

# **Final Report of the 4<sup>th</sup> RIKEN Advisory Council to the President of RIKEN (Institute of Physical and Chemical Research)**

## **Foreword**

RIKEN deserves high praise for its accomplishments to date, particularly the quality of its science, its people, and its facilities, past and present. RIKEN is a model of what can be achieved. It is unique in its ability to demonstrate flexibility and adaptation to growth and fundamental change. It was with a firm commitment to supporting RIKEN in its desire to see this outstanding pattern of success continue well into the future that the RIKEN Advisory Council (RAC) approached the formulation of its recommendations.

## **Introduction**

RIKEN reorganized its Advisory Council system following the 3<sup>rd</sup> RIKEN Advisory Council meeting held in 1998. With the emergence of the RIKEN Centers (Frontier Research System, Genomic Sciences Center, Brain Science Institute) each with their own Advisory Council, RIKEN recognized the need to create a separate Institute Laboratories Advisory Council to focus exclusively on providing a review of the Institute Laboratories System. The terms of reference for the RIKEN Advisory Council were developed to include the task of integrating input from the four individual Advisory Councils, reviewing the structure of RIKEN's research system as a whole, and offering advice to support RIKEN's future performance. To support the necessary integration of input from the Advisory Councils, the membership of RAC includes the Chairpersons of ILAC, FRAC, GSAC, and BSAC.

### **Terms of Reference -4<sup>th</sup> RIKEN Advisory Council**

1. To review the findings and recommendations contained within the four Advisory Council reports (ILAC, FRAC, BSAC, GSAC).
2. To review the structure of research systems at RIKEN as a whole.
3. To offer advice on RIKEN's future performance.
4. To report the Council's findings to the President.

The 4<sup>th</sup> RAC meeting took place from June 4<sup>th</sup> to June 7<sup>th</sup>, 2000 with sessions both in Tokyo and at the Wako campus of RIKEN. From the first moments, all members of the RAC participated fully and enthusiastically in discussion and debate. This enthusiasm was maintained, and in some instances greatly enhanced, as the meeting progressed, reflecting the commitment of all members to the task of providing timely and helpful advice to RIKEN.

The RAC meeting opened with a welcoming address by RIKEN Vice-President Kira on the evening of June 4<sup>th</sup> and began its formal discussions with an address from President Kobayashi on the morning of June 5<sup>th</sup>. RAC was presented with the RIKEN response to the recommendations of the 3<sup>rd</sup> RAC meeting (1998) and with the President's expectations for the 4<sup>th</sup> RAC, its Terms of Reference.

Members were also introduced to the RIKEN philosophy adopted by RIKEN Board of Executive Directors in March, 2000, "Basic Concept for the future of RIKEN". As the major feature of the meeting's agenda, the RAC was informed of the activities within each of the RIKEN sectors through presentations from the Chairman of the Chief Scientists' Assembly (representing the Institute Laboratories (ILs)), and the respective Directors of the Frontier Research System (FRS), Genomic Sciences Center (GSC), and Brain Science Institute (BSI). Each activity report was followed by a report of the respective Advisory Council's findings by each Council's Chairperson. Both the activity reports and the Advisory Council reports were then discussed. Finally, Vice President Kira and President Kobayashi discussed the management structures within RIKEN.

RAC members are grateful for the extensive preparations that were carried out both during and in advance of our meetings. We recognize the tremendous amount of work involved on the part of RIKEN executive members, scientists, and staff and we wish formally to acknowledge your efforts. Our work has been informed and greatly enhanced through your efforts. The kindness and generosity offered throughout the 4<sup>th</sup> RAC meeting made our visit to RIKEN productive, stimulating and truly enjoyable.

#### **Input to the 4<sup>th</sup> RAC report**

While presentations and discussions provided a great deal of the background for the 4<sup>th</sup> RAC report, the Council wishes to acknowledge the importance of the following documents as inputs to the 4<sup>th</sup> RAC report.

1. RIKEN - 2000 White Paper -This document provided Council members with clear factual information about the current state of affairs within RIKEN. This information was ably supplemented through presentations by Center Directors and the Chairman of the CSA.
2. The 3<sup>rd</sup> RAC Report to the President of RIKEN.
3. The Advisory Council reports (ILAC, FRAC\*, GSAC, BSAC).  
\*The FRAC report was not complete at the time of the 4<sup>th</sup> RAC meeting but was presented orally by the Council's Chairman.
4. "Basic Concept for the Future of RIKEN" - a position paper of the RIKEN Board of Executive Directors.

#### **Context for meeting of the 4<sup>th</sup> RAC**

The 4<sup>th</sup> RAC approached its task of providing advice with the knowledge that its recommendations will come at a particularly important moment for RIKEN. RIKEN has for the past number of years been managing a tremendous volume of change within the organization - a fact that was also highlighted by the 3<sup>rd</sup> RAC in 1998.

Council members were most impressed by the pace and magnitude of the change. It is a combination of the unique features comprising RIKEN's character that has facilitated RIKEN's success to date. However, the RAC was very conscious of the fact that there remains much change on the horizon for RIKEN. This change will require active management on the part of RIKEN. Among the significant environmental factors impacting RIKEN are:

- A. enormous recent (and near future) growth

- BSI and GSC, new Millennium Projects (all with 5 year funding commitments) - "SNP Research Center", Plant Sciences Center, Center for Developmental Biology, Bio-resources Center
  - budget increases (¥36 billion, 1996 to ¥75 billion, 2000)
  - major capital expenditures, facilities' expansion
  - personnel expansion
  - emergence of life sciences as a strong force within RIKEN
  - emergence of a dual employment system within RIKEN (permanent and contract)
  - the constraints introduced by a fixed number of permanent positions in an era of rapid growth
- B. the merger of Monbusho and STA and the emergence of a new government structure for support of Japanese science and educational institutions
- C. Japan's S &T Basic Plan (second 5 years) which is expected later this year and comes into effect April, 2001 -this plan outlining the government's intentions with respect to investment in science and technology is the budgetary context for Japanese institutions, including RIKEN
- D. the impending retirement of a substantial number of Chief Scientists, and others in positions of scientific leadership within RIKEN (Center Directors)

RAC wishes fully to acknowledge RIKEN's growth and enormous success over the last 10 years. Alongside a core program whose foundation is built on the Institute Laboratories System and that continues to demonstrate the quality and academic rigor equal to the best University research, RIKEN has developed high visibility, world-class projects, that are enhancing Japan's prestige in world science. Representative examples include:

- SPring-8 synchrotron
- RIKEN Brain Science Institute
- RIKEN-RAL Muon Facility
- Construction of Radio Isotope Beam Factory (RIBF) at WAKO

### **3<sup>rd</sup> RAC-Recommendations to RIKEN**

1. We recommend to Government (through the Executive) that the independence of RIKEN is maintained in the forthcoming changes in the administration of science and technology.
2. We recommend that the commercial exploitation of intellectual property rights generated within RIKEN be promoted by a small professional group within RIKEN dedicated to the task.
3. We recommend that the Executive and the Chief Scientists take a strategic overview of RIKEN as a whole, and plan a research strategy for the next five to ten years on which a new appropriate structure can be developed.

4. We recommend that the Executive and the Chief Scientists consider some concentration, at the expense of diversity.
5. We recommend that the interval between Institute Laboratory reviews should be reduced, probably to four years. Further, we recommend that the Executive consider conducting reviews across whole disciplines, either instead of or in addition to Institute Laboratory reviews.

The starting point for the 4<sup>th</sup> Council's discussions was the report of the 3<sup>rd</sup> Council.

The following comments reflect our observations and assessments of RIKEN's response to the 3<sup>rd</sup> RAC recommendations.

1. We wish to continue to emphasize the great importance of preserving RIKEN's independence within the science system of JAPAN, with a focus on flexibility while maintaining its commitment to the pursuit of excellence. We commend RIKEN's efforts and success thus far in emphasizing the core value of independence to government authorities and urge RIKEN to continue on this path with even greater vigor as the pressure for conformity may well mount.
2. While recognizing the steps that RIKEN has taken to address issues of patenting and intellectual property management, we continue to suggest that a more active, focused, vigorous, and professional approach must be taken by RIKEN in any pursuit of commercialization of its knowledge assets. To pursue such efforts only partially will not allow RIKEN to capture the full potential of the benefits possible.
3. Finally, the 3<sup>rd</sup> RAC recommended that the Executive and the Chief Scientists take a strategic overview of RIKEN as a whole and plan a research strategy for the next five to ten years. RIKEN has taken its modest first step in this direction in adopting the position paper "Basic Concepts for the Future of RIKEN". However, the 4<sup>th</sup> RAC believes that a more distributed, inclusive, and thorough effort must be made to develop a strategic road-map for RIKEN into the future. This view is reflected as perhaps our most significant recommendation.

The 4<sup>th</sup> RAC Recommendations are framed around the five directions and principles articulated in RIKEN's position paper on the future of RIKEN.

#### **BASIC CONCEPT FOR THE FUTURE OF RIKEN**

1. **RIKEN will play the role of a comprehensive, core research institute in Japan.**
2. **RIKEN will implement a dynamic research system and recruit top international scientists.**
3. **RIKEN will consist of traditional Institute Laboratories with an incubator function and new systems of Fixed Term Research Projects.**
4. **RIKEN will establish a strong identity and form complementary**

relationships with universities and industries as collaborators.

5. RIKEN will be conscious of its optimal size and avoid easy expansion.

#### 4<sup>th</sup> RAC Recommendations

1. RIKEN will play the role of a comprehensive, core research institute in Japan.

5. RIKEN will be conscious of its optimal size and avoid easy expansion.

#### RAC Recommendation #1

RIKEN should undertake on an urgent basis a specific project with the purpose of defining the vision, mission, mandate, strategy and identity of RIKEN. Through this exercise the definitions and understanding of a "comprehensive, core research institute", "optimal size" and "easy expansion" should be clarified.

The strategic planning process should encourage and support a fundamental dialogue about RIKEN's reason for being, its unique potential anchored in the national science system of Japan, and its aspirations to achieve global scientific leadership in strategic areas. This must be a cross-RIKEN effort and potentially cross-national. RIKEN should create an inventory of its knowledge assets from which can be built a unique and unshakeable identity as it promotes itself both nationally in relation to national Universities and Research Institutes, and internationally in relation to international science endeavors abroad. RIKEN should recommit itself to maintaining the core values of quality and flexibility as it moves forward.

This project must be followed by the development of an implementation map with concrete objectives, strategies and time-lines for achievement, and defined measures of success as part of an on-going evaluation and accountability regime. RIKEN's capacity in the area of knowledge management should be carefully considered.

Within the context of this strategic planning exercise, RAC makes several specific recommendations.

#### **Recommendation #1a**

We recommend to the Government (through the Executive) that the independence, discretion, flexibility and unique character of RIKEN be maintained regardless of any forthcoming changes in the administration of science and technology in Japan.

#### **Recommendation #1b**

We recommend that RIKEN establish, nurture, and maintain an on-going scientific priorities committee (an agenda setting committee) with representation from the whole of RIKEN together with external advisors. This committee should provide the President of RIKEN with constant feedback and advice regarding RIKEN's pursuit of current and emerging opportunities. It should focus on capturing RIKEN's strategic advantages and identifying the frontiers of science.

#### **Recommendation #1c**

We recommend that the bottom-up curiosity-driven basic science that has driven years of scientific achievement at RIKEN through the Institute Laboratories should continue to be preserved and strengthened. To achieve this outcome it is important that the ILs develop and pursue a clear strategy for the re-direction of research fields and employ a transparent system of metrics for measuring performance. There is a need to improve visibility of the Institute Laboratories both nationally and internationally.

#### **Recommendation #1d**

We recommend that the development plans for the RIKEN Brain Science Institute be implemented, including expansion of the human resource base and the provision of necessary space and infrastructure resources. Key recommendations of the BSI Advisory Council should be given serious consideration.

The BSI has become a current flagship of RIKEN internationally and every effort should be made to support its future development. Consideration should be given to the deployment of a few permanent positions to ensure its great potential is fully realized. It is also important to ensure that the inspired leadership of its founding director is continued.

#### **Recommendation #1e**

RAC highly appreciates the accomplishments of GSC in the past years but has some concerns with respect to the diversity of projects and the seeming lack of a coherent strategic approach to achieving some of the specific goals encompassed by some research projects.

RAC recommends a review of all projects within the GSC with a focus on future plans to set priorities with respect to the research to be pursued and to ensure that the components all support the strategic directions and values and are integrated to provide maximal coherence and synergy.

Consideration should be given to possible integration and the optimal setting for the Plant Functional Genomics group within the GSC in relation to the new Plant Sciences Center. Both the Protein Research Group and the Mouse Functional Genomics Research Group are of great importance in the post-genomics era but need clearer short-term (3-5 year) goals.

RIKEN should continue to support the three new research centers started by the Millennium Project, (SNPs Center, Center for Developmental Biology, and Plant Sciences Center). At the appropriate time, Millennium Projects must be reviewed and continued funding assured if the outcomes of current investment are to be fully realized.

#### **Recommendation #1f**

We recommend that the strategic vision of the Frontier Research System be reexamined. The position of the Frontier Research System is changing due to the development of multiple new centers and the mechanism by which new research areas are selected has become even more important. The above mentioned scientific priorities committee (including external experts) could prove to be an excellent source for priority setting among frontier research areas. At a minimum, the process for selection of new Frontier research areas must be made explicit. The FRS along with the Institute Laboratories might be seen as the wellspring for innovation and the incubator for maturation and development of

the next generation of research fields.

**2. RIKEN will implement a dynamic research system and recruit top international scientists.**

**Recommendation #2**

We recommend that RIKEN establish a concrete plan to recruit and retain research personnel of the very highest caliber and supportive of RIKEN's strategic goals identified by the scientific priorities committee.

The impending retirement of Chief Scientists in the coming years presents an opportunity for redeployment of human resources in light of the strategic plan. The recruitment and retention plan should include provisions for the recruitment of top scientific leadership for the research centers as current leaders come to the end of their terms (i.e. succession planning). It should also include an attractive, well positioned, and innovative evaluation system, and a compensation and promotion system that will assist RIKEN in maintaining the quality of its personnel over the long term. Even more creative and comprehensive support systems need to be developed to facilitate recruitment of international scientific research stars.

**3. RIKEN will consist of traditional Institute Laboratories with an incubator function and new systems of Fixed Term Research Projects.**

**Recommendation #3**

RAC believes that the existence of two parallel systems within RIKEN (the ILs and the Centers) poses very real administrative challenges. This is a core issue for RIKEN. Active leadership must be brought to bear in the management of this parallel relationship to ensure that the two systems exist in a state of maximal harmony and synergy.

There is a need to make explicit the strengths and weaknesses of the two research systems (ILs and Centers) in relation to their stated mission and function. These should be made explicit through the development of an inventory of RIKEN's knowledge assets, and the strategic planning process. Consideration should be given to building more flexibility into both systems (ILs and Centers) allowing distribution of permanent positions across the full spectrum of RIKEN activities based on needs analysis. For example, the bio-resource center will need to maintain a cadre of excellent staff over the long term to be effective in carrying out its mission. Similarly, a cadre of expertise to support other facilities will be required.

**4. RIKEN will establish a strong identity and form complementary relationships with universities and industries as collaborators.**

**Recommendation #4**

We recommend that RIKEN management should consider developing mechanisms to encourage the formation of collaborations and research clusters across RIKEN as well as with the national and international research and development community.

These efforts should focus on developing synergistic interactions. Any such intervention should be based on a system of incentives that allows collaborations to develop naturally across national, geographic, programmatic, and disciplinary boundaries within and beyond RIKEN.

#### **Recommendation #4a**

RIKEN is producing top quality research and technology development in large volumes. This should generate sizeable intellectual property with significant commercial value. Despite increased efforts at the level of patents and technology transfer, licensing contracts and royalties have not shown an increase over the past seven years.

We recommend that RIKEN further accelerate the build up and resourcing of a technology transfer division at a similar level of professional quality as the research and technology development at the Institute. The success of this endeavor should be measured against established goals.

#### **4<sup>th</sup> RAC Response to Individual Advisory Committee Reports**

##### **General Statement**

RAC has not directly reviewed the science within RIKEN. However, based on the reports of the four Advisory Councils, RAC concluded that the science within RIKEN is being performed at a high level when compared with the state of a given field of science in the international context. There are pockets of extraordinary excellence. RIKEN should be proud of its continued success in producing top-rate science across a broad array of research fields.

RAC believes that it is imperative that RIKEN continue to measure the success of its science against an international benchmark, rather than, for example, against specific national objectives or agendas. The RAC suggests that RIKEN could benefit from articulating its specific goals in this regard. RIKEN science -across the full spectrum of fields - should aspire to perform within the top 10% in the world. Quality of science must remain an absolute priority. For any given area of science, if high quality cannot be achieved within RIKEN, it should be phased out.

##### **Summary statements of the Advisory Council reports**

(Prepared by the respective Advisory Council Chairman)

##### ***ILAC (Institute Laboratories Advisory Council)***

ILAC after reviewing the ILs has come to the conclusion that these laboratories continue to produce excellent research results which are widely disseminated in refereed journals and international meetings. In the different science areas represented there are several that are at the forefront of their fields. With the number of impending retirements it is critical that the ILs approach recruitment as part of the overall strategic direction that RAC recommends for RIKEN.

The ILs, as a core component of RIKEN, are part of the exciting environment of change and opportunity at RIKEN. It is critical that in positioning the ILs as centers of growth and promise that the asymmetry of power arrangements between the Institute Laboratories and Centers be addressed. Unlike the Centers which have identified directors able to speak on behalf of their organization, the ILs may want to consider whether the current structure and representation within RIKEN, which has served them well in the past, is the most appropriate

arrangement to represent their interests into the future. We believe these organizational and structural features are appropriate subjects for consideration as RIKEN develops its strategic plans. We urge that careful consideration be given to ensure that the bottom-up basic sciences, including chemistry, which have been at the core of RIKEN, continue to flourish.

### **BSAC (Brain Science Institute Advisory Council)**

The human brain is the most complex organ facing human understanding. Diseases of the nervous system are increasing in incidence and importance. Under the leadership of Dr. Masao Ito, RIKEN-BSI has risen to international competitiveness in an extraordinarily short period of time. In response to BSAC recommendations in 1999, the BSI has implemented, with remarkable speed and efficiency, many of the structural changes the Committee recommended. In speaking with BSI faculty, BSAC members were particularly impressed by: opportunities for scientific collaborations; the openness and transparency with which the BSI is run; the core facilities; the degree of concentrated research time; and the advanced technology development center.

BSAC also note a number of concerns including: the lack of permanent positions available to faculty in BSI; resource allocation, particularly with regard to space; the on-site capacity for housing transgenic mouse populations; the need for bio-informatics capacity; BSI's ability to attract graduate students; and the burden of administrative duties. In response to these concerns, the Council makes the following recommendations: 1) consideration should be given to providing some permanent positions to exceptional scientists; 2) a process should be put in place to ensure appropriate allocation of space; 3) BSI should become pro-active in establishing policies and procedures for animal and human experimentation; 4) innovative ways to attract and enhance the training of graduate students should be considered; 5) consideration should be given to the availability of more administrative service support for BSI researchers; 6) theoretical work in the area of biological modeling and neuroinformatics should be pursued and stronger links with cognitive neuroscience and neurophysiology should be established; 7) BSI should invest in its own bioinformatics facility; and 8) efforts should persist in establishing mutually beneficial collaborations with other researcher groups across RIKEN.

The Advisory Council continues to be impressed with the innovative thinking, flexibility, and energy of all those who are involved in developing the BSI initiative.

### **FRAC (Frontier Research System Advisory Council)**

On the Basic Management Philosophy of the Frontier Research System (FRS)

The aims of the Frontier Research System are to:

- 1) create new fields in science and technology,
- 2) contribute to benefiting society, and
- 3) impacting industry and the economy

The Frontier Research System has been discussed intensively from the view of these three objectives. It is considered that in order to realize these objectives and bring them into concrete expression, prime importance must be attached to the selection of research projects and recruitment of the best human resources. It

is also important from the view of the third objective, impacting industry and the economy, that an active committee be established whose responsibility would be to deliberate how the objective might best be attained. This committee should be composed of specialists from a wide range of fields to ensure proper evaluation of the extensive scope of matters. In addition, the Frontier Research System itself should establish its own committee for assessing and promoting the transfer of the science and technology it creates as the fruits of its own research. This would include assessment of the overall patent strategy.

We wish to congratulate the outstanding efforts of the present FRS management in their endeavors to bring these matters to fruition in the current operation of the system, but want also to emphasize that there is yet much to be accomplished.

It is not an easy task, but this system called "Frontier" by definition, must set the pace by creating new frontiers in research management as well, and move forward on its own initiative to a totally new and unique system especially in the formation of new fields of endeavor in the vast no man's land.

### ***GSAC (Genome Science Advisory Council)***

Last March, the GSAC undertook to extensively review the activities of the GSC over the period of the past two years. Members of the GSAC include internationally renowned scientists who are specialists in each project and scientists having both a broad knowledge and keen interest in research.

In general, the GSAC members have expressed their appreciation of the high quality of the research. For example, the total nucleotide sequence of human chromosome 21 is a recent accomplishment which has been published in the journal Nature. Undoubtedly, this will prove to be the most important contribution from Japan this year.

Some general issues have been raised by the committee. These are discussed below along with suggested means by which they could be addressed.

It is recommended that the research be more focused. This could be achieved by using the limited amount of resources more efficiently rather than relying on increased money and manpower. A further concern is the lack of interaction and collaboration within the GSC itself or between the GSC and other institutes in RIKEN. The committee was pleased to learn that interaction between the GSC and BSI was initiated after their recommendations. The committee has been told that the budget for each project within the GSC is obtained from various and different sources. In order to operate GSC as a single unit, it is recommended that there be some flexibility in the utilization of the budget by the director.

The following are specific comments applicable to each group:

#### **Genome Exploration Research**

Every effort should be made to concentrate efforts on determining the total nucleotide sequence of the mouse full-length cDNA library. The team has previously developed a method for the isolation of full-length cDNA and have made a mouse cDNA library available to the public. In order to make this library of greater value to researchers, it is essential to provide information on the total nucleotide sequence instead of short segments of the sequence from the 3'-end. This information is also important for the validation of the library. A time frame for this project should be provided. The improvement of instrumentation, particularly high throughput DNA sequencing, has almost been completed. The

capacity of the machine is more than enough for the operation of the laboratory. Therefore, this issue no longer holds such high priority. The team should no longer spend so much of its resources on improving instrumentation, such as high throughput DNA chips or protein-protein interaction. It is suggested that the team pay more attention to the management of the laboratories operation.

#### Protein Research Group.

With the advent of the post genome era this project gains in importance. In fact, the team is directing its efforts with this in mind. The team leader, Dr. Yokoyama, was the first to propose the use of a large number of NMR machines to determine the three-dimensional structure of proteins. The new facility will be completed this year and accommodates 20 high-resolution NMR machines. Therefore, it is recommended that a better management system be implemented to ensure the efficient operation of the laboratory. In this respect, it is essential to have permanently employed senior researchers who are responsible for the operation and proper co-ordination of multiple NMR machines. RIKEN headquarters should consider this issue seriously. It is also our recommendation that the laboratory should consider some arrangement whereby outside NMR specialists (both domestic and international) can use its facilities. Such an arrangement would stimulate collaboration between the team and outside specialists, thereby increasing the flow of advanced technology and ideas into the laboratory. For the success of the laboratory, it is a necessity to have the support of the NMR scientific community.

#### Human Genome Research

As mentioned in the introduction, the achievements of this team are greatly appreciated by the GSAC members. No problems appear to exist in this project. The proposal to work on the chimpanzee genome in order to compare with the human genome, and the sequencing of two further human chromosomes (chromosomes 11 and 18) was strongly endorsed by the GSAC members.

#### Mouse Functional Genome Research

The proposed project to produce huge numbers of mutant mice by ENU treatment was supported by the GSAC members. The importance of this project also increases in the post-genome era. In order to realize the possibilities of this project large resources are required (facilities, money and manpower). This is especially true since the team is focusing on mutations with relevance to cancer and behavior which would require keeping the mutant mice for relatively long periods of time. In this sense, the team should perform this project in collaboration with the Bioresources Centre of RIKEN in Tsukuba.

#### Plant Functional Genome Research

The research proposal made by the team leader, Dr. Shinozaki, is excellent. Since the size of this team is small, it is recommended that it should have close contact and collaborations with other institutes within Japan, such as the Kazusa DNA Research Institute, where the Arabidopsis genome project is carried out. Perhaps it would be beneficial if this team were integrated into the Plant Science Centre which has been established by RIKEN earlier this year.

(4<sup>th</sup> RAC Final Report - completed August 15, 2000)

## **Appendix 1.**

## Members of the 4th RIKEN Advisory Council

(June 4-7, 2000)

\*Chairman

\*\*Vice-Chairman

+ absent

\*Prof. Henry G. Friesen (Medicine: Endocrinology)

Chair, Board of Genome Canada, Canada

Chairman of Institute Laboratories Advisory Council (ILAC)

\*\*Prof. Kozo Kuchitsu (Physical Chemistry)

Dept. of Chemistry, Josai University, Professor Emeritus, University of Tokyo, Japan

Prof. Yasunori Nishijima (Polymer Chemistry)

President, Kyoto City University of Arts, Former President of Kyoto University, Japan

Chairman of Frontier Research System Advisory Council (FRAC)

Prof. Michel Cueod (Medical Science)

Hopital Psychiatrique Universitaire de Cery

Centre de Recherche en Neurosciences Psychiatriques, Switzerland

Former Secretary General, International Human Frontier Science Program

Chairman of Brain Science Institute Advisory Council (BSAC)

Dr. Susumu Nishimura (Biology)

President Emeritus, Banyu Tsukuba Research Institute in collaboration with Merck Research Laboratories, Banyu Pharmaceutical co., Ltd, Japa

Chairman of Genomic Sciences Center Advisory Council (GSAC)

Prof. Toshiaki Ikoma (Electronics)

President, Texas Instruments Japan Ltd.

Guest Prof., Institute of Industrial Science, University of Tokyo, Japan

Prof. Hiroo Imura (Medicine: Endocrinology)

Member of Council for Science and Technology, Former President of Kyoto University, Japan

Prof. Junjiro Kanamori (Condensed Matter)

Academic Counselor, International Institute for Advanced Studies

Dr. Yuan Tseh Lee (Chemistry, Nobel Laureate)

President of Academia Sinica, Taiwan

Prof. Ikujiro Nonaka (Science and Technology Policy)

Graduate School of International Corporate Strategy, Hitotsubashi University, Japan

Prof. Guy Ourisson (Chemistry)

President, Academie des Sciences, France

Prof. Hans L. R. Wigzell (Medicine: Immunology)

President, Karolinska Institutet, Sweden

Dr. Paul R. Williams (Physics)

Former Chairman and Chief Executive of The Council for the Central  
Laboratory of the Research Councils, UK