

**Council of Advisors
Brain Sciences Institute-Riken
September 18-20, 2002**

Introduction:

This is the fifth year in which this Council of Advisors has visited the Brain Science Institute (BSI) at RIKEN. For many of us on the Council, this is the end of our terms as advisors. We depart with a mixture of satisfaction and excitement. The satisfaction comes with knowing that we have been able to contribute in a small way to the bold and visionary initiative the Japanese government launched in 1997 when it established the BSI. The excitement comes from realizing that Japan's investment in BSI has begun to pay off handsomely. In five short years, BSI has achieved international visibility and has begun to realize its potential of becoming one of the premier brain research institutes in the world. At the same time, it is providing a new and exciting institutional model for biological research in Japan. It has been a privilege to be part of this magnificent initiative.

The goal in establishing BSI was to invest in an effort that would build and ensure the future of neuroscience in Japan. The investment has paid off. Neuroscience is a great new frontier of contemporary biology, and opportunities for progress have never been greater. The genomes of humans and many other species have been sequenced, and remarkable experimental opportunities are available to us through molecular biology and genetics, systems and computational neuroscience, and brain imaging. Within decades, we will have a far better understanding of how the brain develops, and how it is organized and functions. These advances will aid in improving education and in preventing, treating, and curing or alleviating brain diseases that today affect millions of people and for which we can as yet do little therapeutically.

BSI's aim was to bring together outstanding neuroscientists to create a critical mass of expertise, and to expect performance that would meet the highest international standards. Success would come as a result of the BSI

providing its scientists with the opportunity to commit 100% of their time to research and supporting them with world-class facilities and ample funding. The model would be novel, unlike any other academic institution in Japan. The BSI also aimed to open up Japanese neuroscience to the world by welcoming foreign scientists and students to visit and work at the Institute and also by BSI reaching out to other countries through collaborations and partnerships. All of these initiatives are well under way and many of them are already successful, far beyond what was reasonable to expect five years ago. We congratulate the Japanese government and Dr. Masao Ito for their boldness and insight in creating the BSI. We encourage the government, RIKEN, and BSI's faculty, current and future, to embrace and further develop this outstanding and unique opportunity.

Background:

In this report, the Advisory Council summarizes the observations it made during a three day visit to the Institute. As in previous years, we benefited from the presentation made by Dr. Masao Ito, who reviewed the activities of BSI since the Council's last visit in April of 2001 and who updated us on the BSI's progress in implementing the Council's recommendations made during that visit. In addition, group Directors summarized the activities of their groups, and one scientist from each group summarized the progress and scientific approaches of their labs. Council members also visited labs and spoke privately with BSI scientists. This format provided the Council an in-depth view of the organization in a limited amount of time.

Observations:

The excellent review that Dr. Ito provided us on the progress of the BSI over the past five years was enlightening, and supports the notion that success is hard won. Even in the best new venture, progress comes as a result of trial and error. BSI has carefully analyzed its operations and when appropriate, taken corrective action. Some information that we found especially helpful in that report included the following:

1. BSI has established the new position of **Staff Scientist**, which fills the need of retaining highly qualified and productive PhD level scientists to work under laboratory heads beyond the initial five years. Scientists at the Masters level also have the opportunity to work at BSI for up to

five years while they finish their PhDs in a newly established position of **Research Associate**. The Council strongly approves of these new designations.

2. BSI's staff combines a good mixture of senior and junior people, with the average age 49.2 years for laboratory heads, 35.5 years for research scientists, and 29.1 years for technical staff. This large number of young people bodes well for the future of the organization.
3. The demographics of the Institute are also encouraging in that they indicate the growing appeal of BSI as a place of employment and discovery. Twenty three percent of the BSI's researchers come from 25 different foreign countries, and 35% of researchers come from previous positions in universities.
4. The data show that a significant percentage of researchers (mostly post doctoral trainees) as well as technical staff have left the Institute over the past five years. On the one hand, this turnover should be expected as young people, after being trained, seek to begin independent careers or permanent positions elsewhere. On the other hand, the BSI should be careful to address employment issues that might lead to excessive turnover. It will be important to find the balance between retention and healthy turnover.
5. The Council was extremely impressed with the level of international outreach BSI has achieved. Seen as outstanding are its speaker and seminar programs, its highly successful summer program, which has attracted students from around the world, and its cooperative agreements and research collaborations with international institutes, companies, and universities.
6. The Council also noted that in five years, BSI scientists have published over 1000 research articles, many in the best journals in the field. The number of patent applications also increased to 113 over four years, starting from a modest 10 in 1998 to 35 in the first 8 months of 2002. Both of these indices reflect the quality and importance of the science being done at BSI.

7. Finally, the Institute is to be congratulated for carrying out nine external reviews in which it has asked outstanding Japanese and international scientists to evaluate the quality and effectiveness of its research groups. When necessary, the Institute has taken the difficult step of terminating programs that have not achieved the expected levels of excellence. This process is difficult but necessary if BSI is to achieve its promise as a world-leading neuroscience institute.

The Council made additional observations:

1. A BSI investigator was charged this year with scientific espionage. In the view of the Committee, BSI handled this difficult problem extremely well, minimizing damage to the reputation of BSI in the international community.
2. The Council was pleased with the strength and important contributions of the Advanced Technology Development Group (ATDG), the goal of which is to expand the inventory of advanced technologies that are available to BSI investigators. BSI has recognized that technology can be a driving force behind good research, and has made the investment necessary for its development. ATDG is not a research group like others at BSI and should not be evaluated as such. Its role is to develop and provide technology to support BSI research and it should be recognized and evaluated according to that function. In this connection, we applaud the addition of a Neuroinformatics Laboratory and strongly encourage the dedication of appropriate resources to a service function to meet the needs of other research groups.
3. The Council continues to be concerned about the focus and functioning of the Brainway Group and strongly agrees with and supports the External Review Committee's recommendation of re-review within two years to determine whether the group should be continued.
4. The Creating the Brain Group should integrate into the experimental biology of BSI so that meaningful and mutually beneficial interactions can occur between experimentalists and theoreticians.

5. The Council welcomes Dr. Amari's plan for restructuring the Creating the Brain program, but suggests a different structure in which each group integrates laboratories working on computational neuroscience, robotics and brain style computing. Cross-appointments with experimental labs in other areas would further facilitate innovation in computational neuroscience.
6. The Council recommends that special attention be given to the needs for theoretical biology at the BSI. BSI should consider hiring at the Group Director level a world-class computational neuroscientist committed to building bridges to experimentalists throughout BSI. Moreover, appointments made by the Director should address at all levels modeling from the synaptic through the circuit to the systems level
7. For a different reason, the Council is also concerned about the imaging work of the Cognitive Brain Science Group. One strength of this group lies in technology development of fMRI and MEG, where it is a world leader. However, the application of this technology at BSI to important problems of brain science still needs to be developed.
8. The Council benefited from Dr. Tonegawa's participation in our visit, representing the RIKEN-MIT Collaboration. The science being done by the RIKEN-MIT group is impressive, and we hope that the scientific relationship between this group and the BSI continues to strengthen.
9. We encourage the BSI to continue and expand its interactions with the broader neuroscience community of Japan.
10. The Council is pleased that BSI has established an office to help meet the living needs of foreign scientists and their families. However, some faculty members feel that the office has yet to do anything significant in helping them adjust to life in Japan. This regrettable situation needs to be rectified quickly and the office strengthened and made more responsive if BSI is to attract and retain top scientists from outside of Japan. The recommendation from the year 2001 still remains in terms of help with tuition fees for children and support for spouses.

11. The Council noted that the quality of the scientific presentations this year was very much improved compared to previous years. In most cases, the overviews of group science presented by the Directors were excellent as were most of the scientific presentations of group members.

12. The Council learned of considerable interest growing in Japan for a national effort targeted towards life long learning, numeracy, literacy, and understanding child development as a key step in optimizing early childhood education. BSI is well qualified to participate in this program. The Council supports the BSI plan to contribute to this national effort by applying its strengths in basic neuroscience research, for example, in nervous system and brain development. BSI groups that study developmental neurobiology and the onset and physiology of critical periods in brain development are especially well suited to be major contributors to this program. This is just one example of how the growing strength of BSI in neuroscience can contribute to Japan's national priorities.

Conclusion: Over the five years of its existence, the Advisory Council has been pleased to note the progressive increase in the extent and quality of the scientific and educational programs of the BSI. The potential of these efforts to create a world-class neuroscience institute is being realized.