

**Recommendations of the 9th Meeting of the  
RIKEN Advisory Council (RAC)**

November 11–13, 2014

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## EXECUTIVE SUMMARY

The 9th meeting of the RIKEN Advisory Council (RAC) was convened on November 11–13, 2014 at the InterContinental Tokyo Bay Hotel.

RIKEN President Ryoji Noyori opened the meeting with an update on the findings of scientific misconduct at the Center for Developmental Biology and the response of RIKEN to this incident. He continued with an outline of his vision for RIKEN in a time of exciting new opportunities and great challenges. In line with this vision, RIKEN must seek out new ways of even more fully applying its core strengths of excellence in basic research and the operation of world-class large-scale facilities to its mission of pioneering new discoveries and contributing to innovation efforts targeted to delivering benefit to the people of Japan and the world.

President Noyori additionally asked the RAC for its findings and recommendations under the following terms of reference.

### Terms of Reference

1. The 9th RAC is asked to evaluate RIKEN's response to the proposals made by the 8th RAC.
2. The key concept of the third 5-year Term is "mobilizing RIKEN's overall strengths" for problem-solving research, and a new framework has been put into place to encourage cross-disciplinary research throughout RIKEN. The 9th RAC is asked to evaluate how well this new framework is functioning to promote cross-disciplinary research among RIKEN's centers.
3. RIKEN will be operating under a new system for Independent Administrative Institutions, starting in April 2015. As such, RIKEN's primary objective will be to maximize its research and development capabilities for creative, outstanding outcomes. The 9th RAC is asked to give advice on the goals RIKEN should pursue as a world-class research institution, as well as recommendations on strategies for developing a system dedicated to problem-solving research and maximizing research outcomes.
  - In particular, the RAC is asked to make recommendations as to how RIKEN can further enhance its comprehensive strength in the life sciences.
  - The RAC is also asked to address the directions RIKEN should take in fields in which its centers have been operating for 10 years or more (Brain Science Institute, Center for Developmental Biology, BioResource Center, Nishina Center for Accelerator-Based Science).
4. The 9th RAC is asked to make proposals for attracting international human resources and give advice regarding any other areas that need to be further strengthened.

5. The 9th RAC is asked to propose measures for increasing the number of female scientists and female administrative employees, especially in management positions, at RIKEN.

## SUMMARY OF FINDINGS

The Advisory Council discussed extensively the research misconduct matter, and will address this issue at the end of this report. Within the Terms of Reference, this report focuses first on evaluation of the science and the achievements of RIKEN.

RAC commends RIKEN for its active and comprehensive response to the recommendations of the 8<sup>th</sup> RAC. As Japan's flagship basic research institution, RIKEN stands to play a cornerstone role in the nation's efforts to achieve breakthrough discoveries, and contribute to the development of new innovations that spur economic growth. In the breadth and depth of its research portfolio, its coordination of new and truly multidisciplinary scientific research programs, and its fostering of an institutional culture of scientific excellence undergirded by strong administrative support, RIKEN has shown itself to be in the top ranks of international scientific institutions. As it draws near its 100<sup>th</sup> year, we are struck by how, time and again, RIKEN has demonstrated its capacity for reinvention and self-renewal. We very much look forward to the next century of RIKEN discoveries.

At a time when investment in science and technology is central to Japan's plans for economic growth and prosperity and to its hopes of making important contributions to problems affecting all humanity, RIKEN represents more than just a key institute – it is a national treasure. It will be important for RIKEN to clarify its central role within Japan's overall R&D portfolio. Its culture of promoting investigator-driven creative science, the excellence of its core facilities, and its capacity for coordinating innovative research programs across disciplinary and institutional boundaries are defining features of RIKEN and help make it an indispensable resource for Japan and the international scientific community. The range of its partnerships with universities, multiple industry sectors, and other international research institutions stands as testament to the value of its achievements and the benefits it provides.

The government's resolution to create a new system of national research and development institutions within the independent administrative institution (IAI) framework in FY2015 represents an important step in recognizing and addressing the distinct circumstances and needs of scientific organizations. We enthusiastically support the proposal to name RIKEN as one of Japan's first designated national research and development institutions (or 'Leading Institutes'). This represents an excellent opportunity for the national government to re-invest in its foremost fundamental science institute as a means of driving progress in key priority areas.

In the life sciences, RIKEN has exhibited comprehensive strength across many fields. We note the internationally outstanding efforts of established programs such as the Brain Science Institute (BSI), with its strong contributions to the understanding of cognitive and behavioral neuroscience and its partnerships with industry for technology and therapeutic development. The Center for Developmental Biology

(CDB) has gained international recognition for its work in cell and molecular approaches to developmental biology, which have advanced stem cell research to clinical translational programs, such as the pioneering pilot study of an induced pluripotent stem cell-based treatment of age-related macular degeneration now underway. The BioResource Center (BRC) shows an unusual breadth in its collections, greater than most international collections, and has been particularly successful in improving access and usage by the life sciences research community both within Japan and overseas. These collections are important and will be a valuable resource for future generations of scientists in Japan and across the world.

The newer life sciences centers have also made important strides. The Center for Integrative Medical Sciences (IMS) is exploring new directions in the intersection between functional genomics and the immune system in health and disease, while the Quantitative Biology Center (QBiC) is advancing the field of systems biology by developing new approaches to the study and control of complex living systems from the single molecule to the whole organism level. The Center for Life Science Technologies (CLST) is developing new platforms in structural biology and imaging technologies that are already contributing to the next generation of biomedical research. New interdisciplinary programs in epigenetics, cell dynamics, and whole-body imaging represent exciting new efforts bridging multiple research centers across the institute. While much of the work being done at these centers is basic, it holds great promise for future applications.

Cross-disciplinary research has become increasingly important because many of the most exciting and rewarding new problems must be explored and resolved at the interface of mathematics, physics, chemistry, computation, engineering, fundamental biology, and biomedicine. Working at these interfaces necessitates not only addressing the scientific question of interest, but also a strong commitment to the development of new methods and technology and their applications. RIKEN continues to play a pioneering role in building innovative interdisciplinary research projects in fundamentally important and emerging areas of the natural sciences. The newly formed centers of Emergent Matter Science (CEMS), Advanced Photonics (RAP), and Sustainable Resource Science (CSRS) are stellar examples of the consolidation of collective interdisciplinary strengths to focus on challenging scientific and societal problems. The Advisory Council applauds RIKEN's success in promoting exemplary communications and interactions among scientists from diverse backgrounds to create new interdisciplinary centers that are leading the world in their research fields. This was only possible thanks to the existing excellence, ingenuity, and trust among individual scientists empowered by RIKEN's research environment and scientific culture to follow their scientific vision.

With the newly established Competitive Program for Creative Science and Technology, RIKEN has also established a unique basis for seed funding of innovative and high-risk interdisciplinary research projects, many of which may

initially not be supported through conventional funding mechanisms. Understanding the neural mechanisms behind consciousness, finding solutions to green innovation challenges, and going beyond the limits of current photonics are all excellent examples of the pioneering interdisciplinary efforts led by RIKEN. The Advisory Council also recognizes, however, that rapidly advancing these efforts is constrained by limited budgets. We feel that these new approaches hold enormous potential for both scientific discoveries and contribution to economic growth and social benefits, and they deserve the strongest support from the Japanese government. Moreover, this strategic transformation of disciplinary research into innovative interdisciplinary research projects can serve as a role model for science across RIKEN and indeed all of Japan, as it also facilitates interactions between the institute and both academia and industry.

Among physical science facilities with more than a decade of activity, Nishina Center (RNC) has a long history of world-leading accelerator science and both experimental and theoretical nuclear physics research. The Center shares one of the global goals of the field, which is to understand the origin of visible matter in the universe. Over the past decade, the Center has built a state-of-the-art facility, the RI Beam Factory (RIBF), which is the best facility in the world for radioactive ion beam research. While many other countries, including France, Germany, Korea, and the United States, are spending billions of dollars to construct facilities that eventually will rival those now available at RIKEN, for at least the next five years, RIBF has the enviable position of leading the world's research in this area of nuclear physics. The facility has been primed for full operation since 2012, but has been severely hampered by decreasing budgets and increased utility costs following the 2011 Great East Japan Earthquake and its aftermath. As a consequence, its impact has been limited due to the reduced number of hours it is able to operate which is only at fraction of its maximum capacity. Unlike other major research facilities at RIKEN, RIBF does not have a separate budget for operations from the government, but is solely funded by RIKEN.

The research programs of the SPring-8 synchrotron ring have been very active, producing a significant number of high-impact papers, as well as making contributions to industries. Moreover the SACLA X-ray free electron laser is now in action, providing the first ever success in an accurate and radiation-damage free determination of protein structure and the development of a high performance X-ray image detector. RAC expects many collaborations to come from SPring-8, especially within RIKEN, as it is an ideal facility for both specific frontier problems and interdisciplinary, problem-solving research. We note, however, that while the quality of research results is high, the facility is not operating at optimal efficiency due to budget and staff limitations.

With extraordinary stability and operating capabilities, the K computer facility has made enormous contributions to the research community and industry and is well

recognized in global supercomputer rankings. The center is in a unique position to contribute to the study of major important problems including climate modeling, structural biology, drug design, materials science, and lattice quantum-chromodynamics calculations, which cannot be addressed by other means. In addition, the achievements in software design and library available to users, along with research on global climate simulation toward exa-scale computing, all illustrate its leadership and competence in pursuing the frontier of scientific endeavor.

In its efforts to increase diversity in the workplace, RIKEN has made continuing advances in attracting female and non-Japanese scientists and administrators. In the international recruitment of young scientists, such as post-docs and graduate students, and is well on the way to achieving its target of 20% non-Japanese research staff. The program of Associate Chief Scientist, with 100 million yen funding over five years, also seems to be an improvement over previous systems in attracting outstanding candidates. Japan in general and RIKEN in particular continue to employ lower percentages of female scientists, especially at senior levels, when compared to global trends. Japan needs to promote the recruitment and retention of women in the workplace if it hopes to confront its deepening demographic and economic challenges, and this is even more important for RIKEN. Given its unique status as an international institution, RIKEN must take the lead in adopting measures (in some cases modeled on those in other countries) to increase its number of female scientists.

While we recognize that gains have been made in diversification and gender balance in junior and midlevel appointments, and we congratulate RIKEN for its efforts, the homogeneity of the uppermost levels of the research staff and administrative management remains a concern. By increasing the diversity and gender balance of its workforce at all levels, RIKEN will put itself in a better position to fulfill its own scientific mission and respond effectively to national priority goals.

## KEY RECOMMENDATIONS

### 1. Securing stable funding

Strategies for ensuring stable and secure funding over multiple years will be key to RIKEN's ability to make contributions to advancing national research priorities and fully realizing its role within the international scientific community. Maintenance of RIKEN's core competencies and large-scale facilities is essential for supporting and advancing many of the research activities of individual investigators within and outside the institute. RIKEN will benefit from the longer planning horizons of the new national research and development institutions system. It should work with the government, the ministries, and key agencies to afford its scientists greater stability in their funding baselines beyond single fiscal years. We recognize that national budgets are subject to the constraints of national circumstance and political change, but in order for RIKEN's laboratories to achieve their full creative potential they will need a clearer sense of continuity in the resources they can draw on. Importantly, funding allocations should be made with an eye to the distinct missions of RIKEN's labs, facilities, and research centers. The institute's scientists should not be put in a position where they must compete directly with their university colleagues.

A number of specific instances came to our attention. Providing the support needed to allow for eight months of operation per year would ensure that RIBF remains the unchallenged leader in low-energy nuclear physics for the next several years, and that the facilities can be upgraded to keep pace with the next generation. In view of the high capability of the SPring-8 facilities, together with the effective management of the RSC complex, we strongly recommend that RIKEN secure sufficient funding for full operation of the facility and augmentation of the research staff. Funding will also be required to properly revitalize the Center for Developmental Biology (see also recommendation 13).

Should the decision be made to designate RIKEN as a Leading Institute under the new national R&D institutions framework, we suggest that this would be an excellent opportunity for the government of Japan to redouble its funding commitments to RIKEN in order to maintain its position as Japan's leading basic research institute. This can be accomplished, in part, by returning at least to the funding level of 2009.

### 2. Supporting the Chief Scientist system

The Chief Scientist system is a key driver of innovation in the RIKEN organization and should receive greater dedicated support. We were struck by how many of RIKEN's successful research centers and facilities were first incubated in what are now categorized as Chief Scientist laboratories, from the SACLA X-ray free electron laser, to the exciting new work in emergent matter, to the K supercomputer. We recognize the challenges of coordinating and evaluating such a diverse group of research interests, particularly in light of the combination of permanent and fixed-term Chief Scientist appointments, but this system lies at the creative heart of RIKEN

and should be cultivated in order to ensure meaningful benefits by encouraging talented young scientists to foster their curiosity and explore their individual creativity.

### **3. Balancing discovery and innovation**

Working with government policymakers, RIKEN should strive to attain a strong balance between its core strengths in basic research and identify ways in which these can contribute to institutional and national innovation initiatives. In all countries, there are increasing expectations of societal benefits and economic growth from investments into science and technology, and RIKEN must strive to contribute to the welfare and prosperity of Japan in ways for which it is so admirably equipped—through laying solid scientific foundations, managing world-class facilities resources, and fostering groundbreaking projects that span multiple scientific disciplines. At the same time, recognition must be given to the fact that RIKEN remains Japan’s premier fundamental science institute, and its most significant contributions to innovation efforts will often be made at the earliest stages— discovery, proof of concept, platform establishment and early development—of the translational continuum.

### **4. Encouraging interdisciplinarity**

Cross-disciplinarity is an essential part of modern science. RIKEN should build on the success of its new interdisciplinary centers and enhance opportunities for interaction and collaboration across the entire RIKEN organization. RIKEN should reward the use of existing programs for the promotion of such collaborations, while minimizing duplication of effort. Empowering young researchers to extend their interactions would be the quintessential way to promote interdisciplinarity. Cross-disciplinary research should be promoted not only within each of the newly established interdisciplinary centers, but also among various research centers and between these centers and the interdisciplinary programs. More collaborations of the sort seen in the joint research between the BSI and DMP, QBiC and the K computer, or CLST and the IMS are excellent models for the future. For example, we see high promise in the joint research being done by the BSI, CLST and QBiC, as well as that by QBiC, IMS and BSI, and between IMS and CSRS.

### **5. Effective communications**

RIKEN must position communications, including transparency, media relations, and public outreach as mission-critical components of its scientific administration. The value of effectively communicating its values, goals, and achievements cannot be overstated. We highly value the efforts of the many research centers to hire specialists in communications with scientific experience and expertise to ensure that the organization has greater control over its public identity and messages. RIKEN should establish an effective central public relations office and recruit highly qualified professional communications staff. Through its research efforts, RIKEN has made itself into a truly valuable scientific resource for Japan and the world, and it should be more widely recognized for the value it provides. It now needs to define itself more proactively in the eyes of the Japanese public and the international scientific

community, in order to gain greater recognition and respect for its many great contributions and achievements.

## **6. Working closely with academia**

Universities and RIKEN play complementary and indispensable roles in Japan's national efforts in science and technology. While it has already developed a network of well over 100 domestic and overseas academic partners, RIKEN should continue to explore new ways of collaborating and cross-fertilizing with universities. It may be more effective to collaborate with a small number of leading universities within Japan in establishing a prestigious international Ph. D. program to attract top-quality graduate students. Hosting graduate students in RIKEN laboratories and partnering with faculty is an excellent way to cultivate the scientific careers of graduate students, by giving them access to some of the world's best resources and exposing them to the creative and multidisciplinary scientific climate within the institute. Efforts should be made to ensure that even younger RIKEN PIs, especially those coming from outside Japan, have the opportunity to attract graduate students to their labs, as adjunct faculty appointments at domestic universities may be less available for such investigators. RIKEN should also encourage more of its scientists to pursue cross-appointments at universities, as these may provide greater opportunities for mutually beneficial interactions and exchanges than do adjunct positions.

## **7. Partnering with industry to drive innovation**

Partnering with industry will continue to be a crucial component of RIKEN's innovation efforts, and we applaud the institute's ongoing work in developing close ties with the private sector. While we recognize the value of domestic partnerships, we encourage RIKEN to build and cultivate potential ties with international companies as well, as this will expand possibilities and open up new rewards for the institute, and may stimulate domestic industries as well. In many cases, it is advisable for RIKEN to focus on its core capabilities in driving advances at the earliest stages of the technology value chain before handing off development to its partners. In some cases, such as in challenging or neglected markets, it may be necessary to carry translational efforts further, either by spinning off and nurturing small venture businesses, or in limited cases through in-house development efforts. Importantly, RIKEN should foster an entrepreneurial spirit among its scientists by offering recognition and rewards for creative risk-taking and innovation.

## **8. Clinical translation and drug development**

We were impressed by the signs that RIKEN's translation research efforts are already beginning to enter clinical testing. The world-leading study of an iPS cell-based approach to age-related macular degeneration, a disease that affects 1% of people over 50 in Japan, is a testament to the success of RIKEN's investments in leading-edge areas of the life sciences and ability to cultivate translational partnerships, such as those with the Kyoto University Center for iPS Cell Research and Application, led by Prof. Shinya Yamanaka, and the Institute of Biomedical Research and Innovation

in Kobe. However, it needs to be recognized that RIKEN will need to invest in sustaining leadership and expertise in translational science. It must attract greater numbers of scientists with the appropriate skill sets in clinical sciences, trial coordination, and regulatory compliance in order to establish long-term relationships with academic, medical and industry partners

The work of the Program for Drug Discovery and Medical Technology Platforms (DMP) within the Research Cluster for Innovation also shows tremendous promise and has already led to drug development efforts with industry partners in the lead position. We suggest that if this promising program is to maximize its benefits to society, it should involve industry partners from the earliest stages of target identification and should formulate clear pathways for transferring development responsibilities once a lead compound has been attained. We emphasize that it is advisable to invite industry partners to collaborate in such projects at the earliest stages of planning. Due to the critical biological role and the tremendous therapeutic potential of epigenetic targets, the DMP should also consider developing an epigenetics platform, including in vitro and in vivo screening assays, in concert with RIKEN's new cross-disciplinary efforts in that area. We recognize that a number of individual RIKEN centers are involved in this effort, and hope that this becomes more of an institute-wide interdisciplinary effort. It should also be kept in mind that in addition to generating potentially clinically useful development compounds, DMP is in a position to produce tool compounds for research use, as well as promote drug discovery-oriented research in other parts of RIKEN.

## **9. An international environment**

RIKEN has devoted a great deal of effort to making its research environment bilingual, and we commend the efforts to make nearly all administrative documents available in both Japanese and English. We recommend that English be used in all meetings involving scientific issues as a matter of course. The use of English in administrative meetings is also strongly encouraged. The institute should provide opportunities for English language training to administrators as well, and should conduct targeted recruitment of bilingual or non-Japanese staff at all levels of the administration, including management and director positions. Facility in the lingua franca of international science improves the full recognition of RIKEN by the international scientific community.

The pursuit of inter-disciplinary research should be encouraged both on the domestic and international levels. All international partnership programs of each Research Center should follow the best practices of RIKEN. RIKEN should additionally provide assistance to non-Japanese scientists in applying for nationally competitive grants. RIKEN should consider providing tuition assistance to families of school children enrolled in international schools, and to introduce career support services for spouses and partners of employment candidates from overseas.

## **10. Promoting gender balance**

Maximizing scientific excellence requires recruiting talent from as broad a cross section of society as possible. The RAC feels that there is a wonderful opportunity for RIKEN to boost its outstanding human resources portfolio by recruiting more female scientists. A priority should be to recruit female scientists at the Director, Chief Scientist and Group Leader levels (in that order), given the current male-female distributions. Gender equality training, focused on how to run search committees in ways that do not prejudice against female applicants, should be compulsory for Directors, Chief Scientists, and Team Leaders. Many studies have found that such prejudice against women is innate and often not recognized by the individual, and that even women tend to be biased against women. Such training could be in the form of a half-day symposium, or an online course, and should include a focus on good hiring practices (see next section). The University of Cambridge Gender Equality Program (<http://www.equality.admin.cam.ac.uk>) is a good example of such programs, which are becoming increasingly common at universities in Europe and North America.

Gender equality “good practices” for hiring include the advertisement of top-level positions (Director, Chief Scientist) to ensure that female candidates have at least an equal opportunity to apply. The advertisements should also ask for both nominations and self-nominations. A database of outstanding female scientists should be assembled to help in recruiting women to top-level positions (especially Japanese women who are overseas). For high-level appointments, female scientists should be among the letter writers. All search committees should have female members, as well as a member with training in gender equality to determine whether screening and hiring procedures are fair to women and minorities. Females should be represented on shortlists in the same percentages as they are represented in the applicant pool; i.e., if 30% of the postdocs in that scientific area are women, then it is expected that 30% of the shortlisted group leader candidates will be women. Likewise, if 15% of the group leaders or assistant professors are women, then at least 15% of the shortlisted applicants for Chief Scientist or Director positions should be female as well. The CVs of all the top candidates should be presented by a committee member before the committee decides on a final shortlist. Additional resources should be made available to recruit top women into senior positions.

Sexual harassment training, featuring instruction on what sexual behavior is and is not acceptable, and how to handle situations where sexual harassment has been reported or suspected, should be mandatory for all Team Leaders, Chief Scientists, and Directors. An example to be followed could be Yale’s online course and information on gender matters has been compiled by the US National Academy of Science standing committee on women in science, engineering and medicine, which can be a useful resource. Other potential measures could include support grants for female postdocs with young children to enable researchers to reduce their work-time percentage and hire support staff (the Swiss SNF offers one such grant). Additionally, as family-unfriendly working conditions may discourage women from pursuing

research careers, RAC also recommends that daycare be available onsite at all RIKEN campuses, and that no meetings or seminars be held outside of regular working hours so that women with children can attend.

### **11. Administrative excellence**

The administrative support services provided by the RIKEN head office and the branches at the various campuses and research centers are an essential part of the success of the enterprise. We recognize that RIKEN is efficient in its balance of scientists to administrators compared with other similar institutions in Japan, but feel that it should continue to strive toward greater efficiency and streamlining of the administration in line with world-class institutions.

Efforts should also be made to increase the number of scientifically trained administrators as opposed to non-scientifically trained staff at every level, up to and including the executive directorships. As a research institute, RIKEN only stands to benefit from developing an organizational culture of mutual respect and understanding through such measures, and given the growing demand for alternative career pathways for those who choose to leave bench science, this should be an eminently achievable goal.

### **12. Reinforcing the culture of scientific integrity**

The recent findings of misconduct by a RIKEN investigator at the Center for Developmental Biology are very serious and have aroused political and public concern. It should be borne in mind, however, that incidents of research misconduct occur worldwide and this is a challenge for the entire scientific community. It is self-evident that a high level of integrity in the conduct and reporting of research is essential to scientific progress. RIKEN's long tradition of success in many areas of science provides strong evidence that a culture of research integrity is well established within the institute. At the same time, it is important to establish a clear and transparent, but also measured system for responding to allegations of misconduct and for disciplining scientists who violate community norms. While it will never be possible to eliminate the possibility of impropriety or neglect, by cultivating an awareness of the importance of integrity and zero tolerance for misconduct, RIKEN can help minimize such risks. Training in research ethics should be conducted with a discipline-specific focus, as practices and norms differ across fields, and real-life examples should be provided in teaching about risks. Beyond regulations and lectures, however, it is critically important to promote discussion at all levels from graduate student to PI and instill a culture of examination and challenge. RIKEN labs should require the exposition of data prior to submission for publication, at least at a documented lab meeting, and preferably at an internal seminar, to ensure the opportunity for critical independent review. Equally importantly, effective processes for archiving primary data and experimental records in discipline-appropriate formats should be established.

A second crucial aspect of the promotion of a communal sense of scientific integrity is building trust that the system will protect both the accused and those raising suspicions in cases of alleged misconduct. Guidance and support, including advice on whether and how to respond internally and externally, should be made available for personnel subjected to accusations of misconduct, which must in all cases be objectively evaluated. Similarly, safeguards must also be established for the protection of whistle-blowers, for whom confidentiality and anonymity must be assured. We suggest that a central Research Integrity Office be established and that an ombudsman be elected within each campus, and clear procedures detailing how investigations into misconduct allegations will be conducted must be put in place, and fully communicated to all employees.

This is now an opportunity for research organizations and other stakeholders, including academia, industry, and government, to develop principles of ethical conduct in line with international guidelines, notably the Singapore Statement on Research Integrity (<http://www.singaporestatement.org/statement.html>), the United Kingdom Concordat on Research Integrity (<http://www.ukrio.org/our-work/the-concordat-to-support-research-integrity/>), and the Global Network of Science Academies/InterAcademy Council report on “Responsible Conduct in the Global Research Enterprise” (<http://www.interacademies.net/File.aspx?id=19789>).

### **13. Comments on the STAP issue and revitalization of the Center for Developmental Biology**

RAC applauds RIKEN for immediately initiating an investigation into the STAP publications and calling on the authors to retract as soon as serious errors were confirmed. The individual misconduct and associated failures of research oversight are deeply regrettable and appropriate disciplinary action should be taken against those responsible. However, imposition of a drastic cut in budget for the entire Center appears out of proportion to the international community as reflected in the multiple letters of support for CDB. The penalty suffered by innocent PIs and the uncertainty over the future of CDB are damaging to the mission and ethos of RIKEN. Moreover, such indiscriminate action will not encourage the openness and whistle-blowing that are essential to discourage and prevent future incidents.

RAC understands that the full investigation into the misconduct will soon be complete. It will be important that the findings are made public and are clearly explained by RIKEN. Such transparency should bring closure to the episode. Thereafter, recognizing the importance of developmental biology and stem cell research for both basic understanding of human life and for translational opportunities in regenerative medicine, RIKEN’s efforts to revitalize CDB should assume high priority.