Rekindling Japan’s Spirit

AT THE END OF THIS MONTH, THE INTERNATIONAL BIO FORUM AND BIO EXPO JAPAN CONVENES in Tokyo, highlighting research, technologies, and biopharma trends from academic, industrial, and business sectors across Asia. For Japan, science is generally regarded as a means for boosting economic growth, and the nation has concentrated on supporting scientific discoveries for commercial applications. Basic science—which focuses on discoveries that explain how and why things work—has taken an unfortunate back seat. Yet, it is such curiosity-driven research that brings about conceptually novel discoveries and innovation. In the past decade, it has been difficult for young Japanese investigators in the life sciences to pursue this important type of science. Solutions to this critical problem may come by looking back in history, to a time when Japanese scientists knew how to appreciate nature and let that joy inspire their work.

The Edo period (1603 to 1868) was a time when the Japanese people faced neither domestic nor external battles. This peaceful environment allowed them to innovate in ways that fostered a scientific culture in concert with artistic activities. In the Ukiyo-e paintings by Jakuchu Ito and Hiroshige Utagawa, nature and living creatures were depicted with an amazing precision. Simultaneously, Edo biological and medical sciences developed within a creative framework that spurred discovery. Thus, for example, Seishu Hanaoka developed, for the first time, a herbal concoction as a general anesthetic.

Today, young Japanese researchers in the life sciences face a disheartening academic environment. Many broaden their knowledge and experience by doing postdoctoral work in leading laboratories in other countries, bringing new skills, ways of thinking, and great passion back to Japan as they begin to build their own laboratories in our universities. But ever-increasing administrative duties, incessant meetings, paperwork, and the constant writing of grant applications prevent them from using their time to think creatively—or even joyfully—about research. A decrease in the number of academic faculty positions in national universities has produced a highly competitive environment for young faculty members and a race to demonstrate success through maximizing publications, generating an environment in which Japanese researchers can rarely afford to enjoy the inherent beauty and wonder of the natural systems they are curious about.

Japanese scientists have made many unique contributions in the field of developmental biology, and here new model systems are emerging that have the potential to reignite the spirit that characterized the Edo period. For example, numerous strains of medaka—a popular fish in Japanese children’s songs—maintained in Nagoya University piqued the curiosity of Hiroyuki Takeda and his colleagues (University of Tokyo), leading them to develop medaka as a fantastic animal model for studying genetics and development.* Shigeru Kondo (Osaka University), who was curious about the striped skin of his personal pet, the angelfish Pomacanthus imperator, used it to develop a mathematical understanding of pigment pattern development.† And the famous Japanese morning glory asagao has been exploited by Eiji Nitasaka (Kyushu University) to analyze genetic transposition mechanisms.§

In such ways, we are learning how diverse creatures evolved during animal and plant evolution. And because all organisms use the same molecular machinery, insightful, creative studies of unique organisms such as these can be powerful shortcuts for understanding the fundamental mechanisms that appear throughout nature, including in humans.

There is a popular old Japanese saying, “Onko-chishin,” or “Learn a lesson from the past.” The ignorance of history, coupled with an environment that discourages creative scientific thinking and wonderment, is a poor combination for both Japan and the Asian biotechnology industry, as the upcoming meeting in Tokyo should bear in mind.

—Yoshiko Takahashi

Yoshiko Takahashi is a professor of developmental biology at the Graduate School of Biological Sciences, Nara Institute of Science and Technology, Ikoma, Japan. E-mail: yotayota@bs.naist.jp

Rekindling Japan's Spirit
Yoshiko Takahashi (June 9, 2011)
Science 332 (6035), 1241. [doi: 10.1126/science.1209050]

Editor's Summary

This copy is for your personal, non-commercial use only.

**Article Tools**
Visit the online version of this article to access the personalization and article tools:
http://science.sciencemag.org/content/332/6035/1241

**Permissions**
Obtain information about reproducing this article:
http://www.sciencemag.org/about/permissions.dtl