



If not science, what?

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Editorials and commentaries published by Journals representing scientific and professional societies, popular weekly and monthly magazines, and the science sections of daily newspapers from all-over the world are reporting that the content (data and interpretation) of a significant number of research papers is not to be trusted. A comparably number of radio and TV stations and networks parley a similar message. These damning allegations include direct evidence or implications of either fraud, incompetence or both on the part of researchers.

A number of reasons have been offered to explain why the biomedical sciences in the 21st century are facing this unprecedented crisis. This tragicomedy has several well-identified protagonists. Prestigious and not-so-prestigious college and universities are peopled by experimentalists who for either quirky financial reasons affecting educational and health-related activities or for reasons related to more mundane, sociological factors are put under undue pressure to obtain funds to maintain their laboratories open, fulfill the request for indirect support by the host research institution administration, teach students, etc. In some countries, this tense situation is aggravated by an unambiguous assault on the institution of tenure that has successfully preserved the intellectual freedom of faculty and researchers. Funds distributed by national and philanthropic agencies have been reduced significantly when compared to those offered during most of the second half of the 20th century. In part because of the financial squeeze, the ideally fruitful interdependence that should exist among the protagonists of the research enterprise has been weakened to a point that researchers feel compelled to "cut corners" in an atmosphere where irreproducibility flourishes.

Constrained by pharmaceutical companies and other stakeholders that are pressing for results, researchers are encouraged to accommodate their own priorities to those of the stakeholders. Just to mention an example, research in the GMO fields highlights how scientific reliability is bent by the perceived logic of the market.

The record shows that no participant in the research enterprise is spared some degree of responsibility for what certain commentators have called "the mess" in which research in the biomedical sciences is now trapped. This aspect of the problem is now for everyone to acknowledge and, more importantly, to condemn it. In any case, because an acceptable accurate diagnosis of the situation has been made, namely, that the biological sciences are in crisis, one may optimistically conclude that, alas, a solution is at hand!

Next, comes the more difficult task of successfully treating the disease from which science now suffers. From a historical perspective, a question comes to mind: is there a precedent in which scientists and the research infrastructure that sustained them in the past was confronted with a comparable situation to the one alluded to above? Admittedly, two centuries of research in biology is not a period long enough from which to draw examples of the situation the biological sciences are now facing. Notwithstanding, both historians of science and theoretical and experimental scientists would concur that some hints may provide ways to interpret this sad situation. For at least one hundred years, reductionism has dominated the thought and thus the research strategy in the biological sciences. So, it might stand to reason asking... is it conceivable that this unprecedented situation that the biological sciences are facing

in the 21st century is due to the adoption of a misguided epistemological rationale and of unreliable theoretical assumptions? This reductionist bent adopts methodology and reaches conclusions that pretend to explain phenomena happening at the social, organismal or tissue level of biological organization by seeking causality in molecules and molecular interactions. Consequently, the current reductionist paradigm is unable to explain new paradoxes and controversial results, which, ultimately, worsen the reproducibility crisis.

In sum, does the solution to the current situation involve rejecting reductionism, which we consider it is at the core of the mess? An alternative approach, namely organicism, might be a plausible option. Obviously, a change of tack of this magnitude is not to be taken lightly. If science is indeed self-correcting, this is the time and the opportunity for such assertion to be tested. Or is the scientific community bent to put a band aid or supply just an aspirin to this potentially crippling disease? For sure, this latter approach may be less traumatic and disruptive in the short run but probably fatal in the long one.

In the not too distant past, large financial institutions in the USA were bailed out because of the controversial argument of being “too-big-to-fail”. If science is the social construct we consider worth “saving” because it could also qualify as “too-big-to-fail”, inevitably, fundamental questions need answers... and fast! A sample of them follows... Who has the moral authority to implement (dictate?) a healing strategy? Who will be the managers of the operation? How will the change be handled? How long will it take to operate the change? Scientific and academic institutions and researchers should urgently address these questions and, more importantly, provide the right answers.

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