Biological research in Japan and Asia

An interview with Ken-ichi Arai, Dean of the Institute of Medical Science at the University of Tokyo and President of the Asia-Pacific International Molecular Biology Network

EMBO reports (ER): You made a very early move from academia to biotechnology when you moved from Stanford to DNAX in 1981. Why did you move into biotechnology at a time when it wasn't fully popular?

Ken-ichi Arai (K-iA): Actually, I initially decided to go back to Japan in 1980 to create a similar environment to Stanford, a departmental structure where young and old can work together. At that time, I was also involved with Arthur Kornberg and Jim Watson in creating AMBO, the Asian Molecular Biology Organisation, but it soon became apparent that the time was not right in Japan for such an international entity: Japan's structures were based on a very bureaucratic system which made it difficult to mobilise things. So I decided to move back to the United States. Up until that time, I had been working mostly on bacterial systems and I wanted to move into yeast genetics or mammalian molecular biology or molecular immunology. But as long as I was applying for an NIH grant there was no opportunity to do this as I had to continue in a discipline where I had a track record. I had already received offers of a professorship from several leading universities in the USA when the offer came from DNAX while it was in its 'pre-formative'

ER: So you made an unusual move for the early 1980s, into a start-up company. Would you suggest that someone in the same position should do the same thing today?

K-iA: Yes. I am always in favour of creating a place where the adventurous spirit of scientists and the venture spirit of business people meet together. In the 1980s, however, the academic environment

there. This made me think it may be possible to finally create a research base linking not only Japan but also Singapore and other countries.

ER: Didn't you find it a big change when you returned to Japan to move back into academia again, because there were two changes: you were moving from America to Japan and you were moving from a

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was completely different. At that time, NIH funding was very poor and so there was a danger of a brain-drain into industry. We therefore established DNAX as a very horizontal organisation with a quasi-academic atmosphere: our principle was to encourage individual motivation by offering postdoctoral fellowships and graduate studentships, all with the freedom to publish.

ER: Ultimately you came back to Japan in 1990, so was your aim always to return?

K-iA: My long-term goal has always been to create a research centre in Asia. More than a hundred years ago, Japan began its

company to a university?

K-iA: My first culture shock came in 1977 moving from the vertical Japanese society to the American horizontal society. During my first year in California I felt a little bit uncomfortable as I had received much more respect from graduate students whilst I was in Japan. But I quickly became accustomed to people calling me by my first name rather than Doctor or something like that. However, this made it much harder to adjust back to the Japanese system in 1980, particularly since the move was from a free position to becoming the assistant to my old professor. I went back to the old system where my mentor still told me that I must prepare a research subject in my laboratory and this was actually one of the reasons why we moved back to the United States. When I returned to Japan the second time to the Institute for Medical Sciences of the University of Tokyo (IMSUT), I was a full professor and chairman of the department, but it was still a culture shock. Although I was expecting it, it was still a surprise that no one would make any decisions, that even the Director of the Institute was not in a position to take responsibility.

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stage. I realised that industry was supporting very good research so, at the age of 38, I decided to start DNAX with my wife and another first starting member. In total, about ten people moved as a group from Stanford, Caltech and the University of Tokyo, which was a fast beginning.

modernisation by introducing science and technology from the West. However, in the life sciences, the communication was rather unidirectional with no scientific centres like EMBL or CSHL in Asia. I had visited Singapore in 1987 with the Nature Biotechnology Conference and I saw that a new institute was being developed

interview

ER: So you'd expected that people at different layers would make the decisions?

K-ia: I am not talking about institutional decisions because in my position professors would be responsible for themselves. But,

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cratic, hierarchical structure and the tenure system tended to keep people within academia. Industry was also traditionally organised in a hierarchical way with permanent life-long assurance of employment, so no one wanted to leave that system. But both are now changing: industry because of global competition and academia because it must adopt the standards of modern science. Both sides have recently had some degree of deregulation and today, a government employee in Japan can start a company. A major problem has been the lack of capital, but I calculated that at least \$1 billion in venture funding has been created here in the last 2 years. That is not big money but it is still sizeable and significant. If we give postdoctoral fellows more freedom to move from academia to start spin-off companies with venture capital of a few

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for example, the Director should be responsible for making space available in a limited laboratory or for mobilising resources. Unfortunately, the Director of the Institute either did not have the authority to decide or there were no resources available. So our efforts at IMSUT were initially geared towards defining the roles and responsibilities of the Director and the Professors.

ER: That sounds as if it's going back to a Germanic system where the Professor Direktor is the boss.

K-ia: Yes. Also the standard Japanese system was that everyone had tenure, so if a professor retired, all the staff, including technicians, were inherited by the new professor. After 5 years we made a rule that when a professor retired or changed jobs to another institution, all the research staff had to be disassembled meaning that the professor had more responsibility for the people hired.

ER: Are mobility and changes in tenure status now becoming the norm in Japan?

K-ia: This is generally not the case. With regard to tenured positions, our institute may be the only institute where a clear statement has been made. In the last 5 years Japan has also created many postdoctoral fellowships which is changing job opportunities, especially for women. Previously, they have rarely been hired as assistant professors or offered tenured positions but they now occupy up to 30% of all the postdoctoral fellowships.

ER: What happens after the postdoctorate?

K-ia: That is still the major challenge that we hope to meet through the creation of independent career paths.

ER: There has been at least one high profile case of sexual discrimination or harassment in Japan. Is anything being done specifically for women in science?

K-ia: In our institute we have only one woman among the 30 professors, but the situation may improve in the long-term. The discussion is whether we should

ER: Your institute is unusual in that it links very basic research right the way through to patient care. How would you define your real ambition for IMSUT: is it to become better at patient care, better at the scientific level or better at biotechnology?

K-ia: The mission for the institute is to develop novel therapies based on discovery. Without making a discovery

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there may be no new medicine. So IMSUT is not a standard university medical school where education is the primary concern. Genomic research was originally separated from the hospital because, at that time, most of the people worked only on bacteria. But after 30 years now the time has come to narrow the gap based on the knowledge of genomics plus experimental medicine including gene therapy, cell therapy,

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regenerative medicines, etc. I think we are in a position to think about how we apply this knowledge to the welfare of the human. We are trying to set the example of translational medicine where knowledge-based research is linked to rapid clinical developments.

ER: That would seem like an opportunity for the creation of spin-off biotechnology companies. What is the position in Japan regarding such ventures?

K-ia: Previously a spin-off company was very difficult to form because the bureau-

million dollars, then the opportunity is there. However, the start-up should be linked to a university or the public sector, to avoid sapping all the initial resources. That's why in addition to our institute, I'm proposing that we establish a translational research centre which would belong to both academia and industry, one which is a real venture incubator.

ER: Can IMSUT take shares in companies?

K-ia: That is under discussion, not only in our institute but in the University of Tokyo where there is another institute called The Research Centre for Advanced Science and Technology. This institute has more freedom because they focus more on engineering and they have specialists in handling intellectual property rights. They are also making a holding company to start bioventures. We are discussing this in our institute but the first priority is to create a translational research centre with rights to intellectual property.

ER: Is it possible for scientists to take patents?

K-ia: Currently, we are part of the university bureaucracy which means that every patent may be owned by the government. But as we all know, that leads nowhere, so the government now encourages universities to take the patent, share it with the inventor and work with the company.

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ER: Can we switch topic to the Asia Pacific International Molecular Biology Network, A-IMBN. Your focus is clearly on Japan, but from what you said earlier, your interest is broader than that. The A-IMBN has been working for about 3 years now. You've put a lot of energy and invention into it. Do you think it's going to succeed where AMBO didn't?

K-ia: The situation is very different from that of 20 years ago when only Japan was open to involvement. AMBO therefore had to be based in Kyoto. The question now is why don't you bring the core of this type of organisation to Shanghai or Hong Kong? The major difficulty is not in Asia but within the domestic structure of Japan. No one seems able to make very clear decisions and in my opinion this is killing Japan. Fukuzawa Yukichi was very popular and he was a strong advocator of democracy, but his message was 'Get out of Asia. Go to Europe'. I think, these days, this is the wrong message. Rather, I think the whole of Asia should collaborate with both North America and Europe. There is a mutual need for collaboration and the generation of prosperity through science, and science is a common language for all.

ER: However, there are some Asian countries that are really not in a strong position, particularly in the context of advanced technology which could block collaboration. How is that disparity going to be resolved?

K-ia: This is also a challenge within Europe, but in Asia the challenge is much greater. It is amazing how the Japanese government has been spending money on foreign aid without much appreciation or success that you would expect from such a budget. No one recognises that foreign aid comes from Japan, even Japanese people do not know what we are doing for Asia or Africa. They are sending only the materials without creating a knowledge-based centre in Asia and, in the long-term, this approach doesn't work. We should help to share the knowledge and help people to understand science and technology. That is a knowledge-based collaboration.

ER: Do you see that as an aim for A-IMBN?

K-ia: That's probably the case. But knowledge-based industry cannot be created without a centre of excellence. One of the aims of the Japanese government is to help the poor through aid. It is clear that with this approach you'd never be able to help the poor to reach the

average standard of living. Japan has always strongly believed in the linear model of the development from poor, small industry and agriculture to the textile industry, to heavy industry and finally to the high tech industry. I have serious doubts about that model. If you consider India or China, I think it is very difficult to bring every Chinese or every Indian person to the average, despite the fact that there is an extremely good research base already in both these countries. We have to learn how to make a network of excellence while still helping the poor sector.

ER: That sounds like a good wish with which to finish, and thank you very much for the interview.

The interview was conducted by Frank Gannon.

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