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ACCEPTED MANUSCRIPT

Toxicology and the reproducibility crisis: Scientific publishing, hazard assessment and risk characterization

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Abstract: The editorial discusses issues arising for toxicology and its application due to the "reproducibility crisis".

Keywords: risk characterization, reproducibility, peer review, hazard assessment

According to a recent article in Nature (Baker, 2016), more than 70% of researchers have failed to reproduce results of other scientists experiments and more than half have failed to reproduce their own observations. Selective reporting and poor study design including inadequate statistical evaluation were cited as major factors that contribute to irreproducible research. Outright fraud, pressure to publish, and insufficient peer review were also cited as significant factors contributing to irreproducible results. This is a striking conclusion which has a major impact on the credibility of science in general and thus on public perception of science, and likely on the continued funding of scientific research.

How can the applied science of toxicology address this issue, and how does sporadic reproducibility of experimental results affect the major tasks of toxicological-oriented research, hazard assessment and risk characterization. In my opinion, a number of improvements are possible.

To begin, peer review needs to be as detailed as possible and provide a thorough assessment of methodology, results and conclusions in a submitted manuscript. Admittedly, this is time consuming and requires reviewers with in depth knowledge, who are usually busy and understandably reluctant to dedicate their limited free time to review all manuscripts that they are asked to. Moreover, the rapidly growing

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