

Trust the process and build a better science for tomorrow

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Abstract: In the quest to find an answer to a problem, the evidentiary data may not necessarily support the suggested hypothesis. The alarming increase in the number of retractions for scientific papers, is pointing towards the expanding unscientific practices in the academic community across the globe. Unbiased interpretation of data without preconceived notion can lead to enhancement in the quality and reliability of scientific information.

According to the Nature publishing group, more than 10,000 research papers were retracted alone in 2023¹. In STEM the number is even on the higher side for biomedical research, which is about four times in past 20 years². This is alarming, embarrassing to a scientist, and an impending danger to the scientific credibility. Different possibilities have been highlighted regarding this ever increasing retractions of biomedical research papers. The major reasons suggested are namely plagiarism, falsification or fake peer review, duplicate publication and issues related to the integrity of scientific data^{3,4}. Amongst those, plagiarism and fabrication takes away the largest percentages, alone in India³. The Committee on Publication Ethics (COPE) is an organisation that educate and support authors, editors, publishers, reviewers and others worldwide for good publication practice^{5,6}. Their guidelines provide instructions and list of actions that could be taken to avoid disputes and address other such problems⁵. Despite the fact, we are witnessing such massive increase in unscientific practices. The hope still exists to meet with a solution to this problem.

In the scientific journey, I too learnt to emulate the scientific dogma, which goes like; ask a question → form a hypothesis → get experimental data → validate the hypothesis. This is probably common for every researcher. But what is going wrong eventually?

There is another important step in science, often underestimated, that I realised during my doctoral studies. Modification or correction of a hypothesis secures huge importance in scientific investigation of a problem or question. My hypothesis became my baby after receiving a grant from ProRetina GmbH. Eating, drinking and sleeping the hypothesis, it seems almost impossible that the hypothesis might need a revisit at any point of time. Surely, I was disappointed and felt stuck when my data did not favour the grant winning hypothesis, but the beauty of science is that it has its own way of working. An unbiased interpretation of the data can give more lucidity on the underlying cause or the crosstalk of mechanisms. When I was stuck, I did not know that I was not alone. With different conversations and discussions, the idea gained more clarity that getting stuck and feeling disappointed is a good thing, and reflects progress in science. It is like hunting for the treasure that is buried deep in the ground. If there is something big beneath, the spade cannot dig it out. Small things would often fall apart or come out. For science or in biology to be more specific, it would mean something like this, smaller pathways converge to make bigger mechanisms function. When we go by the trail of a small known pathway, towards the end we may hit an unknown crosstalk that can let us impasse. Trusting the data without any preconceived notion is the way out. I was investigating the effect of modulating calcium metabolism on blindness. All the logic that led to the hypothesis said it should prevent blindness. However, with my data (also from collaborators) we found crosstalk between unexpected components which unfolded an entirely new avenue of research⁷. Following the newly found clues I believe would not only show a treatment opportunity for blindness, but also reveal another wonderful mechanism, our photoreceptors miraculously perform to make this world visible to us.

Summary

Forming a hypothesis for a problem is a part of the scientific journey. Modification of a hypothesis is as important as forming the hypothesis. Evidentiary data not supporting the hypothesis can often lead to disappointment. Feeling of disappointment and stuck can often reflect progress in scientific research but can also lead to falsification of data. It is important to be open minded for accepting the change and trust the experimental data. Performing unbiased interpretation of data together with consistency and perseverance, without any preconceived notion can eventually help gaining knowledge about the unknown.

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