Scientific Fraud – Who Is To Blame: The Individual or the System?

Hans-Joachim Priebe, MD, FRCA, FCAI
Professor Emeritus of Anesthesia
Freiburg, Germany

Definition of scientific misconduct

The 'Office of Research Integrity' (ORI) is defining scientific misconduct as follows (http://www.ori.hhs.gov/policies/fed_research_misconduct.shtml):

• *Category I scientific misconduct (= scientific fraud)*
  - fabrication: making up data or results and recording and reporting them
  - falsification: manipulating research materials, equipment, or processes, or changing or omitting data or results such that the research is not accurately represented in the research record
  - plagiarism: appropriation of another person's ideas, processes, results or words without giving appropriate credit

• *Category II scientific misconduct ("Questionable research practices")*
  - taking undeserved credit for intellectual contributions or discoveries
  - either accepting or awarding "honorary" or "gift" authorship of publications
  - using university equipment, funds, or facilities for private benefit
  - duplicate publication of data
  - piecemeal publishing *(i.e., deliberately splitting research results into the "smallest publishable units" to increase the number of one's publications)*
  - keeping sloppy or incomplete research records

• *Category III scientific misconduct ("Other misconduct")*

  Acts that may occur in a research setting, but "are clearly not unique to the conduct of science … [and] are subject to generally applicable legal and social penalties" *(e.g., sexual harassment, unethical treatment of peers and subordinates, discrimination on the basis of personal characteristics).*

The evidence suggests that in quantitative terms, scientific fraud is more the exception than the rule. However, it occurs far more often than just occasionally.

<u>Individual</u> causes of scientific fraud

• personality characteristics of the "bad apple", i.e., individuals who …

… obey authority figures' unethical directives

… act merely to avoid punishment (*i.e., are lower in cognitive moral development)*

… manipulate others to orchestrate their own personal gain *(i.e., are Machiavellian)*

… who fail to see the connection between their actions and *outcomes (i.e., have an external locus of control)*

… believe that ethical choices are driven by circumstances *(i.e., hold a relativistic moral philosophy)*

… have low job satisfaction *(i.e., unethical behaviour to "compensate" or "retaliate"?)*

• personality disorder *(e.g., pathological narcissism, borderline personality)*

• desire for fame → selfish dishonesty to promote one's own career

• hubris *(i.e, researcher is convinced to 'know' what the results of a study ought to be and manipulates or fabricates the data to fit his/her belief)*

• financial gain in industry-supported research

• self-deception *(i.e., suppression of feeling guilty of fraud)* by,

– arguing "everybody else does it"

– producing quasi-altruistic arguments for lying – i.e., dishonesty in a 'good' cause of helping others, or to be an agreeable colleague *(e.g., project leaders may feel responsible for raising money to support their junior team members; feel obliged to do whatever type of research is most generously funded; and to say or write whatever is necessary to obtain that funding)*

• paranoia that other scientists may be close to success in the same 'hot' area of research

• ease of fabrication because,

– results are often difficult to reproduce accurately because of technical complexities

– lack of emphasis on replication of findings

→ scientist can expect to get away with falsification or at least claim innocence

• career pressure / competition

– promotion and funding of physicians in academic medicine are closely linked to the number of their publications

– supremacy of volume over substance in scientific research

– continuous competition for publishable findings on 'fashionable' topics with statistically significant results

→ the 'hotter' the field, the more likely it is to be corrupted with misinformation

<u>Systemic</u> causes/inducements of scientific fraud

• unprecedented importance attached to publishing in 'A-level' *(i.e., high impact factor)* journals with the unchallenged assumption that any paper published outside these venues is a second-rate paper, and that any paper published in them is first-rate.

• high imperative to publish *("publish or perish")* because,

  – criterion for promotion is often quantity rather than quality of publications *(supremacy of volume over substance in scientific research)*

  – ongoing scientific support and funding depend on good reputation which, in turn, largely depends on publication in high-profile *(high impact factor)* journals

• in most countries, acquisition of funds on the basis of fraudulent data is not a legal offence.

• lack of emphasis on replication of findings

• institutional characteristics of a "bad barrel", i.e., institutions who lack …

  … benevolent climate *(i.e., attention on well-being of patients)*

  … principled climate *(i.e, emphasis on following rules that protect institution and others)*

  … strong ethical culture *(i.e., clear communication of range of acceptable and unacceptable behavior – e.g., through leader role-modelling, reward systems, informal norms)*

  … strict control of ongoing research projects

  … enforcement of code of conduct

• general lack of clear guidelines on how to deal with scientific misconduct

• strong reliance on, and belief in the effectiveness of the peer review system

  → massive expansion and influence of peer review which has become the core process of scientific evaluation

  → replacement of 'peer usage' with peer review as the major mechanism of scientific evaluation *(affecting job appointments, promotions, ethical review and funding, prizes and rewards)*

Possible correctives against scientific misconduct

- intensive teaching of ethics in science
- within research departments establishment of clearly defined rules of correct scientific behaviour and strict implementation of such rules
- independent national institution for supervision and implementation of scientific integrity
- strict sanctioning of scientific misconduct
- supremacy of quality over quantity of publications
- downgrading of the prominence of the impact factor in the evaluation of the scientific "output"
- upgrading of studies with "negative" results
- protection of whistleblowers
- modifications of reviewing process of scientific manuscripts *(e.g., pre and post publication open access reviewing?)*

Conclusion

Scientific fraud, who is to blame: the individual or the system? Both – with the system contributing considerably.