

Advisory Council Report
RIKEN Center for Developmental Biology

March 2006

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The Advisory Council of RIKEN Center for Developmental Biology (DBAC) met in Kobe on February 12 to 15, 2006 for its third review of the Center's activities. An overview of the Center was provided by the Director, and was followed by research presentations from the seven Group Directors (GDs). All the AC members attended the GD's presentations. Some of the Team Leaders (TLs) then gave presentations describing their research activities, each of which was attended by a group of 3-4 members of the Advisory Council. AC members also visited TL labs and met with postdocs and students. Since the Director had asked both GDs and TLs to give talks about the most interesting progress in their labs, the presentations did not necessarily cover the entire activities of any research program. Such information was made accessible to the AC through the 2006 White Paper that had been prepared by the CDB. Following extensive closed discussion, the Chair summarized the AC findings and recommendations to the CDB staff before the meeting was adjourned.

Overview of the productivity of CDB in terms of its research output

The AC members were impressed by the overall high quality of scientific research carried out in the CDB. In its five years of existence, the CDB has rapidly and successfully established a series of creative and ambitious research programs. With nearly 100 publications in 2005 alone, many of them in high-impact journals, the research output is remarkable. It should be noted that although the overall output has been very good, productivity has not been uniform. Some of the labs need to focus more effort on publishing their findings. Given the exceptionally good research environment and the excellent funding situation, the CDB research staff is reasonably expected to achieve comparably high standards of output, which indeed many of them do. The AC noted that CDB has filed several patents but wondered if there was an internal process for reviewing studies for potential patentability prior to public presentation.

CDB Director Masatoshi Takeichi is an exceptional scientist of high international renown. The scientific success of the CDB owes a great deal to him. The AC members were impressed by his outstanding and efficient management, which he performs while maintaining excellence in his own scientific research. The two Deputy Directors and other Group Directors also contribute significantly to the management of the Center. The AC recognized that these contributions by the GDs are very valuable, and expressed the wish that care be taken not to allow managerial duties to become so burdensome as to divert attention from research activities.

This year, the AC had the opportunity to learn about the Center's research support facilities, such as the Functional Genomics subunit and the Laboratory of Animal Resources and Genetic Engineering. The development of these support functions has been impressive and their impact on and importance to the CDB was recognized by the AC members. The AC supports the initiative to open these services to scientists outside the CDB, including those in universities and other institutes. This is seen as especially important during this time of very stringent funding.

The AC was also introduced to the Office for Science Communications and International Affairs (SCIA), which was established after the last AC meeting, and

had a chance to visit the exhibition gallery and mock laboratory designed especially for children and non-scientists, in which live biological specimens and model organisms can be shown and explained to visitors. The AC recognizes that such activities are very important to communicate CDB's mission and information to the public. The SCIA also plays an important role in internationalizing the CDB by providing presentation and writing skills support to non-native English speaking scientists and students, and Help Desk support for non-Japanese speaking staff. These functions are performed by the office's bilingual coordinators and have contributed to the improvement of English communication among Japanese scientists. The AC commends the establishment of the SCIA and the increasing use of English as a working language in CDB.

International status of CDB in terms of name recognition and visibility

The CDB has made good progress in establishing itself as a premiere institute in the field of developmental and stem cell biology, and may in fact be one of the largest institutes devoted entirely to this field. The CDB is now attaining recognition as one of the leading developmental biology institutes in the world (and certainly the best in Asia). This has primarily been achieved through the reputation of the Director and Group Directors, by the excellent publication record and by the efforts of the CDB and its staff in organizing and participating in international research conferences. The Director, Masatoshi Takeichi, is now President of the International Society of Developmental Biology and has launched a new Asian-Pacific regional initiative to improve science and interactions among developmental biologists in this part of the world. This activity was highly commended by the AC. The high level of international recognition and visibility of the CDB will be further enhanced by further efforts to improve English communication skills of junior staff. That said, the AC thought that the Group Directors and Team Leaders presented their work very fluently. In order to enhance international interaction, it is recommended that openings for new staff positions be advertised more internationally. This should ensure that more foreign scientists apply for CDB positions and should alert Japanese scientists who are being trained abroad of the research possibilities at the Center. It is also important to send young staff to meetings abroad to interact with scientists in international forums. This will both increase the visibility of the CDB and encourage international recruitment. Finally, the opportunity should not be overlooked for CDB to attract high calibre foreign PhD students.

Comparison of the CDB with other institutes worldwide in terms of scale and research scope

There are a number of other high quality institutions that focus on this general research area, but it is difficult to name one that precisely matches the CDB in terms of both its scale and the scope of research. The European Molecular Biology Laboratory (Germany), National Institute of Medical Research (UK), and the Max Planck Institute of Developmental Biology (Germany), and several Institutes in the United States, have comparable focuses on developmental and stem cell biology, but they differ somewhat in either their inclusion of additional fields not covered by the CDB, or in their scale. In terms of quality of resources, research and ambition, the CDB is on a par with these comparator institutes. The fact that this has been achieved in a short period of time indicates that the CDB has the potential to become one of a handful of elite developmental biology institutes worldwide.

There are two areas that were mentioned as points of concern by AC members. The first is the small number of female and foreign scientists. We understand that there are historical reasons for this, but the CDB needs to continue to make serious efforts to improve the current situation. There is no reason why this goal should not be achieved without lowering the overall scientific quality of the CDB. There may be good female scientists who are trained abroad but have had little chance to get a position in a Japanese university. One possibility might be to establish a “returning scientists” fund to assist the repatriation of scientists from abroad, both male and female.

The second issue concerns the long-term success of CDB. The strength of the CDB as a center of excellence competitive with comparable institutes in the United States and Europe makes it imperative that stable financial support for the Center be provided. The AC was concerned about the general year-on-year decline of financial support from the government. Any translation of basic research products to the development of clinical practice or biotechnology applications is an endeavour that must be measured in decades rather than years. Further, the physical and intellectual resources assembled in the CDB during the past years are precious, and lack of assured continuity of all the Center’s operations would result in an unfortunate loss of these resources. The AC therefore urges the Japanese government and the RIKEN leadership to provide support to the CDB for the

long-term research programs in order to maintain the Center's operations into the future. Assured continuity is the single most important issue facing the CDB at this stage, and it is vital for maintaining its worldwide recognition. Such a contribution to the scientific community will not only help the CDB but also promote the image of Japanese science as a whole.

Appropriateness of the evaluation system

The AC commends the CDB for implementing an external peer review process for evaluation and reappointment of all Team Leaders and including the Group Directors. At this meeting, the AC was not asked to evaluate all of the individual research programs. Our opinions and comments, based on presentations of GDs and TLs, will be assembled separately from this Review Report and will be conveyed to the Director in a separate report. At the last AC meeting, we made in-depth reviews of some of the CDB staff. This time, we noted that considerable effort had been made by the CDB to follow our recommendations, such as by adjusting the allocation of space and funds. We also recognize that many scientists had taken heed of advice given at the time of the previous AC to consolidate their research foci, and we were pleased to see that they are now making good progress. From these observations, we were pleased to see that our evaluation has had a positive effect on CDB management. We are convinced that the AC system, consisting of foreign and domestic scientists, is working effectively. However, the AC can only review individual lab activity bi-annually, at most. The AC understands that more frequent evaluation and appraisal occurs internally, but would appreciate more information on this process. The AC would be willing to act as the primary interim review body for the Group Directors if the Director considers there is a risk of mail reviewer fatigue. Mail reviews should be retained for the 5 year review, however.

Some members of the AC also recommended that other metrics of accomplishment might also be incorporated into the evaluation process. It was suggested that the number of external presentations, leadership positions in national societies, journal reviewing and editorial positions, etc. all give an indication of peer recognition that would be useful in the regular assessments of staff. The AC would also like to see information on external grant funding

We understand that GDs have frequent discussions on scientific progress and management, which we hope provides opportunities for critical exchange. Each TL has a GD as an advisor, which allows the GDs to play a role in evaluating and helping TLs. This system should work well. One concern was raised at the AC meeting in regard to whether the younger scientists have sufficient opportunity to be evaluated outside their labs. Such international review and feedback is certainly possible at scientific conferences, but it would also be valuable to arrange an

intramural seminar program so that younger research scientists and students have the opportunity to present and defend their work in front of the CDB community. A yearly retreat, which includes poster presentations, does take place and is no doubt helpful, but constant effort is needed to reduce lab barriers to make the activities of young scientists visible to everybody. This is especially important in a center where very competitive research is taking place, to pay special attention to the future independence of students and postdocs working there.

The CDB is still in a period of growth and development. Some of the research programs are in their first 5-year term, while others have already been renewed for a second term. There has been some positive turnover, with PIs taking positions in universities. However, many of the staff hope to stay for a second term. This is understandable, given the excellent scientific environment provided by the CDB. However, research staff turnover will be critical for the future development of the CDB. The AC recommends that clear rules for maintaining turnover be established, to prevent expectations that the renewal of a research program is the norm, rather than a reflection of only the most outstanding performance. It seems natural to set a limit of two 5-year terms for a TL research program. We recognize that these scientists may be more productive if they stay in the CDB, but there are very good younger scientists who should also be afforded a similar opportunity, and new recruitment is essential to maintain the dynamism of the Center. It may be more difficult to have a fixed rule for the turnover of GDs, but here too it is essential not to expose the system to blockage. It is also important that top research scientists flow from CDB into the University system, although this also requires University provision of competitive facilities. The AC can provide a general review based on scientific merit, but ultimately it is for the Director to deal with the general problem of turnover.

A discussion took place about recruitment of new staff. When a new lab is considered, the GDs meet and discuss which fields are to be recruited and which applicants selected, and the Director makes the final decision. However the recruitment process appears to be less transparent than some AC members think appropriate. Staff and program openings should be more widely publicized to increase applications by foreign scientists. This is particularly important for Group Director openings. The start-up funds and scientific environment provided are

highly competitive with other excellent institutions, so that the CDB should be able to attract candidates from around the world.

Suggestions for future programs / recruitment of research staff

(1) Efforts should be maintained to continue to recruit both young and senior scientists from diverse backgrounds. Considering the possibility that a significant fraction of the GDs and TLs hope to enjoy an extension of their research programs, it is strongly recommended that the CDB establish a rule to assure a healthy rate of turnover. Ten years is a significant period in such a rapidly growing field, and the CDB will need to add new areas of research. In order to make this possible, the CDB must have a formal and more transparent system of staff turnover, whilst maintaining appropriate discretionary authority for the Director.

(2) CDB offers unmatched opportunities for training young scientists in developmental and stem cell biology. To achieve full value, however, it is vital that CDB attracts the best PhD students. The AC is mindful that CDB must maintain a positive relationship with the Universities, but considers that attention must be given to promoting PhD training in CDB and to recruiting both Japanese and foreign students, for example through funding “prize studentships”.

(3) Since most of the GDs and TLs are highly prominent scientists, younger research scientists and students in the labs are less visible than they should be. It is important to give them a chance to present their own work and ideas to all the members of the institute at least once a year, possibly in a progress report-type seminar. Institutions of comparable remit usually have formal internal presentations by these young scientists.

(4) In order to make the CDB more international, it is advised that the Center increase the number of both foreign and female GDs and TLs. We recognize the effort made since the last AC meeting to recruit female and non-Japanese laboratory heads, however the numbers remain insufficient. As a general rule, all openings for team leader and group director positions should be widely advertised and the recruiting process made more transparent so that scientists living abroad have increased chance to apply for a position in the CDB.

(5) One possible way to encourage Japanese scientists studying in other institutions, especially in foreign labs, is to set aside some funds to provide “Returnee Fellowships” or semi-independent positions in some of the existing groups. If such a

fellow performs exceptionally well, this could lead to a new TL position in a few years, but this should not be a presumption.

(6) These and other improvements require funds. A possible way of generating more funding is to reduce the allocation of resources of the GDs, especially now that their labs have been established. There should probably also be some limit on the size of GD laboratories, since the allocation of resources to these more senior people reduces the possibility of recruiting additional young team leaders. It is essential to make funding more flexible under the leadership of the Director. Very good financial support has produced excellent results, but further budgetary tightening may be possible, even desirable, as a means of ensuring that the Center keeps its recruitment dynamic and its ability to implement new initiatives.

(7) In respect to future research programs, the CDB already covers a wide and well-balanced spectrum of developmental and stem cell biology, so that it would be difficult to point out one or two areas in need of bolstering. The effort made by the CDB to extend into translational research is appreciated by the AC, but some concern was raised as to the scientific rigor of the translational research in comparison to other basic research programmes. It is important to bridge the gap between basic research and clinical applications, but extension in this direction must be carried out in closer collaboration with clinical institutions. AC members generally agreed that human tissue stem cell research is one of the possible programmes to add to the CDB in the near future, and that expanded activity in the study of organ design would be a natural extension of the Center's current research mission. The AC also approves of the suggestion of establishing a core facility to support human ES cell work that will relieve researchers from routine and labour-intensive cell culture and make human ES cells generally accessible within CDB. It was additionally suggested that a formal system for strategic planning might help to assure the long-term dynamism and success of the Center's research.

(8) The Office for Science Communications and International Affairs is performing an invaluable role in promoting CDB and Japanese biomedical science in general. The AC recommends that dedicated funding be allocated by RIKEN to support SCIA in future.

Members of the CDB Advisory Council

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Signature of DBAC2006

March 30, 2006

A handwritten signature in cursive script that reads "Yoshiki Hotta".

Yoshiki Hotta