Summary of the meeting with Dr. Robert Ogden and Dr. Oliver Ryder

1. Personal Profile

< Dr. Robert Ogden >

(1) Affiliation

Director of Conservation, Royal Zoological Society of Scotland (RZSS)

(2) Major professional experiences (only selected ones)

2003 Director, Wildlife DNA Services

2006 Director, Tools and Resources for Applied Conservation and Enforcement (TRACE) Wildlife Forensics Network

2013 Head of Conservation Science, RZSS

(3) Areas of expertise

Development and application of genetic analysis methods to conservation and wildlife law enforcement; SNP (single nucleotide polymorphism) marker discovery in non-model organisms; evaluating diversity and relatedness in managed populations of endangered species; production and validation of forensic DNA techniques for species, geographic origin and individual identification.

< Dr. Oliver Ryder>

(1) Affiliation

Director of Genetics and Kleberg Chair, Institute for Conservation Research, San Diego Zoo

(2) Major professional experiences (only selected ones)

1975 Research Fellow, San Diego Zoo

1979 Permanent staff as a geneticist

1986 Kleberg Chair in Genetics

(3) Areas of expertise

Biology.

Cell cultures and cell, tissue, blood and DNA banking; chromosome preparation and karyotype analysis; molecular genetic analysis; DNA sequencing; advanced methods for studying genetic variation, sex determination, paternity analysis, and evolutionary changes between populations and species of mammals, birds, reptiles, and amphibians.

2. Meeting Specifications

(1) Date

September 18, 2014

(2) NIES participants

Dr. Akimasa Sumi, President

Mr. Hiroyasu Tokuda, Vice President

Dr. Shogo Murakami, Executive Research Coordinator; Manager, International Coordination Office

<Center for Environmental Biology and Ecosystem Studies>

Dr. Noriko Takamura, Director

Dr. Miho Murayama, Head, Wildlife Genome Collaborative Research Group

Dr. Akio Takenaka, Senior Principal Researcher; Head, Biodiversity Assessment and Projection Section

Dr. Nobuyoshi Nakajima, Head, Ecological Genetics Research Section

Dr. Hiroya Yamano, Head, Biodiversity Conservation Planning Section

(3) Discussion procedure

To begin, Dr. Ogden and Dr. Ryder were provided with reference materials and shown a DVD introducing NIES as a research institution. President Sumi then presented an overview of NIES, and indicated to the advisors the following three general topics as guiding points for discussion:

(A) Distinctive features of NIES in the areas of advisor's specialization;

(B) Distinguishing features of NIES as a research institution involved with the environment, and points of expectation;

(C) Points which NIES should address and strengthen.

Dr. Ogden and Dr. Ryder were briefed on the research activities conducted at the Center for Environmental Biology and Ecosystem Studies. This was followed by a tour of the two facilities with the highest correspondence to their specialty and interests, namely the Biological Resource Collection Building and Environmental Specimen Time Capsule Building by affiliated researchers, while conducting a frank exchange of opinions with these researchers. Subsequently, Dr. Ogden and Dr. Ryder offered their comments (see 3 below) to President Sumi, based on the information provided, followed by wide-ranging discussion between the attendees.

3. Comments by Dr. Ogden and Dr. Ryder

(1) The large datasets covering long timescales are a standout resource of the institute and should be maintained and fully exploited

You have large datasets and the ability and capacity for long-term studies, which is

increasingly rare and should be maintained. This feature sets NIES apart from most research centers both in Japan and internationally and these data should be exploited to their full capacity.

It is also important to conceptualize the use of data, and new ideas are extremely valuable. A poor data environment is one of the most significant hindrances to conceptual studies and thus you are uniquely positioned to further conceptual studies by generating ideas and hypotheses from data.

These data additionally represent a potential brand for NIES and it should develop its reputation as a repository for big datasets. If you develop a way of curating and providing access to this data on a large scale, people from outside will come to you.

(2) The Time Capsule is an extraordinary facility and represents numerous potential opportunities into the future

The Time Capsule is an excellent facility – possibly the best of its kind in the world. The construction of this facility is a significant accomplishment and culturing fibroblasts from diverse species and cryopreserving them and using them for research has enormous potential applications. This work, while not widely appreciated at present, certainly will be in the future, and when this happens, as pioneers in the field, you will be in a position of leadership.

One opportunity would be to increase the international role of the Time Capsule. For example, you might consider becoming a biobanking resource for endangered species for Southeast Asian specimens. An alternative option would be to set up the facilities in these countries, share samples, or at least digitized information, as well as instruments and know-how.

Another opportunity might be to form a network of people who understand the merits of sharing specimens, as there are currently barriers to exchanging materials over international borders. Humankind has not saved anything over a millennial timeframe without having multiple copies in lots of places. A collective voice could more effectively communicate the merits of sharing. We should learn the lessons of history and preserve these resources into the future by creating this kind of network.

(3) Genomics is underemphasized at NIES and you should clarify your strategy on how you will integrate genomics into your research

Genomics and especially genomic sequencing is a powerful method which is going to be used in every area of biological inquiry, so NIES must address the issue of how it will engage with genomics. Previously genetics was the domain of geneticists exclusively, but scientists in a wide variety of sub-disciplines in biology are incorporating genetic studies. This

was underemphasized in the talks I heard today and you are going to have to consider how this will develop.

There is significant expense associated with high-throughput sequencing and the subsequent computing power needed for genomics so to get around this one solution might be to outsource to domestic genomics facilities. I believe you are investing in a medium level genomic sequencing platform that will represent a powerful research tool; to maximize the efficiency of this resource it is important to develop a research pipeline that ensures you utilize this equipment at a high capacity.

(4) Bioinformatics is an essential area and one with which NIES will have to engage

While NIES clearly has the capacity to produce large volumes of data, the issue of analysis speed remains. In this context it is necessary for NIES to consider how it will engage with bioinformatics to facilitate the processing and interpretation of these data. As with high-throughput sequencing, the best solution might be to have modest onsite infrastructure (computing power) and then to outsource your bioinformatics needs to relevant institutions. You should at least have the ability to initiate projects in the laboratory and identify the analysis needs of each project.

Another option would be to invest in training a more technologically-inclined biologist in bioinformatics. While this is a longer term investment, they will have the advantage of already understanding genetics and evolutionary concepts, so this is something you should consider.

(5) Networking is becoming increasingly imperative and more should be done to strengthen NIES's networks in these areas

There are multiple benefits to networking, and increasing communication between laboratories and facilities working on similar areas is essential and must be actively pursued. The Microbial Culture Collection and its associated database suggests one way in which NIES might strengthen its networks, by sharing information or even integrating the database with similar ones abroad.

Perhaps your greatest potential allies are academic researchers. If you strengthen your ties with academia there is the potential to increase your sources of revenue through joint applications for funding. Not only would you generate money but you will get more recognition for the investments you make to support the research activities of those working in similar or complementary areas.

In the past, for different areas of biology, for example genetics, a single investigator or small group if investigators could conduct a project from field work to publication; but those

days are now long over, such that biologists as a whole need to be more networked. If the psyche of scientists is not set up for integration and collaboration it will limit what they can achieve and this should be emphasized in your research strategy.

(6) Public relations are of increasing importance and more of such activities are necessary

It is increasingly important on the international stage that science translates and communicates its outcomes in order to appeal to society at large. While the disconnect between society, the government and research bodies is still a reality, closing the gap between them is something which is being increasingly emphasized and will increase in importance. This process is already underway as you may have learned from your experience in the aftermath of the Great East Japan Earthquake, with the disaster being a trigger for NIES to share more information on the issues of concern from its research activities related to the disaster.

(7) The passion and commitment of the young researchers at NIES is impressive and they represent a valuable resource which should be both acknowledged and encouraged

The last point is that we really enjoyed hearing the presentations by young researchers at NIES. These inspiring young people and their commitment and passion were a great thing to see and that gives hope for the future. These efforts should be acknowledged as they are a very good investment for the future of NIES. On a normal work day at a busy time when you see someone who loves what they are doing and they are working hard on it, it gives you hope for the future. It is important to remain optimistic to maintain their enthusiasm and so that they are encouraged to continue to work hard and make a difference. These are the people who will make the future contributions which will change our world.

Discussions with the NIES President's Office
理事室との意見交換

Dr. Ryder (left) and Dr. Ogden (right)
ライダー博士(左)とオグデン博士(右)

Biological Resource Collection Building
環境生物保存棟

Environmental Specimen Time Capsule Building
環境試料タイムカプセル棟