

Report

Institute of Experimental Medicine, Advisory Board Meeting, Praha, 18.-20.2. 2019

Introduction

The Institute of Experimental Medicine (IEM) of the Czech Academy of Sciences organized an International Advisory Board (IAB) meeting in Prague from February 18 to February 20 (*Appendix I*).

IAB consisted of 5 members:



Status of the Institute

The IEM covers currently 12 departments with a staff of 207 individuals (154 full time equivalents). Of these PhD-level scientists count 70 persons, PhD students 50 persons, other graduate specialists 43, technical staff 17 and administrators and others 27 persons.

The departments vary in size from a few individuals to the largest one with 24 individuals. The departments cover diverse areas as shown in the IAB Meeting Program (*Appendix I*). IEM is housed in the main building Main IEM building (5665 m²), Innovation Center (1956 m², half of it is rented to Bioinova) and BIOCEV (160m²). The IAB had a chance to visit the departments and could note that the space appeared sufficient for the current activities and that the instrumentation was up-to-date.

The total IEM budget in 2018 was 194,9 million CZK, of which institution endowment was 76,9 million CZK and project funding 118 million CZK. The largest project funders were Ministry of Education, Youth and Sport (including EU funds) - 61,3 million CZK and Czech Science Foundation - 43,5 million CZK.

The review of the presentations

All presentations were prepared according to a uniform scheme, where the head of the department was presenting the research focus of the group, the research infrastructure or facilities being used, the cooperation activities, including intra-institutional, at national and international level, the teaching activities (if any), the structure of department where all employee were divided into research scientists, PhD students, research assistants and technicians. The presentations included the list of current grant support, a short discussion of the most important results, a list of publications from 2014-2018 and patents (if any). The presentations were concluded with the outline of future research directions. The committee appreciated very much the unified pattern of the presentations.

The overall quality of the presentations was very good. All presentations were given by the heads of departments with one exception of Dept. of Biomaterials and Biophysical Methods where a post-doc was representing the department.

The topics presented by the groups showed a broad diversity of research fields, covering both basic research and some aspects of applied research.

All departments are reasonably well equipped with the infrastructure allowing to conduct their research. In many cases, they share facilities (microscopy, cell sorting, etc.). Future plans to purchase new equipment were also announced (e.g. microscopy).

According to the presented bullet points most of the departments have various intra-institutional, national and international collaborations. However, no information was provided regarding the nature and extent to which such collaborations result from using partner's infrastructure and what are the metrics of such collaborations as measured by the number of joint papers or projects.

Information about the structure of departments would provide a more meaningful picture about the employee potential if the number of independent researchers (principal Investigators, postdoctoral fellows) would be listed and given by the total annual full time equivalents (many researchers have part-time jobs or are already retired). Research scientists should be divided into senior and junior categories (or possibly common categories used by the Academy).

The success of securing grants in general is rather high. However, there are some significant differences in fund raising between the departments, which is not only dependent on the size of the labs. Most of the funding is coming from national grants, two grants (one with the role of coordinator) are funded by the EU. The presentations should precisely specify the role of the named researcher on the grants (investigator/co-investigator or applicant/co-applicant).

The scientific achievements of the departments are impressive in many areas, mostly in molecular biology of cancer, genetic toxicology/nanotoxicology and neuroscience (measured by the reputation of the journals where they publish their results). There is also high potential in new topics being developed at the Institute.

The publication records from 2014-2018 are indicating the overall "productivity" ranging up to 18 papers per year per department with average IF of journals in a range from 3-6. The IEM departments are co-authoring few papers in prestigious journals representative of the respective disciplines. However, giving the number of citations per paper would be more informative and better allow for estimating the impact of the scientific achievements of the IEM.

The future plans are showing rather broad perspectives spanning various activities. In one case, Department of Pharmacology, no continuation of the research activities are planned because of the small size of the group (4 people in total) and retirement of the department head. The future of Transplantation Immunology Department should also be discussed in terms of future development.

Strengths of IEM

- An excellent recovery effort after the restructuring ("earthquake") in 2016.
- Excellent management of people and resources by the Director.
- Use of published papers and acquired grants as measures for the success.
- Enthusiasm and motivation/drive of the young researchers/students.

- An effort to bring in new research groups.
- Very well-developed infrastructure.
- A lot of good quality space.
- Good campus structure/all the departments are close and collaborative Institutes as well.
- Scientific excellence in many areas.
- The freedom that the director has means and is willing to motivate people in terms of salaries and space.
- Some "Fresh blood" in the form of new Departments.

Weaknesses of IEM

- Some departments have unfocussed programmes, largely overambitious and unrealistic (examples: Department of Auditory Neuroscience and Department of Biomaterials and Biophysical Methods).
- There is no clear distinction between the Department of Biomaterials and Biophysical Methods and the Department of Neuroregeneration. Probably the biggest conflict/overlap is within the Neurorecon Project. There is a significant overlap with other programmes as well, notably within the areas of corneal regeneration/stem cell scaffold grafting etc.
- Some departments have a large number of non-active scientists (historical burden) and the researcher/external grant ratio is very high.
- There is a big variability in the quality of the currently produced science and dynamics of the departments. This may again be linked to the "historical burden", as more prominent (in numbers) older groups do not appear to perform at the same level.
- A general comment is that the current requirement of the granting agencies dictates that numerous small papers are published as an outcome of a single project grant, resulting in the low probability to perform studies with greater impact.
- "Inbreeding" as a general culture, i.e. tendency to keep graduate students as postdocs rather than to motivate them to have a postdoc abroad.
- Publications – insufficient accent on "domestic" publications, where the lead authors (first or last) come from the Institute and the research is lead/financed/co-financed by the Institute's scientist.
- Not enough integration/collaborative efforts between the new groups and the established ones.
- A clear Institute direction/mission is missing, which would demarcate IEM from other institutions within the Academy of Sciences
- No clear common institutional strategy

Plan for the future

Several departments presented future plans that are based on the topics they were dealing with for decades and they have a track record of the projects, and in many cases achieved significant outcomes. Neuroscience is prevailing here, but also stem cell research, nanomaterials/nanosafety and ageing diseases.

The presentations also featured future plans based on collaboration but not following or having a **common strategy**. The future plan should focus to streamline the direction of the Institute and to strengthen areas in which they are unique or can become leaders.

There is a huge diversity in the future plans, which reflects present heterogeneity of the departments. There is time to change history and to work on a future strategy with short term (5 years) and long term (10-15 years) perspectives.

Future direction should focus on finding specific, possibly new fields and techniques to distinguish themselves from others to make the institute unique towards other institutes.

Recommendations

- Define clear scientific goals/mission of the Institute for the next 5 years. The departments need to find common goals for research – for example ‘mechanisms in ageing related (chronic) diseases’ etc.
- Recent recruits/departments should be integrated to better match the overall goals of the Institute (Depts. of Neurochemistry, Developmental Biology etc.)
- The topic of new department(s) has to strengthen the overall future mission of the Institute.
- As a first step in relieving the historical burden - replace two departments (Pharmacology, Transplantation Immunology) and strengthen the Institute’s new direction by recruiting new groups.
- As a second step, use the resulting free capacity to advertise a new department chair position, with attractive salary and postdoc position for the first 3 years.
- Consider thinning and streamlining the Department of Biomaterials and Biophysical Methods. We recommend the new direction(s) that were funded recently (such as projects developing the use of low-temperature atmospheric pressure plasma for biomedical applications) to become the new main focus. The change can be made progressively as the grants relating to neuroregeneration/retinal grafts/mesenchymal stem cell applications are finalised and the students finish their projects. The scientists associated with those projects can move to relevant Departments of Neuroregeneration and Department of Tissue Engineering.
- Establish core facilities where applicable.
- Build an animal house.
- More focus should be put on European projects and even better recognition at the National and International levels.
- Any new grant proposal should fall within the overall mission of the Institute.
- Postdocs and PIs should be strongly encouraged to get experience abroad to bring new ideas, methods and skills, and become eligible to write grant applications.