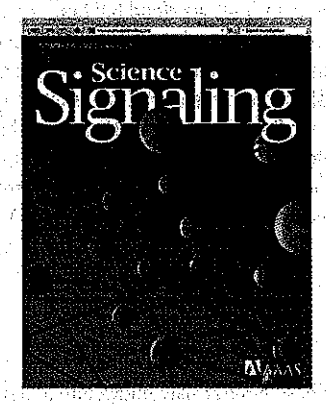
Bruce Alberts is the Editor-in-Chief of *Science*.

Scientific Publishing Standards

THIS WEEK MARKS THE LAUNCH OF A NEW, IMPROVED VERSION OF THE AAAS JOURNAL *Science Signaling*, which will now contain original research. Professor Michael Yaffe, its new chief scientific editor, has clearly articulated the ambitious goals for his journal.* Highly elaborate signaling mechanisms are essential for controlling the behavior of each cell in a multicellular organism—allowing each of the many billions of cells in our bodies to decide whether it will grow and proliferate, remain quiescent, kill itself, or change its behavior according to signals received from neighboring cells. Understanding how this complex system works represents a major challenge. Unraveling its many mysteries will require a great deal of ingenuity—and the collaboration of biologists, chemists, physicists, engineers, computer scientists, and mathematicians. We are confident that *Science Signaling* will set the highest standard for research in this important field, and that, through its Perspectives and Review articles, it will help to guide future researchers along highly productive paths.



The new journal began in 1999 as *Science*'s STKE (Signal Transduction Knowledge Environment), an online resource. The initial aim was to speed the generation of new knowledge by creating an Internet-based work environment that would provide "all practitioners in a field of endeavor access to all the knowledge within the field" and "speed identification of relevant information and encourage communication with others." The Web site flourished. As the next step in an ongoing evolution, *Science Signaling* has now added original peer-reviewed research papers to the myriad of resources provided at the site.

I want to take this propitious occasion to reflect briefly on the core purpose of scientific publishing, and to consider some guiding principles that we scientists, editors, and publishers need to keep in mind in our collective efforts to improve the scientific literature.

The publication of a scientific article is less a way for scientists to earn recognition and advance their careers than it is an engine for scientific progress. Science continually advances only because many cycles of independent testing by different scientists allow new knowledge to be built with confidence upon old knowledge, thereby creating a repository of reliable understandings about the world. The publications of those of us who are scientists explain what we have found in our investigations, and they lay out exactly what we have done to make each discovery. Clear, truthful presentations of data, results, and methods are essential for enabling the findings of one scientist to be confirmed, refuted, or extended in new ways by other scientists.

Scientists have an absolute obligation to honesty: They must accurately report how they arrived at their discoveries, as well as the discoveries themselves. Thus, our journals must insist on detailed descriptions of all of the methods used, so as to allow other scientists to reproduce the results in a straightforward manner. The appropriate place for most of this information is in the easily expandable Supplementary Materials that accompany each article. Authors, reviewers, and editors of scientific manuscripts should therefore constantly ask themselves whether the reader has been provided with everything needed to both understand and reproduce the results.

The increasingly large data sets produced in some studies present a different challenge; they require deposition in readily accessible, online archives, supported by stable public funding.

Last but not least, journals themselves can certainly set a higher bar for the clarity of presentation in the manuscripts that we publish. The problem is perhaps most obvious in the brief abstracts that authors write to introduce each article, which often seem to be written only for a handful of experts in the authors' subspecialty. Some abstracts, full of three-letter abbreviations and jargon, are incomprehensible to me even in my own field of cell biology. As scientists and as journal publishers, we can and we must do better. In this, as in many other areas, *Science Signaling* will aim for the same high standards that we strive for at *Science*.

–Bruce Alberts

10.1126/science.1165268

Sci. Signal. **1**, eg5 (2008).

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