Five years of translation

In October 2009, the Nobel committee awarded prizes for basic research on ribosomes and telomeres. In the same month, AAAS launched a new journal with a different focus—Science Translational Medicine (SciTM)—staking out a clear role for the organization in advancing clinical medicine. One year later, awards at the pinnacle of science also recognized more translational achievements.*

Worldwide, scientists are thinking more about the translational value of their work, and big efforts have been funded to create institutes that bridge basic research and clinical practice. Over the past 5 years, there has been an exciting outgrowth of research programs and funding resources focused on discoveries at this interface. With the guidance of Elias Zerhouni, SciTM’s founding Chief Scientific Advisor and former director of the U.S. National Institutes of Health, the journal shaped its mission: to provide an interdisciplinary forum for research that makes tangible progress toward improvements in clinical medicine by applying basic biological research and engineering science. Then and now, with Chief Scientific Advisors Elazer R. Edelman and Garret A. FitzGerald at the helm, SciTM publishes findings from all areas of biomedicine, including those with roots in engineering and the physical sciences.

On this 5-year anniversary of SciTM, the journal’s progress and support of this exciting and vital “bench-to-bedside” enterprise can be traced through its published papers that have spurred encouraging translational progress. Early success was reported in 2011 with the treatment of two advanced leukemia patients with T lymphocytes engineered to attack tumor cells.† These therapeutic immune cells—decorated with chimeric antigen receptors—seemed to be long-lasting memory T cells, raising hopes that remission would be permanent. Today, these patients remain cancer-free. Numerous biotech and pharma firms are now genetically engineering T cells, and the approach appears to work for other blood cancers. At present, 52 clinical trials employ these engineered receptors for targeting cancers ranging from leukemias to neuroblastoma. Cancer immunotherapy was chosen as Science’s 2013 Breakthrough of the Year, and the field is poised to make more major leaps.

SciTM also published a key resource for exploring the links between disease and the human microbiota—a mouse model in which microbes of the human gut set up residence in the mouse gut for study under controlled conditions.‡ Since then, this model has shown that intestinal microbes transferred from obese or malnourished people confer these maladies to recipients and that gut microbes contribute to colon cancer and fatty liver disease. Further elucidation of microbe-disease associations using this model will lead to treatments and preventions that improve health.

In an early application of bioengineering to cancer, SciTM reported an implantable vaccine depot built from a polymer matrix.§ Loaded with a soluble signal to attract immune cells, the polymer triggers an immune response in the host, just like a natural infection. Mice carrying the implant produce lymphocytes that kill cancer cells and squelch undesirable immune cells, resulting in tumor regression and longer survival. This fruitful collaboration among materials scientists, bioengineers, and immunologists has led to a clinical trial of a small disklke sponge inserted under the skin of patients with melanoma—the first test of the system in humans.

Recently, Stephen Palumbi, a prominent marine biologist, commented that the rise of the conservation mission at aquariums provided the perfect outlet to bring marine ecosystem research to an audience that is larger and more powerful than a few dozen academic peers. Although awards and citations are intellectually gratifying, little compares with the satisfaction of knowing that one’s research has had an impact on the well-being of society. As a science community, we should be creating more opportunities for facilitating the transfer of science in the service of society.

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“Worldwide, scientists are thinking more about the translational value of their work...”


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Editor's Summary

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