Evaluation of the Research and Professional Activity of the Institutes of the Czech Academy of Sciences (CAS) for the period 2010–2014

Final Report on the Evaluation of the Institute

Name of the Institute: Institute of Animal Physiology and Genetics of the CAS, v. v. i.

Fields, in which the Institute registered its teams:

Biochemistry and molecular cell biology, biophysics, virology, …

Observer representing the Academy Council of the CAS: Karel Aim
Observer representing the Institute: Michal Kubelka

Commission No. 6: Biochemistry and molecular cell biology, biophysics, virology
Chair: Professor emeritus Morten Kielland-Brandt

Date(s) of the visit of the Institute: November 11, 2015
Programme of the visit of the Institute: see attached Minutes from the visit

Evaluated research teams:
No. 2 - Team of Biochemistry and Molecular Biology of Germ Cells

A. Evaluation of the Institute as a whole

1. Introduction

The Institute of Animal Physiology and Genetics has twelve Laboratories in three locations in the Czech Republic. Only six teams' scientific output was judged during this evaluation period. The Commission 6 has to evaluate only one team out the six, the Team of Biochemistry and Molecular Biology of Germ Cells. Therefore, the evaluation of the Institute of Animal Physiology by this commission is mainly based on the presentation by **Prof. Jan Kopecny,** who is the director of the institute, as well as the meeting between the institute board and the commission. The Institute of Animal Physiology has its headquarters at Libéchov and some of its teams in Brno and Prague. About 140 employees are at Libéchov, 40 at Brno and 14 at Prague. These 3 locations are due to mainly historical reasons.

The Institute has high quality pedagogical activities at several universities in Czech Republic, and even at foreign universities, such as Aberystwyth University, Wales, UK, and Mendoza University, Mendoza, Argentina. The biomedical teams work on meiosis and morphogenesis; the biodiversity teams investigate fish, rodent an lower vertebrate genetics, and are involved in studying the microbiota in humans, ruminants, pigs, herbivores, reptiles and insects. The PIGMOD centre at Liběchov provides state-of-the-art animal models for Huntington disease, spinal cord injury and melanoma. The Director and the board of the Institute constantly modernize the structure of the Institute; during the last five years, teams were cancelled, and four new teams were established to follow new trends in research.

2. Strengths and Opportunities

The main strengths of the institute at Liběchov are its animal models and the breeding facilities, e.g .the minipig breeding station and a large facility for fish breeding. The minipig breeding station is unique, as it harbours a line of genetically engineered Huntington disease and myeloma minipigs. The minipig breeding is financially supported by a US company. The team of **Prof. Michal Kubelka** is very strong in research (see respective evaluation). The Institute established a Project Management Centre to teach the students how to apply for grants, and help researchers in their grant applications.

3. Weaknesses and Threats

Given by historical reasons the institute is distributed at 3 different locations which are rather distant from each other (Liběchov to Prague, approx. 60 km; Liběchov to Brno, approx. 270 km). There is a single Department in Prague, located on the **Krč** Campus. The 3 different locations of the Institute may make the collaboration between groups less straightforward, and the Institute could re-assess the advantages of the present arrangement. The Institute argues that 3 different locations have also several advantages: e.g. the recruitment of PhD. students in big cities (Prague and Brno) is much easier than in Libechov, where the Institute headquarters reside. However, the Institute has high quality pedagogical activities at several universities which also provide good recruiting possibilities. The focus of the department in Prague is on anaerobic bacteria of the gut. It is located at the same place as the Institute of Microbiology, which may also argue for considering its integration into the Institute of Microbiology. Pros and Cons were discussed, and a final recommendation cannot be given. The strong focus on anaerobic gut bacteria argues for the current structure. Expected improvement of local scientific interactions and a more smooth administration could argue for integration of the Department of Microbiology into the Institute of Microbiology at Prague.

Although international grants represented 45% of the Institute grant income in 2015 this needs to be considered in more detail. The institute has relatively few grants which go beyond year 2015, and the number of international grants obtained during the evaluation period is low and most of the international grant money may attribute to the PIGMOD breeding costs.

The large grant supporting the ExAM Experimental Animal Models will end in year 2015. Continuation of the service is important. The support for the PIGMOD Centre (Exam) has already been solved by NPU.

The quality of outputs by intensity of citations is lower than the quality of the outputs as evaluated in Phase I and by journal impact. This is explained by the fact that in Phase I selected results which represented the most important topics of the Team were evalutated, whereas in Phase II all publications were included.

The bureaucracy of the EU PIGMOD project is complicated, making the project risky in some respects.

Some labs, especially at the Liběchov location, have difficulties in recruiting very good PhD students.

4. Recommendations

The Institute with these high quality outputs should try to apply for EU grants more intensively. More PhD students should be involved in the research work. When team leaders are recruited, it is important to advertise internationally. The PIGMOD project should receive CAS institutional support to help the Institute in maintaining the animal facility.

5. Detailed evaluations

Declaration on the quality of the results and share in their acquisition

The scientific output of the Institute is very good; many papers were published in high-impact journals. The Institute has high grant success at national grant agencies. The number of international grants that were awarded to the teams of the Institute during the evaluation period is relatively low.

Declaration on the involvement of students in research

The number of students involved in the research is generally satisfactory; however, their number should be increased in some teams of the Institute.

Declaration on societal relevance

The education activity of the Institute is excellent. The activity of the Institute in the area of research popularization is very impressive; the public has been approached at many levels.

Declaration on the position in the international and national context

The Institute has very good and fruitful national and international collaborations. The unique animal models make the Institute very attractive for collaborative research.

Declaration on the vitality and sustainability

The age structure of the Institute is close to optimal; the average age of the researcher has decreased in the last three years. The Director and the board have expediently dared to cancel teams and start four new teams to follow new trends in research.

Declaration on the strategy and plans for the future

The Institute has a realistic research plan for 2015-2019. Special emphasis is put on the Project Management Centre in order to stimulate international collaborations. New unique animal models are planned to be established. **New facilities are planned to be constructed in Krč and Brno.**

B. Evaluation of the individual teams

Evaluation of the Team No. 2: Team of Biochemistry and Molecular Biology of Germ Cells

1. Introduction

The current Team "Biochemistry and Molecular Biology of Germ Cells" includes 4 researchers. During the evaluation period, 10 PhD students were supervised.

The research investigates the regulation of meiotic division in mammalian female germ cells, oocytes. Special attention is given on the molecular mechanisms resulting in chromosomal aneuploidy using a mouse model. Major finding was that mammalian oocytes cannot postpone anaphase to prevent major segregation defects. Recently, the team discovered significant differences in the precision of sister chromatid segregation within cells of various aneuploid mouse strains.

The publication record of the team is very good with some outstanding publications in highly recognized journals.

2. Strengths and Opportunities

The team follows several highly significant research subjects and has become internationally visible. The researchers publish in well acknowledged international journals.

The unique animal facility (minipigs, fish) and the collection of anaerobic gut microbes are a further strength.

3. Weaknesses and Threats

No weaknesses and threats are obvious.

4. Recommendations

The lab should continue their successful research topics.

5. Detailed evaluations

Declaration on the quality of the results and share in their acquisition

In the years 2009-2013, an EMBO Installation Grant and a Purkynje Fellowship were awarded to Martin Anger by EMBO and Academy of Sciences of the Czech Republic, respectively. A Marie Curie Reintegration Grant was awarded to Martin Anger in the years 2009-2011. Publications are in very good journals.

Declaration on the involvement of students in research

Students are participating in the research activity of the team. The lab is involved in teaching and lecturing.

Declaration on societal relevance

In modern societies the average age of pregnant females significantly increases. This is accompanied by increasing numbers of infertility. Therefore, understanding oocyte development in mammalian female germ oocytes and sister chromatid segregation in molecular terms are of high social relevance.

Declaration on the position in the international and national context

The research is well acknowledged and has an excellent international reputation.

Declaration on the vitality and sustainability

For the next 3 years the lab has sufficient funding resources (4 grants from the Czech Science Foundation); there are other grants in preparation, so there should be sufficient funding for the further period.

Declaration on the strategy and plans for the future

The team will concentrate on studies of the chromosomal aneuploidy in mammalian oocytes and early preimplantation embryos, as well as on studies of regulation of translation in mammalian oocytes and its specific significance for the major morphological changes during maturation.

Date: February 15, 2016

Commission Chair: Professor emeritus Morten Kielland-Brandt