Is there a robust future for research in reproduction?

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Spurred on by recent high-profile discoveries that, in pre-clinical research, the majority of findings cannot be replicated, there is an increasing awareness and vociferous debate about the validity of data in medical/scientific studies (Plant et al., 2014; Freedman et al., 2015). What information can we rely on? Some of the revelations and statistics are frightening. For example, scientists at Amgen tried to replicate the findings of 53 ‘landmark’ research papers in pre-clinical cancer. Remarkably, the findings could only be confirmed in six cases (Begley and Ellis, 2012). Comparable examples occur in other fields of biomedical sciences (Masca et al., 2015) and beyond. For example, a large-scale study conducted on the reproducibility of psychological science covering 100 studies demonstrated that a large proportion of the replications produced much weaker evidence for the original findings and a number were no longer significant (Open Science Collaboration, 2015).

Whilst irreproducible findings waste time, effort and delay potential treatment for patients, calculations illustrate an astronomical economic impact. Freedman et al. (2015) calculate that US$28 000 000 000 ($28 Billion) per year is spent on research in the USA that is not reproducible.

What’s happening in our own discipline? Is reproductive medicine immune? Absolutely not. In my own field of male infertility, the situation is tragic. Semen analysis is the cornerstone of diagnoses; however, for over 70 years, there has been debate as to its diagnostic and prognostic significance. A primary concern has been the considerable lack of standardization. To the uninitiated this may, at first, appear strange as the WHO have been producing manuals on semen assessment since 1980. However, what is clear is that even though robust methods exist, and have been proved to produce reliable data, the overwhelming majority of laboratories do not follow them. A salient example is the performance in the German semen analysis external quality control program (Mallidis et al., 2012). Overall, fewer than 8% of the participating laboratories followed the WHO—a percentage that had changed little over the 10-year period. Depressingly, this is similar to the UK experience (Riddell et al., 2005). It is, of course, not just semen analysis that is subject to methodological error as issues with AMH exemplify (Nelson et al., 2014).

So what can be done? A plethora of calls from individuals, societies and groups of interested parties including funding bodies are exploring a variety of ways to address the issues. The fundamental importance of robust methodology for sound scientific development is gaining significant traction (Masca et al., 2015) and innovative approaches are being tested. For example, with regard to chemical probes, an expert community has developed a community-driven wiki resource termed the Chemical Probes Portal (http://www.chemicalprobes.org/). The aim is to convey the current practice by providing specific advice and resources that includes a checklist for experiments using chemical probes (Arrowsmith et al., 2015).

What are we doing in the ESHRE journals?

Firstly, we are leading the way in addressing discipline-specific issues. An initial example is semen analysis. We will shortly be adopting a tool for authors and reviewers of the ESHRE Journals to improve the quality of published studies which rely on semen analysis data (see Björndahl et al., 2016).

Secondly, with Associate Editors and editorial staff we will be updating the Instructions to Authors to emphasize the requirement to use robust methods. Referees will be asked to specifically comment on these.

Thirdly, whilst the focus of MHR is on innovative work, we will regard experiments that repeat original data and clarify methods as fundamentally important. After all, results need to be robust otherwise they have little meaning.

Here’s looking to a robust future.

References


