

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: Biology Centre 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: Jiří Dědina

Observer representing the Institute: Vladimír Košťál, substitute observer Jaroslav Vrba

Commission No. 6: Biochemistry and molecular cell biology, biophysics, virology

Chair: Professor emeritus Morten Kielland-Brandt

Date of the visit of the Institute: November 18, 2015

Programme of the visit of the Institute: see attached Minutes from the visit

Evaluated research teams:

No. 1 - Molecular biology and genetics; No. 14 - Molecular protistology

A. Evaluation of the Institute as a whole

1. Introduction

The Biology Centre (BC) of the CAS (director: Miloslav Šimek) consists of five research institutes (the Institutes of Entomology, Hydrobiology, Parasitology, Plant Molecular Biology and Soil Biology) and performs modern ecology-oriented fundamental and applied research, with strong interdisciplinary features employing the broad technical arsenal of basic biology as well as the tools of taxonomy, genetics, field ecology, mathematical modelling, some aspects of medical sciences etc). With its nearly 600 employees (230 scientists, 85 foreigners) BC is one of the largest research institutes in Europe focusing on environmental-oriented research. With its excellent scientific output (marked also by 123/343 papers in the first decile/quartile journals), modern infrastructure, remarkable participation in EU FP programs, immensely successful participation in education, BC has strong impact on the field. Via participating in the elaboration of Strategy AV21 of CAS, with the chapter “Diversity of Life and Health of Ecosystems”, they also have strong influence on strategic plans of the Czech Republic. Links to the society and to the economical sphere are also manifested by numerous regular appearances in printed and electronic media, and by several patents. Commission 6 had the opportunity of evaluating two teams, the Laboratory of Molecular Biology and Genetics of the Institute of Entomology and the Laboratory of Molecular Protistology of the Institute of Parasitology; we also visited laboratories and had chances for formal and informal discussions with BC Board members and coworkers of the evaluated teams.

2. Strengths and Opportunities

BC, with its cutting-edge modern research techniques and internationally renown scientists and clear strategic goals - coordinated with the universities and other academy research institutes, is in exceptionally strong position and will most certainly have many opportunities both at national and international levels. Their focus on important problems of our changing environment, along with their multidisciplinary approaches and high quality outputs, warrants the potential to further strengthen their positions.

3. Weaknesses and Threats

No obvious weaknesses and threats – assuming a continued stabile funding.

4. Recommendations

Follow the strategic plans, which are clearly determined; at the same time, they may have to be adjusted to the actually most important problems due to possibly rapid changes in the environment. Their position allows further internationalization of their teams.

5. Detailed evaluations

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

The scientific output of the BC is outstanding, and the share of their coworkers is significant.

Declaration on the involvement of students in research

Very good coordination with universities and high quality PhD training activity (with more than 90 PhD students involved)

Declaration on societal relevance

The ecological and environmental issues, in the focus of BC activity, are of high societal relevance; also, some medical aspects and applications are to be mentioned.

Declaration on the position in the international and national context

BC – as pointed out above – is in excellent position internationally and unique position in the Czech Republic and perhaps in CEE.

Declaration on the vitality and sustainability

BC's vitality and sustainability, while evidently depend on domestic and international funding, is excellent.

Declaration on the strategy and plans for the future

Clearly determined important strategic plans, with attainable goals.

B. Evaluation of the individual teams

Evaluation of the Team No. 1: Molecular Biology and Genetics

1. Introduction

The Team, headed by Ivo Sauman, includes 14 researchers and consists of four laboratories, on Developmental Genetics (headed by Marek Jindra), Molecular Chronobiology (David Dolezel), Molecular Cytogenetics (Frantisek Marec) and Molecular Genetics (Michal Zurovec). During the research period under evaluation, 22 PhD students were involved, from which 6 have received their PhD.

The Team uses insects to study energy metabolism, immunity, cell growth, signalling and differentiation, development and circadian rhythms. An additional focus is the evolution and function of eukaryotic chromosomes. The Team has improved the efficiency of *in vivo* gene manipulation in the housefly, *Musca domestica*, the silkworm, *Bombyx mori* and the red flour beetle, *Tribolium castaneum*. They run a biological imaging and microinjection facility, a bioluminescence imaging system for non-invasive long-time *in vivo* imaging with sub-cellular resolution.

The publication record of the Team is very good with some outstanding publications in highly recognized journals, in many of which the sub-teams took the lead.

2. Strengths and Opportunities

The Team is internationally visible and has a number of important international collaborations. Insects are excellent model organisms in eukaryotic research and the team has established methods to genetically engineer insects.

3. Weaknesses and Threats

No obvious weaknesses and threats.

4. Recommendations

The research topics are very interesting and the sub-teams should continue their successful research.

5. Detailed evaluations

The publication record is excellent. The results are reported in internationally highly acknowledged journals. Students are very well incorporated in the Team. The knowledge generated is of significant societal relevance.

The Team and sub-team leaders are internationally well acknowledged and visible. The Team's vitality and sustainability is high. The strategy and plans for the future are straight forward.

Evaluation of the Team No. 14: Molecular Protistology

1. Introduction

The research team, headed by Julius Lukeš (further PIs: Alena Panucucci Ziková and Zdenek Paris), in the examined 5-year period was composed on average of 7.5 members of optimal age-structure. They focus on the basic research oriented mainly on protists of the order *Kinetoplastida* and on free-living relatives of the obligatory parasitic *Apicomplexa* as well as the functional analysis of respiratory complexes of *T. brucei*. The Team produced 90 original papers in impacted journals, two papers in other journals, 3 chapters in scientific books.

2. Strengths and Opportunities

The Team has a number of international collaboration and it is internationally well recognised. The outputs of the published results of the Team are apparent not only in the field of parasitology but also in biochemistry, partly in microbiology and occasionally in several other fields of life sciences. Their pedagogical activity is wide, as well as the popularisation of science in different media.

The advantage of the Team is the presence of young scientists who are receiving opportunity to open own projects.

3. Weaknesses and Threats

No obvious weaknesses and threats.

4. Recommendations

Continue the present activities, but consider to concentrate on the most important research topics.

5. Detailed evaluations

High number (90) of original papers published in impacted journals should be acknowledged.

Many students of bachelor, master and PhD programmes are involved in the research. The Team and especially its leader is involved in intensive public propagation of science and its achievements.

The Team has unique position in national context and it is well known internationally.

The low average age of the Team guarantees the vitality and sustainability.

The research strategy is well and in detail described, in which young scientists receive opportunity to have own project.

Date: December 16, 2015

Commission Chair: Professor emeritus Morten Kielland-Brandt