Consorted approaches to facilitate data quality, robustness and relevance in preclinical research and development

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The views expressed in this presentation are solely those of the individual authors, and do not necessarily reflect the views of their employers.
Multiple Players in the Field

- Academia
- Industry
- Biotech / CROs
- Scientific societies
- Publishers
- Funding agencies

Many "independent" initiatives
Benefits of a Consortium Approach

- Common Goals
- ONE Voice
- Pooling resources
- Greater impact
- Enhanced efficiency
- Broad reach
External Programs to Enhance Data Quality

Responding to concerns about research reproducibility

UK funders demand strong statistics for animal studies

Journals unite for reproducibility

Netherlands Research Integrity Network

Quality in Research

Guidelines for working in non-regulated research

RQA Research Quality Association

Reproducibility Initiative

Get Mendeley What is Mendeley? Papers Groups
Focus on development of SOPs for rodent behaviors to model neurological and neuropsychiatric disorders and the examination of the SOPs for reproducibility and reliability

Right intentions - limited impact
Arrive Guidelines for Animal Research

Reporting of In Vivo Experiments

Published in 2010 by authors from 4 organizations (NC3R, Univ. Bristol, Imperial College London, Univ. Oxford)

- Checklist of essential information in a manuscript (authors/reviewers/editors)
- Focus on research using animals
- To promote reproducible, transparent, accurate, comprehensive, concise, logically ordered, well written manuscripts
Arrive Guidelines for Animal Research Reporting of In Vivo Experiments

Published in 2010 by authors from 4 organizations (NC3R, Univ. Bristol, Imperial College London, Univ. Oxford)

Right intentions - moderate impact
New NIH Grant Guidelines (2016)

- Changed application requirements and review language to enhance scientific rigor and transparency
- Updates to research strategy guidance
  - Critical evaluation of prior knowledge
  - Description of experimental design
  - Consideration of biological variables (e.g., sex)
- Authentication of key biological and/or chemical resources
- New reviewer evaluation guidelines
  - Strength of the scientific premise
  - Relevance of the biological variables
  - Robustness of approach and control for bias

Right intentions – expected strong impact

[Link to NIH Grant Guidelines](https://grants.nih.gov/reproducibility/documents/grant-guideline.pdf)
Little Indication that Guidelines are Effective

Temporal Patterns in Randomization, Blinding and Sample Size Estimation in Preclinical Cardiovascular Studies

28,636 articles screened
• 10-year period
• 5 leading cardiovascular journals
3,396 included

Conclusions: Methodological shortcomings are prevalent in preclinical cardiovascular research, have not substantially improved over the past 10 years, and may be overlooked when basing subsequent studies. Resultant risks of bias and threats to study validity have the potential to hinder progress in cardiovascular research.

Preclinical Studies Don't Regularly Adhere to Best Practices
By Kerry Grens
Animal experiments published in a handful of cardiovascular journals mostly ignore NIH guidelines.
8 May 2017

The Scientist » News & Opinion » Daily News
One Journal Standing Out

Rarmirez et al., Circulation Res., online, 2017
The Next Generation

Data Quality in Preclinical Research and Development

First IMI consortium completely dedicated to improving Data Quality

11 EFPIA partners – defining the need

18 applicants – responding to the need

10 Universities:
(Germany, Netherlands, Switzerland, UK)

6 SMEs
1 scientific society
1 PMO
High Level Objectives

Pool resources from both academia and industry to pilot this action in Neuroscience and Safety, facilitated by a Quality Management System

**Historical Data Analysis (industry / academia / CRO / public):**
- Define the variables in study design and data analysis that influence experimental outcome

**Guiding Principles on Experimental Design:**
- Define Research Guidelines for non-regulated R&D and basic research to improve scientific rigor

**Quality Management System (QMS):**
- Define the components which will make up and maintain a fit-for-purpose QMS to assure data integrity

**Prospective Studies / Feasibility Testing:**
- Implement Research Guidelines and validate feasibility of the QMS in cross-site validation / ring testing studies

**Training Platform / Dissemination:**
- Deliver an online educational platform providing certificated education and training modules
Summary

Need to further improve data reproducibility and data quality remains high

Several initiatives with different levels of success

Majority of initiatives focus on experimental design and less on data integrity

Consorted approaches offer benefit due to broad base with common goals and greater impact – but early stage
Acknowledgements

Janssen
• Anja Gilis
• David Gallacher
• Tom Lavrijssen
• Tom Van de Casteele

University of Edinburgh
• Malcolm Macleod

PAASP
• Anton Bespalov
• Christoph Emmerich
• Björn Gerlach

Concentris
• Sara Stöber

IMI
• Elisabetta Vaudano

EFPIA
• Magda Chlebus