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The Art of Translation

THIS WEEK MARKS THE LAUNCH OF THE NEW AAAS JOURNAL *SCIENCE TRANSLATIONAL MEDICINE*. I am very pleased that we were able to recruit Elias A. Zerhouni, the distinguished former director of the U.S. National Institutes of Health, to be its chief scientific adviser, and Katrina L. Kelner, until recently the Deputy Editor for Biological Sciences at *Science*, to be its editor. As Zerhouni writes in his editorial, the goals of this journal, and of translational medicine more broadly, are to speed the rate at which the astounding recent advances in our basic understanding of biological mechanisms are exploited for preventing and treating human disease.*

Knowledge accumulates as science advances, and science and technology are generating new knowledge at an increasing pace. The acceleration becomes understandable once one recognizes that new knowledge is formed by creatively combining old knowledge in new ways, and that, for example, 100 pieces of knowledge can be combined in 100 times more ways than can 10 pieces of knowledge. The most striking innovations often come from combining knowledge across disparate domains, but only a tiny fraction of such combinations will be useful, making research strategies ever more critical as science proceeds. Great science therefore resembles great art in the sense that an outstanding scientist has carefully selected a “subject” (the unsolved problem to attack) and the “brushes and paints” (the research strategy and techniques), using them to skillfully create a pleasing original “painting” (a new explanation of some aspect of the natural world).

The opportunities and the challenges in translational medicine are enormous, and constant waves of innovation will be needed to meet them. New ideas and approaches are essential. Too often, information with the potential to improve human quality of life is available only through silo-like channels. For example, cardiologists who only attend specialized meetings and read the cardiology literature, but not the physics or computer science literature, can miss an important breakthrough that could advance their own research. To stimulate innovation, we must intentionally catalyze the mixing of scientists and clinicians from different disciplines, knowing that new approaches will emerge from their interactions. *Science Translational Medicine* strives to increase such mixing by keeping researchers informed about relevant advances across all disciplines.

When I was at the U.S. National Academies, we experimented with several types of scientific meetings that clearly demonstrated the power of transdisciplinary mixing. The simplest focused on developing new approaches to an important scientific challenge through a 2-day workshop involving no more than 30 scientists.

Traditionally, scientific meetings have been designed to bring together a large number of scientists who work on similar problems. For example, to discuss schizophrenia, the best scientists who study it would normally be invited to give back-to-back 30-minute talks about their most recent research over the course of 2 to 5 days. The schizophrenia workshop at the National Academies was very different. We invited only a few experts in schizophrenia, plus a larger group of leading scientists from a wide variety of fields, including cell biology, biochemistry, human genetics, and neuroscience. During the first half-day, the experts provided teaching sessions for those who knew little about schizophrenia, including overviews of the latest progress in understanding and treating the disease. The next day and a half was then devoted to brainstorming sessions, in which the non-experts attempted to bring their unique scientific perspectives to bear on a group effort to outline the most promising approaches for future research.

Exactly the same approach was used a few years later to scope out new approaches for developing antiviral treatments for smallpox. Both workshops were unusually stimulating and successful, generating important new ideas.† Analogously, it is our hope that *Science Translational Medicine*, by juxtaposing scientists and clinicians with very different backgrounds and approaches to disease, can speed the rate at which innovation increases human well-being.

– Bruce Alberts

10.1126/science.1182658

*E. A. Zerhouni, *Sci. Transl. Med.* **1**, 1ed1 (2009). †S. H. Barondes *et al.*, *Proc. Natl. Acad. Sci. U.S.A.* **94**, 1612 (1997); S. C. Harrison *et al.*, *Proc. Natl. Acad. Sci. U.S.A.* **101**, 11178 (2004).

