

## GUEST COMMENTARY

### On Rejection<sup>∇</sup>

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“Prepare yourself for a life of rejection.”

—Prof. John David, advising a trainee

“Rejection is in the fabric of what we do. We send our papers, carefully crafted to consider every angle and interpretation of our hard won data, and ‘Slap!’ we’re squashed like vermin.”

—Mole (9)

“Dear Editors,

Thank you for the rejection of our paper. As you know, we receive a great many rejections, and unfortunately it is not possible for us to accept all of them. Your rejection was carefully reviewed by three experts in our laboratory, and based on their opinions, we find that it is not possible for us to accept your rejection. By this we do not imply any lack of esteem for you or your journal, and we hope that you will not hesitate to reject our papers in the future.”

—Mole (10)

Roughly two-thirds of the manuscripts submitted to *Infection and Immunity* are rejected, about the same fraction of time that an excellent professional baseball player fails to get a hit. Such selectivity is arguably essential for *Infection and Immunity* to retain its impact as the most widely cited infectious diseases journal in the world (2). Nevertheless, while this proportion may not approach the staggeringly high rejection rates currently encountered in NIH Study Sections (5, 11), each rejected manuscript represents hundreds of hours of work relegated, at least temporarily, to the rubbish bin.

Although most rejections are quietly and graciously accepted as an inevitable part of the process, occasionally rejections are appealed and rarely there is even a vehement response. One author, after being informed that his manuscript was outside the scope of the journal, announced that he would never again submit nor review a manuscript for *Infection and Immunity*. Another notified the journal that the reviews of his manuscript were sent to the National Institutes of Health as proof that reviewers in his field were hopelessly incompetent. In light of such responses, perhaps it is appropriate to reflect on the importance of rejection in the scientific process.

Let me first freely acknowledge (from ample personal experience) that rejection is painful. I agree with the pundit who observed, “Honest criticism is hard to take, particularly from a relative, a friend, an acquaintance or a stranger” (attributed to Franklin P. Jones). However, I would assert that rejection is central to science. Science is a community endeavor in which

experts attempt to achieve consensus with regard to the present state of understanding in their field. This consensus is constantly under reevaluation. Although scientific knowledge may be tentative, it is not a trivial matter to change the status quo. The more sensational or unexpected the discovery, the greater the burden of proof demanded by others. As James Randi famously observed, “If I told you that I keep a goat in the backyard. . .and if you happened to have a man nearby, you might ask him to look over my garden fence. . . But what would you do if I said ‘I keep a unicorn in my backyard?’ (8)?” Once a scientist makes a discovery, the task of amassing evidence to convince reviewers and skeptical competitors begins. Although it is not necessary to convince every last holdout (e.g., Peter Duesberg or Michael Behe) for new information to be incorporated into the corpus of scientific understanding, it is essential to convince a critical mass of workers in the field. Otherwise the work will lack impact, whether valid or not.

The scientific method evolved from the ancient Greek traditions of mathematical logic and rhetoric (6). The Greeks valued the derivation of a logical conclusion from a succession of rational steps and revered the individual who could persuasively argue a point in public. Accordingly, scientists who have made a new discovery must systematically support their conclusions and then proceed to convince a skeptical community of the veracity of their claims. It is the duty of one’s fellow scientists to challenge and critically scrutinize each new piece of new information before accepting it. The process of questioning, demanding multiple lines of evidence and reproducibility, and testing the predictive power of new ideas makes our knowledge more secure. This is what makes science uniquely powerful as a way of understanding the natural world.

It is human nature to set the bar lower for our own data than for someone else’s, hence the aggravation of jumping through various hoops set by reviewers before a manuscript can be published. Moreover, reviewers are human—mistakes are made. The journal *Nature* still expresses regret over forcing Krebs to publish his discovery of the TCA cycle somewhere else (1). An entire website has been devoted to the rejections endured by Nobel laureates (3), although I would hasten to add that lots of poor-quality work gets rejected too. The appropriate response to reviewers, though not always the first one that comes to mind, is to patiently address critiques whether they seem well informed or not. And let us not forget that authors are human, too. In my personal experience, specious criticism does not sting nearly as much as critiques that are right on target. Those extra experiments insisted upon by reviewers often turn out to provide valuable corroboration and occasionally even spare an author from committing embarrass-

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ing mistakes permanently into print. Rejection will always be tough to take. But until the skeptics are convinced, the author's job is not done. Reviewers make mistakes, to be sure, but they are trying to do an essential, difficult, and generally thankless job. Most of the time, the manuscript review system works. As Churchill once observed about democracy, peer review "is the worst (system) . . . except all the others that have been tried."

How can we keep the system working? Reviewers can strive to provide reviews that they themselves would be willing to receive (7). This may be particularly challenging when one's own work has been recently rejected (4), but the Golden Rule remains a good principle in reviewing, as in other aspects of life. Even when a decision is made to reject a manuscript, reviews should be respectful, constructive, and reasonable, focusing on issues that are truly substantive. Authors, for their part, should carefully consider critiques before firing back in-judiciously. For the rebuttal accompanying a revised manuscript, the author should take the time to respond point-by-point to each concern. Reviewers' critical comments and suggestions for experiments may be disputed but should not be ignored. When possible, it is often the best course of action for

authors to provide additional data that resolve uncertainty and satisfy reviewers' concerns. A collegial but rigorous engagement between reviewer and author is at the very heart of *Infection and Immunity*, and of science itself.

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