the public, feel a need to defend science from misconception, recognise the need to build trust, see a benefit for themselves or their institutions, or realise opportunities for involving the public in their own research [6,10–14]. It has also been pointed out that favourable conditions play an important role, with scientists more likely to communicate their science if they have an established position and dedicated funding, if they are supported by their institution, or if they have a strong reason to believe that their engagement will be successful [10] . Therefore, improving external factors is one major challenge that needs to be addressed by decision and policy makers [13], but finding the right motivation is a challenge that concerns us all. We hope that the examples of well-established science communication initiatives in this issue will inspire more scientists to engage with wider audiences and that those who are engaging already feel reassured and get new ideas to further improve their strategies.

3. Understanding concepts and pitfalls of science communication

Science communication rationales, aims and strategies are widely researched by science communicators [6,15,16], but perhaps too little of this filters through to scientists who are actively engaging with the public [17–19]. We feel one important reason for this gap to be that the strategies and concepts of the academic science communication field are not well enough communicated to non-specialist audiences (see Section 5.1). In our view, this hypothesis deserves serious investigation which could, in turn, provide new opportunities and incentives for true interdisciplinary collaborations between science communicators and scientists; such collaborations will be of great benefit, especially when considering that the field of science communication is so complex that it defies a