# Evaluation of research and professional activity of research-oriented institutes of the Czech Academy of Sciences for the period 2015–2019

**Summary Final Report**

**Name of the Institute: Institute of Physiology of the CAS, v. v. i.**

**Evaluated teams and their leaders:**

1. Laboratory of Biomaterials and Tissue Engineering (Lucie Bačáková)
2. Laboratory of Structural Biology of Signaling Proteins (Veronika Obšilová)
3. Laboratory of Bioenergetics (Tomáš Mráček)
4. Laboratory of Neurochemistry (Jan Jakubík)
5. Laboratory of Pain Research (Jiří Paleček)
6. Laboratory of Membrane Transport (Hana Sychrová)
7. Laboratory of Adipose Tissue Biology (Martin Rossmeisl)
8. Laboratory of Epithelial Physiology (Jiří Pácha)
9. Laboratory of Translational Metabolism (Tomáš Čajka)
10. Laboratory of Biological Rhythms (Alena Sumová)
11. Laboratory of Experimental Hypertension (Ivana Vaněčková)
12. Laboratory of Cellular and Molecular Neuroendocrinology (Hana Zemková)
13. Laboratory of Cellular Neurophysiology (Ladislav Vyklický)
14. Laboratory of the Neurophysiology of Memory (Aleš Stuchlík)
15. Laboratory of Developmental Epileptology (Hana Kubová)
16. Laboratory of Computational Neuroscience (Lubomír Košťál)
17. Laboratory of Molecular Neurobiology (Martin Balaštík)
18. Laboratory of Genetics of Model Diseases (Michal Pravenec)
19. Laboratory of Biomathematics (Jiří Janáček)
20. Laboratory of Mitochondrial Physiology (Petr Ježek)
21. Laboratory of Developmental Cardiology (František Kolář)

# Part A: Evaluation of the institute

**Strengths:**

- The Institute of Physiology has a very good, in part excellent publication record with a total of 710 papers within the evaluated period. 43 of these were published in the most prestigious journals; the sum of impact factors is 2600.
- The scientists of the institute are highly competent. Most group leaders and senior scientists were trained abroad and use state of the art technology and models.
- The current director shows strong leadership in advancing the research program and developing mechanisms to enhance the quality of research. Institute funds are distributed according to a system that rewards excellency.
- The expertise of the newly formed International Advisory Board will be a particular strength of the institute.

**Weaknesses:**

- The commission noted that in most institutes there is a tendency to start smaller, short term projects with loose connections, rather than to embark on ambitious, deep drilling research. This tendency to “fragment” research efforts seems to reflect the domestic funding landscape which appears to encourage the development of smaller scale, shorter duration projects.
- The commission appreciates all activities of the institute towards internationalization, which were very successful. In the past, these activities were supported by the Institute’s involvement in European funding programs. However, these EU programs have ended or will end soon, and it seems unclear whether the institute will continue to solicit, and receive, EU grants.
- The collaboration between teams is in part weak. While the institute leadership made solid efforts to implement an overarching “brain – heart – metabolism” theme, it still needs further effort and direction.

**Opportunities:**

- A particular asset of the institute is the internationally recognized Metabolomics unit. This unit is in a very good position to be more than merely a service unit. Rather, it can generate important intramural, and also international, collaborations. Thereby, it can strengthen the international standing of the institute.
- A strength of the Institute of Physiology is its research program, which clearly addresses topics that are relevant for healthcare, e.g. in cardiovascular medicine, neurophysiology, and metabolic diseases. Most importantly, the institute has started to interact with medical disciplines and clinical research, and it is in an ideal position to enhance these interactions. In that regard, the commission appreciates the particular effort of the institute to attract medical students, which will be helpful to strengthen ties with the medical faculty.

**Threats:**

- The institute considers the relatively low funding of science by the Czech government, as well as the possibility of future budget cuts, as potentially threatening.
- A potential threat is the possibility that the gap in the level of salaries between the Czech Republic and other European countries widens, so that it will become difficult to not only recruit scientists from abroad but also avoid the most promising Czech scientist leaving.

## Main criterion: 1. Quality of results (H1.1-H1.5)

| H1.1 | Quality of selected outputs of Phase I |
|---|---|
| The quality of selected outputs of Phase I was very good, a considerable portion was excellent. | |
| **H1.2** | **Contribution of workers on the outputs reached** |
| In some collaborative projects and publications, the scientists of the institute were the leading partner, in all others it provided essential contributions. | |
| **H1.3** | **Quality of all outputs and results** |
| The commission concludes that the results of the Institute are overall very good, in part excellent. | |
| **H1.4** | **The most valuable discoveries and findings in the fields, their importance for the field** |
| Scientists of the Institute of Physiology published numerous important findings on brain functions, heart and metabolism. As examples,<br>• an open-access software for processing untargeted metabolomics was developed by the Laboratory of Translational Metabolism (published in Nature Biotechnology), including a lipidomics atlas for 117 lipid subclasses that was frequently used and cited by others.<br>• Palmitic acid ester of hydroxystearic acid (PAHSA) was identified as an important modulator of insulin sensitivity by the Laboratory of Adipose Tissue Biology. 5-PAHSA is regulated by adipose triglyceride lipase and primes adipocytes for glucose metabolism (published in Diabetes). In addition, it exerts anti-inflammatory and antioxidant effects.<br>• The Laboratory of Epileptology investigated potential biomarkers for prediction of seizures and found that their occurrence is a slow process characterised by the progressive loss of neuronal network resilience (published in Nature Neuroscience).<br>• The Laboratory of Biological Rhythms investigated disorders associated with changes of the circadian clock. They developed a method to characterize the circadian clock in humans by using buccal smears, and could thereby show its alteration in patients with bipolar disorder and Alzheimer (published in Bipolar Disorder and PLOS-1). | |
| **H1.5** | **Contribution of the participation of the authors in large collaborations** |
| Not applicable here. | |

## Main criterion: 2. Societal relevance (H2.1-H2.5)

| H2.1 | Societal relevance of outputs and results pursuant to CAS and institute mission |
|---|---|
| Research of the institute addresses the most important public health problems such as cardiovascular disease, diabetes, and Alzheimer's disease. Thus, the outputs are of highest societal relevance. Furthermore, research and results are congruent with CAS' and the Institute's mission. | |
| **H2.2** | **System functionality for knowledge transfer into practise, its usefulness for society. The impact of the institute´s activity on proper practice in society in the area of social sciences and humanities** |

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| The results of the institute are of high usefulness for society. The impact of the institute´s activity on proper practice in society in the area of social sciences and humanities is limited. |

| H2.3 | Relation to practice |
|---|---|
| In order to identify research results with application potential, the institute has outlined an internal directive, and has established the position of a Specialist in Intellectual Property. 14 patents/patent applications were filed, and 378,000 CZK of license fees were obtained. The institute proactively collaborates with private companies e.g. in the field of drug identification and testing. Collaborations with the business sector contribute 15% of the total budget. | |

| H2.4 | Participation in AV21 strategy |
|---|---|
| The institute coordinates two programs within the AV21 strategy: the **Qualitas** program to prevent and treat lifestyle-related diseases, and the program ‚Preclinical testing of potential pharmaceuticals'. | |

| H2.5 | Cooperation with regions of the Czech Republic |
|---|---|
| According to its report, the institute collaborates with several public institutions and commercial subjects within regions of the Czech Republic. The institute provides experts for the evaluation of accreditations of university degree programs and for the teaching of both graduate and postgraduate students, and it participates in Continuing Medical Education of clinical doctors, especially in the field of neurology, paediatric neurology, and cardiology. | |

## Further criterion: 1. Position in international and national context (D1.1-D1.3)

| D1.1 | Comparison of the teams and the institute with similar international and national institutes |
|---|---|
| The Institute of Physiology plays a leading role in the national context. In the international context, it is recognized, and in part leading (Team 7, metabolic effects of lipids such as palmitic acid ester of hydroxystearic acid). | |

| D1.2 | Scope and quality of international and national cooperation and the role of the institute in such cooperation; engagement in broad international cooperation |
|---|---|
| The institute is engaged in numerous national and international collaborations with distinguished scientists. In the international context, formal agreements were signed with 10 universities/institutes, these led to 115 joint papers. Multilateral collaborations resulted from 10 EU projects in FP7 and Horizon 2020. As a consequence of these collaborations, the number of foreign researchers working at the institute steadily increased and is 59 now. At the national level, the Institute of Physiology collaborates with numerous university and non-university research institutes as well as with clinical research units. | |

| D1.3 | Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards) |
|---|---|
| Scientists of the Institute of Physiology were regularly involved in the organization of national and international workshops and conferences. 30 scientists were members of editorial boards. The institute publishes the open access journal Physiological Research (IF=1.7). | |

## Further criterion: 2. Vitality, sustainability and strategy (D2.1-D2.9)

| D2.1 | Direction in line with the perspective of the planned research directions |
|---|---|
| The institute‘s mission is to elucidate fundamental biological mechanisms and to thereby improve the prevention, diagnosis and therapy of cardiovascular, metabolic and neurological diseases. A convincing, clear strategy was presented that is shared by the director and the leading scientists. The current research plans are fully in line with the institute’s mission. | |
| **D2.2** | **Assessment of the previous research objectives and their achievement** |
| The institute has reached a significant portion of its research aims. Furthermore, it succeeded in increasing the quality and visibility of publications, strengthening links with clinical research, and attracting competent young postdocs / PIs. | |
| **D2.3** | **Assessment of implementation of recommendations from past evaluation** |
| The institute has intensively discussed and analysed all recommendations from the previous evaluation, and has implemented measures to comply with all of them. Most importantly,<br>• an international Advisory Board was formed,<br>• several departments and groups were reorganized to avoid small units that lack critical mass,<br>• Younger group leaders were recruited, and the average age of senior scientists was significantly reduced, and<br>• Links with clinical partners were significantly strengthened. | |
| **D2.4** | **Success in receiving grants** |
| The institute was successful in obtaining national and international (mostly EU) grants. However, the portion of the budget from grants decreased in the evaluation period (from approximately 50% to 39%). In addition, most EU projects ended recently, and it is presently unclear whether the institute will be successful applying to new calls. | |
| **D2.5** | **Adequacy of instrumental equipment** |
| The instrumental equipment of the institute has been improved during the evaluation period and can be considered fully adequate. In particular, the Metabolomics Unit operates two LC-mass spectrometer combinations. Furthermore, equipment for bioimaging with confocal microscopes and a PET scanner for mice is optimal. | |
| **D2.6** | **Effectiveness of management** |
| The commission considers the management of the institute very effective. The Director shows strong leadership, and the internal mechanisms for quality control appear to work. | |
| **D2.7** | **Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth** |
| The institute competes with other research institutions on an international level. In spite of some obstacles, it succeeds in recruiting and keeping excellent students, postdocs and PIs. The age structure has improved since 2015. | |
| **D2.8** | **Creating work-life balance conditions, assessment of approach towards possible gender issues** |
| According to its report, the institute considers the optimal work-life balance an essential part of its culture. Flexible working hours, an attractive working environment, and family/employee benefits are important components of its policy and are continuously | |

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| improved. The overall gender ratio of scientists is balanced (51% female). Seven of 21 team leaders are female. | |
| **D2.9** | **Relation of the institute with regard to the integration, development and sustainability of the research centre funded by the National Programme of Sustainability II.** |
| Not applicable here. | |

## Further criterion: 3. Cooperation with universities and participation in education (D3.1-D3.6)

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|---|---|
| **D3.1** | **Scope of cooperation with universities on national and international level** |
| Cooperation of the institute with universities on the national and international level is intense. In particular, the institute collaborates in the area of clinical research with the Faculty of Medicine of the Charles University, the Institute of Clinical and Experimental Medicine, and the National Institute of Mental Health. | |
| **D3.2** | **Effectiveness of joint research centres** |
| The institute has very effectively collaborated within the following joint research centres with universities:<br>- Centre of Excellence in Biomedicine and Biotechnology (BIOCEV) since 2015,<br>- Centre of Mitochondrial Biology and Pathology (MITOCENTRE) 2014-2018<br>- Research Centre “Project of Excellence in Neuroscience” (PEN) 2012-2018<br>- Centre for Development of Original Drugs, 2012-2019<br>- Research Centre “Preparation, Modification and Characterisation of Materials by Radiation”, 2012-2019<br>- Centre of Personalized Medicine – Diagnostics and Therapy (PerMedT), since 2019 | |
| **D3.3** | **Success rate in supervision of PhD students** |
| The commission considers the success rate in supervision of PhD students very good; 66 students finished their study with the thesis defence. | |
| **D3.4** | **Participation of PhD students in the outputs** |
| Participation of PhD students in the outputs was very good, in part excellent: in 70% of all publications, students were co-authors. | |
| **D3.5** | **Participation of the institute in master or bachelor studies** |
| Within the evaluation period, 81 master and 61 bachelor students finished their study. | |
| **D3.6** | **Assessment of cooperation intensity with universities in the form of teaching** |
| The institute is proactively engaged in cooperation with universities in the academic teaching: 12 full professors and 18 assistant professors coordinate 25 undergraduate courses and approximately 7600 hours at 14 faculties. | |

## Further criterion: 4. Outreach activities (D4.1-D4.3)

| D4.1 | Sufficiency of media strategy and activities in the area of research popularisation |
|---|---|
| The institute is very active in the area of research popularisation. During the evaluation period the number of releases (TV, radio, press, internet) increased 2.5-fold and reached 647. Among others, regular activities for the general public were the Open House Day, exhibitions such as 'The Week of Brain', and Open Science for high school students. | |
| **D4.2** | **Publishing activities and its quality** |
| No information was given to the commission as to this point. | |
| **D4.3** | **Participation in professional organisations in the area of research and development** |
| The institute collaborates with private business (SMEs, Novo Nordisk) e.g. in the area of drug development. In 2019, these collaborations contributed 15% to the total budget. | |

**Other comments of the commission:**

# Part B: Evaluation of teams

## 1. Laboratory of Biomaterials and Tissue Engineering

**Strengths and Opportunities:**
This is a big team that has been subdivided into three working groups, working on cardiovascular engineering, bone engineering and skin tissue engineering. The team has several national grants and 75 publications in journals with impact factor. Many collaborations have been initiated and are successfully carried on. Biomaterials represent a very attractive topic for translational application and have important societal and economic impact.

**Weaknesses and Threats:**
The commission noted that this team has limited interaction with the clinical setting. Since the field of tissue engineering has a strong potential for clinical translation, more efforts should be paid to foster collaboration with the clinics, in order to make this team competitive internationally and able to attract international funding.
Since the team is mainly dependent on national grants, the possibility of future budget cuts by the Czech government is potentially threatening.

### Main criterion: 1. Quality of results (H1.1-H1.5)

| H1.1 | Quality of selected outputs of Phase I |
|---|---|
| The quality of the selected outputs of Phase I is good. The results have predominately been published in good quality international journals (64% of outputs in second quartile journals). Citation frequency of the outputs is adequate. | |
| **H1.2** | **Contribution of workers on the outputs reached** |
| In publications resulting from national and/or international collaborations, members of the team were leading authors in about half percent of the outputs. | |
| **H1.3** | **Quality of all outputs and results** |
| The quality of all outputs of Phase I is good. The majority of the results have been published in second quartile journals. | |
| **H1.4** | **The most valuable discoveries and findings in the fields, their importance for the field** |
| For the cardiovascular engineering group:<br>- Reconstruction of a continuous endothelial cell layer on the inner surface of synthetic polymeric vascular prostheses used in current clinical practice.<br>- Preparation of our tissue-engineered small-diameter vascular replacements.<br>- Use of human or porcine pericardium for constructing replacements of heart valves.<br><br>For the bone engineering group:<br>- Development of novel surface modifications of metallic bone implants currently used in orthopaedic practice.<br>- Bone tissue engineering based on 3D matrices colonized with cells.<br><br>For the skin tissue engineering group:<br>- Development of a bilayer dermal-epidermal skin construct seeded with human epidermal keratinocytes in order to reconstruct the epidermis. | |

| H1.5 | Contribution of the participation of the authors in large collaborations |
|---|---|
| The Team participated in several large collaborations in the form of grant projects funded by the Czech Science Foundation, Ministry of Health of the Czech Republic or by the Technology Agency of the Czech Republic. Members of our laboratory (L. Bačáková, E. Filová or R. Matějka) were usually Principal Investigators or Co-Investigators in these projects. | |

## Main criterion: 2. Societal relevance (H2.1-H2.5)

| H2.1 | Societal relevance of outputs and results pursuant to CAS and institute mission |
|---|---|
| Tissue engineering and biomaterials are important research fields with potentially strong impact on human and animal health. | |
| **H2.2** | **System functionality for knowledge transfer into practise, its usefulness for society. The impact of the team´s activity on proper practice in society in the area of social sciences and humanities** |
| The team members are involved in some outreach activities such as lectures for students and the general public or the Open Science Project. The impact of the team´s activity on proper practice in society in the area of social sciences and humanities is limited. | |
| **H2.3** | **Relation to practice** |
| Despite the research performed by this Team may have important clinical implications, the Team has limited interaction with clinicians. The Team collaborates with several private companies, although the nature of such collaboration has not been exploited neither during the presentation of the Team, neither in the report on the research activity. | |
| **H2.4** | **Participation in AV21 strategy** |
| Not mentioned. | |
| **H2.5** | **Cooperation with regions of the Czech Republic** |
| The team cooperates with several Czech institutes that can provide relevant contributions to its research program. | |

## Further criterion: 1. Position in international and national context (D1.1-D1.3)

| D1.1 | Comparison of the team with similar international and national institutes |
|---|---|
| The Team has good national recognition, but should increase international visibility. | |
| **D1.2** | **Scope and quality of international and national cooperation and the role of the team in such cooperation; engagement in broad international cooperation** |
| The Team has several national collaborations in all three areas of research, i.e., cardiovascular, bone and skin tissue engineering. The Team also collaborates with 7 international Institutes. International cooperation involves bilateral stays of PhD students and postdocs, joint publications and joint grant applications. | |
| **D1.3** | **Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)** |

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| One senior member of the team (Lucie Bacakova) organized several workshops and seminars and has received international invitations for lectures (7). Five members of the team have received prestigious national awards. |

## Further criterion: 2. Vitality, sustainability and strategy (D2.1-D2.9)

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|---|---|
| **D2.1** | **Direction in line with the perspective of the planned research directions** |
| In the period from 2020-2024, the Team will continue and further develop research in cardiovascular, bone and skin tissue engineering. | |
| **D2.2** | **Assessment of the previous research objectives and their achievement** |
| The Team mostly fulfilled the research objectives set for the period 2015-2019. | |
| **D2.3** | **Assessment of implementation of recommendations from past evaluation** |
| On the basis of the past evaluation, the Team has been divided into three working groups, each with its own leader. This has improved the organization, the effectiveness and the outputs of the work in the whole Team. Each group (with at least 5-8 members) concentrates on its topic (cardiovascular engineering, bone engineering and skin tissue engineering). | |
| **D2.4** | **Success in receiving grants** |
| The commission considers the funding of the team through national grants as very good. More efforts should be paid to attract international funding. | |
| **D2.5** | **Adequacy of instrumental equipment** |
| The instrumental equipment of the team appears adequate. | |
| **D2.6** | **Effectiveness of management** |
| The management of the Team is effective. More efforts should be paid to foster collaborations with clinicians. | |
| **D2.7** | **Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth** |
| The commission considers the strategies for recruitment and keeping best students and scientists convincing. The age structure of the team is balanced. | |
| **D2.8** | **Creating work-life balance conditions, assessment of approach towards possible gender issues** |
| There were no specific measures for work-life balance conditions and possible gender issues described by the team. | |
| **D2.9** | **Relation of the team with regard to the integration, development and sustainability of the research centre funded by the National Programme of Sustainability II.** |
| Not applicable. | |

## Further criterion: 3. Cooperation with universities and participation in education (D3.1-D3.6)

| D3.1 | Scope of cooperation with universities on national and international level |
|---|---|
| The Team has been involved in several collaborations with national and international universities, which resulted in joint publications. The Team established a Bilateral Co-funding R&D Project with the Industrial Technology Research Institute (ITRI), Taiwan, and a mobility project with the University of Memphis. | |
| **D3.2** | **Effectiveness of joint research centres** |
| Until 2016, the Team was a member of the "Biology of the Tumor Cell" joint research centre with the 1st Medical Faculty of Charles University (Prof. Vladislav Mareš from our lab, Prof. Aleksi Šedo from Charles University). Membership in this joint centre was ended after the retirement of Prof. V. Mareš from the Team.<br>In addition, the Team also participated in large joint grant-funded projects with universities, other research institutions, hospitals and private companies (please see point H1.5). | |
| **D3.3** | **Success rate in supervision of PhD students** |
| In the period 2015 to 2019, the Team hosted a total of 14 PhD students. Five of them defended their theses, two quit their studies, and 7 PhD students are continuing their studies. | |
| **D3.4** | **Participation of PhD students in the outputs** |
| PhD students participate in the outputs of the Team, such as articles in international journals, conference presentations and articles in conference proceedings. PhD students are currently the first authors of primary articles, and advanced PhD students also have an opportunity to be corresponding authors. | |
| **D3.5** | **Participation of the team in master or bachelor studies** |
| In the period 2015 to 2019, 8 master students and 6 bachelor students finished their thesis. | |
| **D3.6** | **Assessment of cooperation intensity with universities in the form of teaching** |
| Four senior members of the team give lectures at Czech universities. | |

## Further criterion: 4. Outreach activities (D4.1-D4.3)

| D4.1 | Sufficiency of media strategy and activities in the area of research popularisation |
|---|---|
| The team teams' members communicate their results to the general public mainly through lectures. Outreach activities through media (web, newspapers, TV) are limited. | |
| **D4.2** | **Publishing activities and its quality** |
| The team members are involved in some outreach activities such as lectures for students and the general public or the Open Science Project. | |
| **D4.3** | **Participation in professional organisations in the area of research and development** |
| The team members collaborate with several private companies for various R&D projects. | |

**Other comments of the commission:**

The commission feels that the Team has several interesting research projects that may have important clinical and societal implications, but only if closer clinical collaborations are established.
The commission also recommends that efforts should be made to increase competitiveness in attracting international grants.

## 2. Laboratory of Structural Biology of Signalling Proteins

**Strengths:**
Experts well established in their field (molecular regulation of signal transduction kinases).

**Weaknesses:**
Team is located in a building far away, reducing the possibility for collaborations with others teams from the Institute of Physiology.

**Opportunities:**
Team has topics with strong potential for drug development.

**Threats:**
The team has a limited number of permanent positions and there could be a lack of space.

### Main criterion: 1. Quality of results (H1.1-H1.5)

| H1.1 | Quality of selected outputs of Phase I |
|---|---|
| Good to very good level of publications in journals such as PNAS, Elife, JBC etc. | |
| **H1.2** | **Contribution of workers on the outputs reached** |
| The corresponding authors are both from the team for most outputs indicating their leadership in the research implementation. Generally, the first author is also from the team. | |
| **H1.3** | **Quality of all outputs and results** |
| Solid research based on atomic structures of various complexes produced by the team members. In addition, the structures are produced using a wide range of state-of-the-art techniques. | |
| **H1.4** | **The most valuable discoveries and findings in the fields, their importance for the field** |
| Provided multiple atomic structures of 14-3-3 protein in complex with their cellular targets. These models opened up new avenues for the understanding of 14-3-3 activation mechanism and for the development of new compounds targeting these factors. | |
| **H1.5** | **Contribution of the participation of the authors in large collaborations** |
| They participated in one large collaborative effort financed by a joint grant between the Czech Science Foundation (grant n°17-33854L) and the Austrian Science Fund (grant n°I3089-B28). | |

### Main criterion: 2. Societal relevance (H2.1-H2.5)

| H2.1 | Societal relevance of outputs and results pursuant to CAS and institute mission |
|---|---|
| The researchers are perfectly in accord with the missions of the CAS and of the institute, i.e. to perform cutting-edge science for health. | |
| **H2.2** | **System functionality for knowledge transfer into practise, its usefulness for society. The impact of the team´s activity on proper practice in society in the area of social sciences and humanities** |

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| Knowledge transfer is on-going for some projects of the team (FOXO-DBD and senolytic compounds). |
| **H1.3** **Relation to practice** |
| Research translation is actively pursued by the team. |

## Further criterion: 1. Position in international and national context (D1.1-D1.3)

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|---|---|
| **D1.1** | **Comparison of the team with similar international and national institutes** |
| The team is performing as expected for a team of that size, especially with the excellent surrounding infrastructure. | |
| **D1.2** | **Scope and quality of international and national cooperation and the role of the team in such cooperation; engagement in broad international cooperation** |
| The scope of the cooperation was different from the previous project in the team, which gave them the opportunity to expand the diversity of their subject while still relying on their technical strength. Altogether, the quality of the cooperation is very good. | |
| **D1.3** | **Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)** |
| Team members activities are relatively modest in the scientific community. | |

## Further criterion: 2. Vitality, sustainability and strategy (D2.1-D2.9)

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|---|---|
| **D2.1** | **Direction in line with the perspective of the planned research directions** |
| Direction fits well with the past projects. | |
| **D2.2** | **Assessment of the previous research objectives and their achievement** |
| Research objectives have been reached. | |
| **D2.3** | **Assessment of implementation of recommendations from past evaluation** |
| Past recommendations have been followed with the establishment of new international collaborations and the hiring of a new scientist expending their technological expertise. | |
| **D2.4** | **Success in receiving grants** |
| The team is successful in obtaining numerous competitive grants. | |
| **D2.5** | **Adequacy of instrumental equipment** |
| Excellent adequacy. | |
| **D2.6** | **Effectiveness of management** |
| Management by the team leader seems fine. | |
| **D2.7** | **Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth** |

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| The development strategy aimed at hiring another senior researcher to reach a critical mass of permanent researcher. Age structure is very young indicative of the strong dependence of the laboratory on availability of PhD students. |
| **D2.8** **Creating work-life balance conditions, assessment of approach towards possible gender issues** |
| Gender issue is taken into account as number of women is roughly equal to the number of men. |
| **D2.9** **Relation of the team with regard to the integration, development and sustainability of the research centre funded by the National Programme of Sustainability II.** |
| Thematically and technically speaking, the team could be part of the Institute of Biotechnology. The issue should be discussed at the level of the different institutions. |

## Further criterion: 3. Cooperation with universities and participation in education (D3.1-D3.6)

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|---|---|
| **D3.1** | **Scope of cooperation with universities on national and international level** |
| Team member Prof. T. Obsil is a professor at the Charles University where he heads the department of Physical Chemistry. | |
| **D3.2** | **Effectiveness of joint research centres** |
| The team is integrated into the BIOCEV site, and therefore has access to the site's technological platforms. | |
| **D3.3** | **Success rate in supervision of PhD students** |
| Excellent. | |
| **D3.4** | **Participation of PhD students in the outputs** |
| Each PhD student participated in the published research (first or co-first authors). | |
| **D3.5** | **Participation of the team in master or bachelor studies** |
| Both the team head and the other senior researcher are lecturing at bachelor and master levels. | |
| **D3.6** | **Assessment of cooperation intensity with universities in the form of teaching** |
| As indicated, one team members is also a University professor and the team head is also teaching to undergraduate students. | |

## Further criterion: 4. Outreach activities (D4.1-D4.3)

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|---|---|
| **D4.1** | **Sufficiency of media strategy and activities in the area of research popularisation** |
| This activity is limited. Only one member of the laboratory is actually having such activity. | |
| **D4.2** | **Publishing activities and its quality** |
| None. | |

| D4.3 | Participation in professional organisations in the area of research and development |
|---|---|
| The team leader is a member of Czech Science Foundation. His senior researcher Prof. T. Obsil has a similar link with the local scientific organisation. | |

**Other comments of the commission:**

## 3. Laboratory of Bioenergetics

**Strengths:**

- international collaborations in Europe
- national collaborations, clinical relevance
- stable personal situation balanced of senior scientists, postdocs, PhD students, master- and bachelor students
- students and post-docs find positions to continue their research careers, (academic and industry)
- highly qualified team
- publication output through a broad spectrum of research fields
- well elaborated research plan for the next period
- regular university teaching activities
- modern equipment
- organization of conferences and symposia

**Weaknesses:**

- relative low number of last author publications
- several results wait for publication

**Opportunities:**

- well elaborated working plan
- well embedded in international network
- research with clinical relevance
- to improve publication activities and last author publication numbers

**Threats:**

- to find appropriate clinical partners

### Main criterion: 1. Quality of results (H1.1-H1.5)

| H1.1 | Quality of selected outputs of Phase I |
|---|---|
| High quality outputs in national and international collaborations but with low number of last authorships. | |
| **H1.2** | **Contribution of workers on the outputs reached** |
| Out of 32 papers published in 2015-2019, PhD students are co-authors of 13 of them (5 times as the first author)<br>PhD, master and undergraduate students actively participate in scientific projects and their outputs. PhD students can develop their particular areas of interest within major projects and get funding for associated sub-projects from the Internal Grant Agency of Charles University (GA UK). This serves as a good introduction into grant-writing and project management. | |
| **H1.3** | **Quality of all outputs and results** |
| In general, high quality outputs in national and international collaborations but with low number of last authorships. | |
| **H1.4** | **The most valuable discoveries and findings in the fields, their importance for the field** |
| All research activities are centred around the function of mitochondrial oxidative phosphorylation (OXPHOS) apparatus. Studies were aimed at the understanding of TMEM70 function and into function of ATP synthase. Tmem70 knockout in the mouse | |

| |
|---|
| results in embryonic lethality due to the lack of ATP synthase and impairment of mitochondrial energy provision. The role of SURF1 in mitochondrial diseases was investigated with reference to clinical therapeutic options. Mitochondrial function in cardiovascular diseases and cancer were studied. |

| H1.5 | Contribution of the participation of the authors in large collaborations |
|---|---|
| None. | |

## Main criterion: 2. Societal relevance (H2.1-H2.5)

| H2.1 | Societal relevance of outputs and results pursuant to CAS and institute mission |
|---|---|
| Basic research with strong clinical relevance and potential therapeutic importance in the major research fields of the institute: metabolism on the systemic, cellular and molecular level and cardiovascular diseases on the molecular level.<br>Executive committee member in the physiology society. | |

| H2.2 | System functionality for knowledge transfer into practise, its usefulness for society. The impact of the team´s activity on proper practice in society in the area of social sciences and humanities |
|---|---|
| The research is driven by basic findings and investigations with a very high potential for clinical transfer and therapeutic target identification of (rare) mitochondrial diseases. The research can also have an impact on the understanding and influencing mitochondrial activities in cardiovascular diseases and cancer. | |

| H2.3 | Relation to practice |
|---|---|
| Please enter your comment here | |

| H2.4 | Participation in AV21 strategy |
|---|---|
| Research program 10: Molecules and materials for life with the goal to elucidate mechanisms governing the self-organization of macromolecules into supramolecular structures and controlling of their interactions with target molecules in living cells and tissues.<br>Research program 7: Well being in health and disease with the goal to pursue multidisciplinary biomedical research. | |

| H2.5 | Cooperation with regions of the Czech Republic |
|---|---|
| Prague area and Krč campus, cooperation with Charles University. | |

## Further criterion: 1. Position in international and national context (D1.1-D1.3)

| D1.1 | Comparison of the team with similar international and national institutes |
|---|---|
| The research quality is on top international level. | |

| D1.2 | Scope and quality of international and national cooperation and the role of the team in such cooperation; engagement in broad international cooperation |
|---|---|
| Preference on bilateral collaborations. | |

| |
|---|
| Strong collaborations with UK: Wellcome Centre for Mitochondrial Research, Newcastle, UK (mitochondrial diseases); MRC Mitochondrial Biology, Cambridge, UK (research on Surf1 protein function).<br>Further collaboration with Belgium, USA, Germany. |
| **D1.3** **Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)** |
| Very active in organization of conferences on national and international level (9 within the period).<br>Twice invited by the Congress of the Serbian Society for Mitochondrial and Free Radical Physiology<br>A group member and collaborators received the prize of the CAS for excellent scientific contribution. |

## Further criterion: 2. Vitality, sustainability and strategy (D2.1-D2.9)

| | |
|---|---|
| **D2.1** | **Direction in line with the perspective of the planned research directions** |
| Very well in line and in detail elaborated. | |
| **D2.2** | **Assessment of the previous research objectives and their achievement** |
| - Clearly defined, well designed goals<br>- Executed with competence<br>- High medical importance for clinical translation<br>- Unfortunately some data and results so far not published | |
| **D2.3** | **Assessment of implementation of recommendations from past evaluation** |
| No recommendations given. | |
| **D2.4** | **Success in receiving grants** |
| Successful in many small national grants which can serve to finance the group.<br>Not successful in EU grants.<br>4 PhD students get funding for sub-projects from the Internal Grant Agency of Charles University (GA UK). | |
| **D2.5** | **Adequacy of instrumental equipment** |
| The opportunities of the institute and the campus with core facilities gives all instrumental support required. | |
| **D2.6** | **Effectiveness of management** |
| Many group members work in sub-projects independently. Good management of supervision of students. | |
| **D2.7** | **Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth** |
| The age structure is rather homogenous over the active life time.<br>Students and post-docs find positions in the Czech Republic (academic and industry). | |

| D2.8 | Creating work-life balance conditions, assessment of approach towards possible gender issues |
|---|---|
| Work-life balance conditions are offered in the frame of the institute and the campus.<br>Gender issues may be improved. | |
| **D2.9** | **Relation of the team with regard to the integration, development and sustainability of the research centre funded by the National Programme of Sustainability II.** |
| Not applicable. | |

## Further criterion: 3. Cooperation with universities and participation in education (D3.1-D3.6)

| D3.1 | Scope of cooperation with universities on national and international level |
|---|---|
| Cooperation with Charles university through teaching activities and in the follow-up activities of the Mitocentre (see D3.2). | |
| **D3.2** | **Effectiveness of joint research centres** |
| **MITOCENTRE,** the Czech Science Foundation Centre of Excellence was coordinated by the laboratory of Bioenergetics. MITOCENTRE represented a consortium of six research teams from CAS (Institute of Physiology), Charles University (1st Faculty of Medicine), and General Faculty Hospital in Prague. This collaboration enabled identification of new functions and components of mammalian mitochondria and characterized their physiological roles as well as dysfunctions resulting in human mitochondrial diseases. 57 articles were published.<br>While the consortium itself ended, collaborations between individual groups have continued. | |
| **D3.3** | **Success rate in supervision of PhD students** |
| Very good. | |
| **D3.4** | **Participation of PhD students in the outputs** |
| PhD students are co-authors of 13 articles (5 times as the first author). This is too low for the size of the group and number of PhD students during the period. | |
| **D3.5** | **Participation of the team in master or bachelor studies** |
| Master (3) and bachelor (1) students supervised until defence. | |
| **D3.6** | **Assessment of cooperation intensity with universities in the form of teaching** |
| Very strong participation in master studies compared to other groups. | |

## Further criterion: 4. Outreach activities (D4.1-D4.3)

| D4.1 | Sufficiency of media strategy and activities in the area of research popularisation |
|---|---|
| Very active in many lectures for general public, popularization publications, youth educational activities, promotion on social networks and even through a public event to raise awareness about mitochondrial diseases. | |
| **D4.2** | **Publishing activities and its quality** |
| The participation in the program “Open science”, which increases students' interest in science and research through students' internships in laboratories of CAS institutes is highly appreciated. The internships provide students time to experience scientific work, attract their attention or even motivate them for a future career in science.<br>The organisation of a public event to raise awareness about mitochondrial diseases during the worldwide Mitochondrial Disease Awareness Week is a highlight of public activities. The event was localized on the campus of CAS institutes in Prague (Krč). It was intended to gain knowledge of mitochondria in an entertaining way and/or to meet the specialist in the field including medical doctors. The event should also raise journalistic interest in the mitochondrial research. | |
| **D4.3** | **Participation in professional organisations in the area of research and development** |
| One group member was in the executive committee of the Mitochondrial Physiology Society. | |

**Other comments of the commission:**

# 4. Laboratory of Neurochemistry

**Strengths and Opportunities:**
This is a small and young team that will join in the near future another team with complementary interests. The Team has several collaborations at the national and international level and very good publications.

**Weaknesses and Threats:**
The translational relevance of the research activities performed by this Team should be increased. The Team lacks experienced senior researchers.
Since the team is mainly performing basic research, the possibility of future budget cuts by the Czech government in this field is potentially threatening.

## Main criterion: 1. Quality of results (H1.1-H1.5)

| H1.1 | Quality of selected outputs of Phase I |
|---|---|
| The quality of the selected outputs of Phase I is very good. The results have predominately been published in very good/good quality international journals (50% of outputs in second quartile and 25% in first quartile journals). Citation frequency of the outputs is good. | |
| **H1.2** | **Contribution of workers on the outputs reached** |
| The team were first and corresponding authors in the majority of Phase I evaluated outputs. | |
| **H1.3** | **Quality of all outputs and results** |
| The quality of all outputs of Phase I is very good. The majority of the results have been published in first and second quartile journals. | |
| **H1.4** | **The most valuable discoveries and findings in the fields, their importance for the field** |
| - Lipid-Based Diets Improve Muscarinic Neurotransmission in the Hippocampus of a mouse model of Alzheimer's disease<br>- Cholinergic signalling plays an important role in both cortical and striatal regions involved in control of the goal-directed behaviour<br>- Clarification of allosteric modulation of muscarinic receptors by different ligands | |
| **H1.5** | **Contribution of the participation of the authors in large collaborations** |
| The Team participated in 7th EU FP LipiDiDiet project. | |

## Main criterion: 2. Societal relevance (H2.1-H2.5)

| H2.1 | Societal relevance of outputs and results pursuant to CAS and institute mission |
|---|---|
| This Team mainly does basic research. The societal relevance of the research is considered limited. | |
| **H2.2** | **System functionality for knowledge transfer into practise, its usefulness for society. The impact of the team´s activity on proper practice in society in the area of social sciences and humanities** |

| |
|---|
| The team members are only marginally involved in transferring their research activity to society, essentially because they operate in a very basic field of research with very limited interactions with clinical and industrial partners. |
| **H2.3** **Relation to practice** |
| Not mentioned. |
| **H2.4** **Participation in AV21 strategy** |
| Not mentioned. |
| **H2.5** **Cooperation with regions of the Czech Republic** |
| The team cooperates with several Czech institutes that can provide relevant contributions to its research program. |

## Further criterion: 1. Position in international and national context (D1.1-D1.3)

| | |
|---|---|
| **D1.1** | **Comparison of the team with similar international and national institutes** |
| The Team has good national and international reputation. | |
| **D1.2** | **Scope and quality of international and national cooperation and the role of the team in such cooperation; engagement in broad international cooperation** |
| The Team collaborates with 5 international Institutes and was involved in a large EU-funded project (7th EU FP LipiDiDiet). | |
| **D1.3** | **Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)** |
| Drs Dolezal and Jakubik are members of international scientific societies. Only one member of the Team (Dr Jakubik) was invited to give lectures at two international meetings. No conferences or workshops have been organized by the team members. | |

## Further criterion: 2. Vitality, sustainability and strategy (D2.1-D2.9)

| | |
|---|---|
| **D2.1** | **Direction in line with the perspective of the planned research directions** |
| In the period from 2020-2024, the Team will continue research in allosteric modulation of muscarinic receptors, cholinergic control of goal-directed behaviour and pharmacological analysis of activation or blockade of muscarinic receptors. In the near future, this team will join another team with complementary interests. | |
| **D2.2** | **Assessment of the previous research objectives and their achievement** |
| The Team mostly fulfilled the research objectives set for the period 2015-2019. | |
| **D2.3** | **Assessment of implementation of recommendations from past evaluation** |
| On the basis of the past evaluation, the Team enrolled new students, initiated another research line in the area of cholinergic mechanisms in striatum-driven behaviour, and established new techniques. | |
| **D2.4** | **Success in receiving grants** |

| | |
|---|---|
| The Team was involved in one big EU project and in several national projects. | |
| **D2.5** | **Adequacy of instrumental equipment** |
| The instrumental equipment of the team appears good. | |
| **D2.6** | **Effectiveness of management** |
| This is a small team that may get benefits in joining another team with complementary expertise. | |
| **D2.7** | **Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth** |
| The team is composed of very young researchers and lacks senior staff. | |
| **D2.8** | **Creating work-life balance conditions, assessment of approach towards possible gender issues** |
| There were no specific measures for work-life balance conditions and possible gender issues described by the team. | |
| **D2.9** | **Relation of the team with regard to the integration, development and sustainability of the research centre funded by the National Programme of Sustainability II.** |
| Not applicable. | |

## Further criterion: 3. Cooperation with universities and participation in education (D3.1-D3.6)

| | |
|---|---|
| **D3.1** | **Scope of cooperation with universities on national and international level** |
| The Team has been involved in several collaborations with national and international universities, which resulted in joint publications. | |
| **D3.2** | **Effectiveness of joint research centres** |
| Not mentioned. | |
| **D3.3** | **Success rate in supervision of PhD students** |
| In the period 2015 to 2019, 2 PhD students defended their theses. | |
| **D3.4** | **Participation of PhD students in the outputs** |
| PhD students are co-authors of research articles. | |
| **D3.5** | **Participation of the team in master or bachelor studies** |
| In the period 2015 to 2019, 2 bachelor students finished their thesis. | |
| **D3.6** | **Assessment of cooperation intensity with universities in the form of teaching** |
| One member of the team gives lectures at Czech universities. | |

## Further criterion: 4. Outreach activities (D4.1-D4.3)

| D4.1 | Sufficiency of media strategy and activities in the area of research popularisation |
|---|---|
| The team members communicate their results to the general public mainly through lectures. No outreach activities occur through media (web, newspapers, TV). | |
| **D4.2** | **Publishing activities and its quality** |
| The team members are involved in some outreach activities such as lectures for students and the general public or the Open Science Project. | |
| **D4.3** | **Participation in professional organisations in the area of research and development** |
| Not mentioned. | |

**Other comments of the commission:**
This is a young team that appears still in a development phase. It will join another team with complementary expertise, and this may be beneficial. More efforts should be paid to increase the translational value of the research performed.

# 5. Laboratory of Pain Research

**Strengths and Opportunities:**
This Team works on a research area that has important clinical and societal implications.

**Weaknesses and Threats:**
The team is rather small. The translational relevance of the research activities performed by this Team should be increased. Indeed, while the Team aims to develop new analgesic drugs, limited contacts with clinicians and private companies have been initiated, and therefore the potential to bring such compounds into the clinic is still unclear.

## Main criterion: 1. Quality of results (H1.1-H1.5)

| H1.1 | Quality of selected outputs of Phase I |
|---|---|
| The quality of the selected outputs of Phase I is very good. The results have been published in excellent/very good quality international journals (75% of outputs in first quartile journals and 25% in second quartile). Citation frequency of the outputs is good. | |
| **H1.2** | **Contribution of workers on the outputs reached** |
| Three out of five outputs evaluated in Phase I were related to research performed entirely by the team. | |
| **H1.3** | **Quality of all outputs and results** |
| The quality of all outputs of Phase I is very good. All the results have been published in first and second quartile journals. | |
| **H1.4** | **The most valuable discoveries and findings in the fields, their importance for the field** |
| - Clarification of role of spinal cord transient receptor potential vanilloid-1 (TRPV1) receptors in nociceptive transmission<br>- Clarification of the mechanisms of painful neuropathy development after chemotherapy treatment<br>- Identification of new potential treatments for neuropathic pain | |
| **H1.5** | **Contribution of the participation of the authors in large collaborations** |
| The Team participated in one international large collaboration (GACR P304-12-G069 “Project of excellence in the field of neuroscience”) and in one large national project headed by the Institute of Organic Chemistry and Biochemistry of the CAS. | |

## Main criterion: 2. Societal relevance (H2.1-H2.5)

| H2.1 | Societal relevance of outputs and results pursuant to CAS and institute mission |
|---|---|
| Pain research has very important clinical and societal implications. The research activity performed by this team includes the identification of novel therapeutic tools for pain management, which has high relevance. | |
| **H2.2** | **System functionality for knowledge transfer into practise, its usefulness for society. The impact of the team´s activity on proper practice in society in the area of social sciences and humanities** |

| | |
|---|---|
| The team members are only marginally involved in transferring their research activity to society. | |
| **H2.3** | **Relation to practice** |
| The Team aims to develop new analgesic drugs and therefore this research could have important practical implications. However, limited contacts with clinicians and private companies have been initiated, and therefore the potential to bring such compounds into the clinic is still unclear. | |
| **H2.4** | **Participation in AV21 strategy** |
| Not mentioned. | |
| **H2.5** | **Cooperation with regions of the Czech Republic** |
| The Team participates to the European Centre of Excellence in Biomedicine and Biotechnology BIOCEV. Participation in this project allows the Team to use the core facilities of this Centre. | |

## Further criterion: 1. Position in international and national context (D1.1-D1.3)

| | |
|---|---|
| **D1.1** | **Comparison of the team with similar international and national institutes** |
| The Team has marginal international reputation. | |
| **D1.2** | **Scope and quality of international and national cooperation and the role of the team in such cooperation; engagement in broad international cooperation** |
| The Team collaborates with 3 international Institutes and was involved in a Czech-American collaborative project. | |
| **D1.3** | **Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)** |
| Dr. Palecek participates to several scientific activities and organized the Czech Neuroscience society meeting twice. The other team members do not report any activity within the scientific community. | |

## Further criterion: 2. Vitality, sustainability and strategy (D2.1-D2.9)

| | |
|---|---|
| **D2.1** | **Direction in line with the perspective of the planned research directions** |
| In the period from 2020-2024, the Team will continue research in pain mechanisms and in the development of new analgesic drugs, in line with the research performed so far. | |
| **D2.2** | **Assessment of the previous research objectives and their achievement** |
| The Team mostly fulfilled the research objectives set for the period 2015-2019. | |
| **D2.3** | **Assessment of implementation of recommendations from past evaluation** |
| Following the previous evaluation, this Team (that was part of the Functional Morphology group) was restructured into the Laboratory of Pain Research. | |
| **D2.4** | **Success in receiving grants** |

| | |
|---|---|
| The Team is marginally involved in national projects. | |
| **D2.5** | **Adequacy of instrumental equipment** |
| It is unclear whether the equipment for optogenetic experiments is available in-house or if such experiments are done through collaborations. | |
| **D2.6** | **Effectiveness of management** |
| Management efforts should be directed to increase the translational relevance of the research performed by this team. | |
| **D2.7** | **Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth** |
| The team is mainly composed of young researchers and a couple of senior researchers. | |
| **D2.8** | **Creating work-life balance conditions, assessment of approach towards possible gender issues** |
| There were no specific measures for work-life balance conditions and possible gender issues described by the team. | |
| **D2.9** | **Relation of the team with regard to the integration, development and sustainability of the research centre funded by the National Programme of Sustainability II.** |
| Not applicable. | |

## Further criterion: 3. Cooperation with universities and participation in education (D3.1-D3.6)

| | |
|---|---|
| **D3.1** | **Scope of cooperation with universities on national and international level** |
| The Team has been involved in some collaborations with national and international universities. | |
| **D3.2** | **Effectiveness of joint research centres** |
| The Team participates to the European Centre of Excellence in Biomedicine and Biotechnology BIOCEV. Participation in this project allows the Team to use the core facilities of this Centre. | |
| **D3.3** | **Success rate in supervision of PhD students** |
| In the period 2015 to 2019, 4 PhD students defended their theses. | |
| **D3.4** | **Participation of PhD students in the outputs** |
| PhD students are co-authors of research articles. | |
| **D3.5** | **Participation of the team in master or bachelor studies** |
| In the period 2015 to 2019, 2 bachelor and 2 master students finished their thesis. | |
| **D3.6** | **Assessment of cooperation intensity with universities in the form of teaching** |
| No member of the team gives lectures at Czech universities. | |

## Further criterion: 4. Outreach activities (D4.1-D4.3)

| D4.1 | Sufficiency of media strategy and activities in the area of research popularisation |
|---|---|
| Limited outreach activities have been performed. Dr. Palecek is the only team member involved in outreach activities, mainly in the form of lectures to the general public. No outreach activities occur through media (web, newspapers, TV). | |
| **D4.2** | **Publishing activities and its quality** |
| The only outreach activities are lectures for students and the general public. | |
| **D4.3** | **Participation in professional organisations in the area of research and development** |
| Not mentioned. | |

**Other comments of the commission:**
This is a small team that performs research activities in a relevant research field. i.e., pain research. Overall, however, the research program appears modest, with limited clinical implications. More efforts should be paid to increase the translational value of the research performed.

# 6. Laboratory of Membrane Transport

**Strengths:**

- very broad international collaborations
- regular invitation and participation in large research consortia
- students and post-docs well educated to find positions to continue their research careers, both in the Czech Republic and abroad (academic and industry)
- highly qualified multidisciplinary team
- strong publication output
- well balanced age distribution of group members
- communication of science also to the public
- well elaborated research plan for the next period

**Weaknesses:**

- no regular teaching courses
- institutional financing covers only about 40% of the team personnel and running costs are funded by relatively short term grants
- increasing bureaucratic burden (actually about 30- 40% of a PI work time which cannot be used for research).

**Opportunities:**

- well elaborated research plan
- very good international partners, well embedded in international network

**Threats:**

- failure so far to get international funding for projects with international partners

## Main criterion: 1. Quality of results (H1.1-H1.5)

| H1.1 | Quality of selected outputs of Phase I |
|---|---|
| High quality outputs in national and international collaborations.<br>Many publications with corresponding author from the group. | |
| **H1.2** | **Contribution of workers on the outputs reached** |
| Out of 37 papers published in 2015-2019, PhD students are co-authors of 15 of them (12 times as the first author).<br>Presentations of results of PhD students more than 10 times at national and more than 20 times at international conferences. | |
| **H1.3** | **Quality of all outputs and results** |
| High quality outputs in high quality journal.<br>39 articles with focus in different fields (multidisciplinary group):<br>- 25x first author<br>- 24x last author<br>Patents (CZ, US, EU).<br>Book edition. | |
| **H1.4** | **The most valuable discoveries and findings in the fields, their importance for the field** |
| Main results are the description of a hydrophobic filter in Na+/H+ antiporters, whose size determines the substrate specificity of the transporter (recognition and transport of K+ or | |

only smaller Na+). Via modelling (international collaboration) three amino-acid residues of three different transmembrane helices (Thr141, Ala179 and Val375) were identified as components of the filter. I was confirmed that the three residues play a central role in the determination of cation selectivity and transport activity and that the cation selectivity can be modulated by repositioning a single local methyl group within the filter region.

Genes encoding the Trk transporters have been identified in all yeast species with sequenced genomes, and they have orthologues in fungi and higher plants, not in animals. Trk1 is extremely active, has a very high affinity for $K^+$. The activity prevents the non-specific uptake of toxic cations.

| H1.5 | Contribution of the participation of the authors in large collaborations |
|---|---|

23 articles from international collaborations.

3 articles from national collaborations.

The group is excellently embedded in international networks.

## Main criterion: 2. Societal relevance (H2.1-H2.5)

| H2.1 | Societal relevance of outputs and results pursuant to CAS and institute mission |
|---|---|

Basic research in one of the major fields of the institute: metabolism on the cellular and molecular level.

Participation in many scientific boards:

- Institutes of CAS
- CAS councils
- European academies
- Universities
- Scientific societies
- National and international grant agencies

| H2.2 | System functionality for knowledge transfer into practise, its usefulness for society. The impact of the team´s activity on proper practice in society in the area of social sciences and humanities |
|---|---|

Characterization of the antifungal activity of several members of peptide families. The level of killing efficiency is not only peptide-specific, but also species specific and proportional to the level of caused plasma-membrane damage.

Most important output of the work with antimicrobial peptides are Czech, EU and USA patent applications submitted together with CAS Institute of Organic chemistry and Biochemistry (IOCB).

| H2.3 | Relation to practice |
|---|---|

Basic research but open for transfer projects.

| H2.4 | Participation in AV21 strategy |
|---|---|

Research program 10: Molecules and materials for life with the goal to elucidate mechanisms governing the self-organization of macromolecules into supramolecular structures and controlling of their interactions with target molecules in living cells and tissues.

| H2.5 | Cooperation with regions of the Czech Republic |
|---|---|

| |
|---|
| Prague area and Krč campus.<br>Great opportunity for collaborators to get connections to international co-operations. |

## Further criterion: 1. Position in international and national context (D1.1-D1.3)

| D1.1 | Comparison of the team with similar international and national institutes |
|---|---|
| Excellent on top level. | |
| **D1.2** | **Scope and quality of international and national cooperation and the role of the team in such cooperation; engagement in broad international cooperation** |
| Actively involved in 4 EU joint research activities with multinational partners.<br>Bilateral collaborations with 12 academic partners from 10 countries (Belgium, China, France, Italy, Latvia, Mexico, Portugal, Slovakia, Spain, Turkey).<br>Collaboration with partners in China, Mexico, Turkey and Slovakia supported by bilateral mobility/research grants. | |
| **D1.3** | **Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)** |
| Excellent record: involved in organization of 5 conferences / symposia; internationally invited to give presentations (14). | |

## Further criterion: 2. Vitality, sustainability and strategy (D2.1-D2.9)

| D2.1 | Direction in line with the perspective of the planned research directions |
|---|---|
| Very well in line and in detail elaborated. | |
| **D2.2** | **Assessment of the previous research objectives and their achievement** |
| - Clearly defined, well designed goals<br>- Executed with multidisciplinary competence<br>- Internationally funded<br>- Clear output<br>- Highly ranked publications | |
| **D2.3** | **Assessment of implementation of recommendations from past evaluation** |
| The only concerns of the last evaluation did not happen. Funding on international level was available. | |
| **D2.4** | **Success in receiving grants** |
| Very successful on the national, bilateral, international (EU) level. | |
| **D2.5** | **Adequacy of instrumental equipment** |
| The opportunities of the institute and the campus with core facilities gives all instrumental support required. | |
| **D2.6** | **Effectiveness of management** |

| |
|---|
| The group leader is very effective if one considers the number of national, international committees and boards in which she is involved and the number of projects especially international one in which she is contributing in leading functions. |
| **D2.7** **Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth** |
| Multidisciplinary team well balanced between disciplines for the project of the research.<br>The age structure is middle age balanced.<br>Students and post-docs easily find positions to continue their research careers, both in the Czech Republic and abroad (academic and industry). |
| **D2.8** **Creating work-life balance conditions, assessment of approach towards possible gender issues** |
| Work-life balance conditions are offered in the frame of the institute and the campus.<br>All leading scientists and technicians are women. |
| **D2.9** **Relation of the team with regard to the integration, development and sustainability of the research centre funded by the National Programme of Sustainability II.** |
| Not applicable. |

## Further criterion: 3. Cooperation with universities and participation in education (D3.1-D3.6)

| | |
|---|---|
| **D3.1** | **Scope of cooperation with universities on national and international level** |
| Education and supervision of students from national and international universities. Due to the projects and structure of the group it appears easier to work with PhD students from abroad. Under this aspect the cooperation with national universities could be improved towards further contacts to national students. | |
| **D3.2** | **Effectiveness of joint research centres** |
| Not available. | |
| **D3.3** | **Success rate in supervision of PhD students** |
| Very good. | |
| **D3.4** | **Participation of PhD students in the outputs** |
| PhD students are co-authors of 15 of 37 publications (12 times as the first author). | |
| **D3.5** | **Participation of the team in master or bachelor studies** |
| No regular teaching but master (3) and bachelor (3) students supervised until defence. | |
| **D3.6** | **Assessment of cooperation intensity with universities in the form of teaching** |
| If possible, the teaching cooperation intensity could be improved by regular teaching courses. | |

## Further criterion: 4. Outreach activities (D4.1-D4.3)

| D4.1 | Sufficiency of media strategy and activities in the area of research popularisation |
|---|---|
| Very active<br>- participation in the CAS activity Open Science as supervisors in the research projects for high-school students<br>- participation in Science Expo, Week of Science and Technology, Open House Day<br>- organization of a whole-day educational excursion of a class of 10-year old pupils<br>- responsibility and organization of all outreach activities in the institute and outside<br>- organization of institutional public lectures on health issues at the CAS headquarters<br>- coordination of all outreach activities of the institute for the press and public media | |
| **D4.2** | **Publishing activities and its quality** |
| Preparation of necessary materials for all outreach activities in the institute and outside that speaks for the quality (!) | |
| **D4.3** | **Participation in professional organisations in the area of research and development** |
| Member of the council and boards of scientific societies. Very active. | |

**Other comments of the commission:**

# 7. Laboratory of Adipose Tissue Biology

**Strengths & Opportunities:**
The laboratory is very well structured with a clear and well-established scientific strategy. The projects developed are competitive with a real translational approach and a significant interaction with clinicians. Scientific expertise and interaction appear well balanced within the team. The level of funding of the team is very good. The team is the driving force in most of the established collaborations. The team must continue to rely on very good quality translational research, with very good interaction with clinicians and industrial partners. The attractiveness of the team and the option of a European grant is a guarantee of success for the coming years

**Weaknesses & Threats:**
Two very active and talented young researchers will no longer be included in the laboratory's profile for the next evaluation period, which can impact the team's dynamics and outputs. In addition, the director of the institute also heads a research group, which is not a weakness in itself but raises a point of vigilance on the management of the team and the direction of the institute in parallel.

## Main criterion: 1. Quality of results (H1.1-H1.5)

| H1.1 | Quality of selected outputs of Phase I |
|---|---|
| The quality of selected outputs of Phase I was very good, in part excellent. | |
| **H1.2** | **Contribution of workers on the outputs reached** |
| Team members have a leadership position and a significant contribution in the majority of the outputs achieved. | |
| **H1.3** | **Quality of all outputs and results** |
| Overall, the quality of all outputs is very good, in part excellent. Nineteen of 35 papers were published in first and second quartile journals. Five papers were published in excellent journal (first decile journals). Citation rate of the outputs was good, in part very good. | |
| **H1.4** | **The most valuable discoveries and findings in the fields, their importance for the field** |
| During the last evaluation period, the team identified and characterized, in mouse models and in humans, new signalling pathways that underlie the mechanisms of action of omega-3-fatty acids and their effects on glucose metabolism and diabetes. Through multidisciplinary, translational and collaborative approaches, they have demonstrated the importance of the lipid form in which these fatty acids are administered to exert their beneficial effects such as insulin sensitivity. In addition, they identified and characterized new lipid mediators and their biosynthetic pathways responsible for the beneficial anti-inflammatory effects of omega-3 supplementation. These mediators are of potential relevance for the therapy of diabetes. | |
| **H1.5** | **Contribution of the participation of the authors in large collaborations** |
| The team has many collaborations at national and international level which are very well balanced and very productive. | |

## Main criterion: 2. Societal relevance (H2.1-H2.5)

| H2.1 | Societal relevance of outputs and results pursuant to CAS and institute mission |
|---|---|
| The team addresses major public health problems linked to obesity and type 2 diabetes. They develop research strategies from bench to bedside and vice versa in order to understand and optimize new therapeutic strategies Consequently, the societal relevance of the outputs resulting from the team's activity is in perfect harmony with the mission of the CAS and the Institute. | |
| **H2.2** | **System functionality for knowledge transfer into practise, its usefulness for society. The impact of the team´s activity on proper practice in society in the area of social sciences and humanities** |
| The outputs of the team are of a great interest for the society. The impact of the team's activity in the field of social and human sciences is interesting with regards to nutritional and eating behaviour as well as physical activity. | |
| **H2.3** | **Relation to practice** |
| The team has established strong collaborations with clinical research centres and with industry to ensure translation to practice. | |
| **H2.4** | **Participation in AV21 strategy** |
| The team mentioned a participation in the AV21 programme Qualitas and Preclinial Testing of Pharmaceuticals. | |
| **H2.5** | **Cooperation with regions of the Czech Republic** |
| Several domestic collaborations but mostly within the Prague area. | |

## Further criterion: 1. Position in international and national context (D1.1-D1.3)

| D1.1 | Comparison of the team with similar international and national institutes |
|---|---|
| The team is internationally recognized and well positioned, especially regarding the research theme related to lipid mediators. | |
| **D1.2** | **Scope and quality of international and national cooperation and the role of the team in such cooperation; engagement in broad international cooperation** |
| The team has many national and international collaborations with academic and industrial partners. The various consortia are in perfect harmony with the themes of the team. The members of the team are, for a large majority of projects, leaders in the various national and international cooperation. Note that the team is a member of the European consortium H2020 Marie Sklodowska Curie ITN “Foie Gras” No. 722619. | |
| **D1.3** | **Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)** |
| The theme leaders have regular invited lectures. The team has organized several national workshop and conference especially on lipidomics. A team member has been awarded by the “Lumina Quaeruntur praemium“ prize. | |

## Further criterion: 2. Vitality, sustainability and strategy (D2.1-D2.9)

| D2.1 | Direction in line with the perspective of the planned research directions |
|---|---|
| The team has a clear line of research, with well-defined axes focusing on lipid forms of omega 3, but also on the interplay between adipose tissue and other tissue. | |
| **D2.2** | **Assessment of the previous research objectives and their achievement** |
| The team achieved its research objectives. In addition, the team consolidated the links with clinical research and enabled the emergence of a new team within the institute, a sign of the team's dynamism. | |
| **D2.3** | **Assessment of implementation of recommendations from past evaluation** |
| The team has maintained its high level of competitiveness at international level and its national leadership and as developed several innovative approaches in the “omics” research field. | |
| **D2.4** | **Success in receiving grants** |
| The team was very successful in receiving grant and very well support during the effective period. | |
| **D2.5** | **Adequacy of instrumental equipment** |
| The instrumental equipment of the team is adequate. The team has closed collaboration with the metabolomics/lipidomics groups . | |
| **D2.6** | **Effectiveness of management** |
| The leadership of the team has undergone several changes in recent years. The former team leader, Jan Kopecký, became the director of the Institute of Physiology and kept the deputy head of the team. He also manages the "energy metabolism" research group of the team. Martin Rossmeisl, in charge of the "Glucose Homeostasis" group, took over the head of the team in 2016. Finally, O. Kuda leader of the Metabolomics group settled an independent Laboratory of Metabolism of Bioactive Lipids at the Institute of Physiology in 2019. This remodelling in the organigram seems to work but should be the subject of special attention in the balance of the managerial function. | |
| **D2.7** | **Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth** |
| The team is attractive with a number of PhD and young researchers. The age of the structure is well balanced. The team has demonstrated its ability to promote and support the careers of young researchers like O. Kuda who recently established his own team. It should be noted that the team had to deal with the unexpected death of one of its talented researchers. | |
| **D2.8** | **Creating work-life balance conditions, assessment of approach towards possible gender issues** |
| The work balance is very good and there are no obvious gender issues | |
| **D2.9** | **Relation of the team with regard to the integration, development and sustainability of the research centre funded by the National Programme of Sustainability II.** |
| Not applicable. | |

## Further criterion: 3. Cooperation with universities and participation in education (D3.1-D3.6)

| D3.1 | Scope of cooperation with universities on national and international level |
|---|---|
| The team has a dynamic cooperation with several universities at the national and international levels: Charles University/Faculty of Science and the University of Chemistry and Technology in Prague. Within the EU H2020 project “Foie Gras” they have recruited an Italian student, and a Russian student from the Ural Federal University. | |
| **D3.2** | **Effectiveness of joint research centres** |
| The team collaborate with the BIOCEV joint research centre on projects involving GC/MS analyses of fatty acids composition in various biological samples. | |
| **D3.3** | **Success rate in supervision of PhD students** |
| The success rate of the PhD program is very good with 5 theses defended (between 2015-2019). Currently, 10 PhD students are supervised. At least 1/3 of the PhD students began as bachelor’s and/or master’s degree students at the Laboratory. | |
| **D3.4** | **Participation of PhD students in the outputs** |
| Most of the projects developed by the team rely on PhD student activities (under the supervision of the junior and/or senior scientists). Their contribution to the outputs of the team is substantial. | |
| **D3.5** | **Participation of the team in master or bachelor studies** |
| Five and 6 students in Bachelor and Master respectively were supervised during this period. | |
| **D3.6** | **Assessment of cooperation intensity with universities in the form of teaching** |
| The team has little educational activity with only 5 semesters of master's courses between 2015-2019. | |

## Further criterion: 4. Outreach activities (D4.1-D4.3)

| D4.1 | Sufficiency of media strategy and activities in the area of research popularisation |
|---|---|
| The team participated in numerous of communication and popularization activities towards the general public through the media, lectures and open scientific days. | |
| **D4.2** | **Publishing activities and its quality** |
| A team member, P. Zouhar is a member of the editorial board of the popular science magazine “Vesmír” and author of 29 short popular science articles from 2018-2019. | |
| **D4.3** | **Participation in professional organisations in the area of research and development** |
| J. Kopecky actively participated to the Week of Science and Technology, CAS.<br><br>A number of projects relies on R&D with active collaboration with biotechnological company and industrial partners (Novo Nordisk, VIDIA). | |

**Other comments of the commission:**

## 8. Laboratory of Epithelial Physiology

**Strengths & opportunities:** the main strength of the team lies in the understanding of the mechanisms that control and regulate the gut brain axis. It is a field of research requiring advanced knowledge in integrated physiology. Understanding the mechanisms that govern these interactions may have important implications applicable in different pathophysiological conditions. The team has managed to recruit a postdoctoral fellow and has a high potential to establish and strength cooperation with other teams in the field of microbiology**.**

**Weaknesses & threats:** The team has a number of weaknesses which are mainly related to its small size and a limited level of funding. In addition, the team mentions difficulties in developing projects with germ-free animal models. The team leader will be retiring soon. The succession plan is not clear. The lack of collaborations and the level of financial support. The renewal of the leadership of the team

### Main criterion: 1. Quality of results (H1.1-H1.5)

| H1.1 | Quality of selected outputs of Phase I |
|---|---|
| The quality of the outputs is good. Six of the 10 selected outputs were published in first and second quartile journals. | |
| **H1.2** | **Contribution of workers on the outputs reached** |
| The team members were first and corresponding authors in the majority of Phase I evaluated outputs. | |
| **H1.3** | **Quality of all outputs and results** |
| The quality of all outputs of Phase I is good. Seven of 13 papers were published in first and second quartile journals. No output was published in an excellent journal (first decile). Citation frequency of outputs was low. | |
| **H1.4** | **The most valuable discoveries and findings in the fields, their importance for the field** |
| The most valuable finding is the demonstration that microbiota regulate the HPA axis response to stress, shaping the response of peripheral tissues to chronic stress | |
| **H1.5** | **Contribution of the participation of the authors in large collaborations** |
| Not applicable here. | |

### Main criterion: 2. Societal relevance (H2.1-H2.5)

| H2.1 | Societal relevance of outputs and results pursuant to CAS and institute mission |
|---|---|
| The societal relevance of the gut-brain axis in the context of psychological / psychiatric disorders is certain. The integration of this topic in the context of the institute is however less obvious. | |
| **H2.2** | **System functionality for knowledge transfer into practise, its usefulness for society. The impact of the team´s activity on proper practice in society in the area of social sciences and humanities** |

| |
|---|
| The interface between psychological disorders and integrated physiology has strong translational potential but the team has lost its collaborations with clinicians and no strategy has been presented to reconnect with practice and patient care. |
| **H2.3** **Relation to practice** |
| As mentioned above. |
| **H2.4** **Participation in AV21 strategy** |
| No information as to this criterion was given to the commission. |
| **H2.5** **Cooperation with regions of the Czech Republic** |
| The team is engaged in an important collaboration with the Laboratory of Gnotobiology (LG), Institute of Microbiology, Czech Academy of Sciences. There appears to exist no other national or international collaboration outside CAS that resulted in publications. |

## Further criterion: 1. Position in international and national context (D1.1-D1.3)

| | |
|---|---|
| **D1.1** | **Comparison of the team with similar international and national institutes** |
| The team is recognized nationally, but hardly visible in the international context. In order to be competitive, it will need to develop innovative concepts, supported by domestic and international collaborations and by the use of up-to-date methodological approaches. | |
| **D1.2** | **Scope and quality of international and national cooperation and the role of the team in such cooperation; engagement in broad international cooperation** |
| The commission could not identify international collaborations that resulted in publications. | |
| **D1.3** | **Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)** |
| The participation of the team members in scientific community activities is limited. M. Vodička was awarded Pavel Flachs Prize for young authors. J. Pácha was awarded honorary membership of the Czech Physiological Society in 2017. | |

## Further criterion: 2. Vitality, sustainability and strategy (D2.1-D2.9)

| | |
|---|---|
| **D2.1** | **Direction in line with the perspective of the planned research directions** |
| The planned direction is clear and will centre on the microbiota. However, this topic is marginal with regard to the research strategy and plan of the institute. | |
| **D2.2** | **Assessment of the previous research objectives and their achievement** |
| As outlined in the previous evaluation, the research plan was overall convincing. The team achieved most of its objectives. | |
| **D2.3** | **Assessment of implementation of recommendations from past evaluation** |
| It was recommended that the team, given its small size and poor resources, should concentrate on key aspects of the research program. Consequently, the team abandoned one of its three sub-projects. | |
| **D2.4** | **Success in receiving grants** |

| | |
|---|---|
| According to the size of the team, the number of grants is limited. No international grants were identified. | |
| **D2.5** | **Adequacy of instrumental equipment** |
| The instrumental equipment appears adequate. No access to a germ-free animal facility is required to carry out the planned projects | |
| **D2.6** | **Effectiveness of management** |
| The current team leader will retire, and the succession plan is unclear. | |
| **D2.7** | **Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth** |
| This is a very small team with 4FTE, and the group leader will retire soon. Currently, there appears to be no strategy for the continuation of the team. | |
| **D2.8** | **Creating work-life balance conditions, assessment of approach towards possible gender issues** |
| No information as to these criteria was given to the commission. | |
| **D2.9** | **Relation of the team with regard to the integration, development and sustainability of the research centre funded by the National Programme of Sustainability II.** |
| Not applicable. | |

## Further criterion: 3. Cooperation with universities and participation in education (D3.1-D3.6)

| | |
|---|---|
| **D3.1** | **Scope of cooperation with universities on national and international level** |
| The team collaborates with the Laboratory of Gnotobiology of the institute of Microbiology of CAS, and with the Laboratory of Anaerobic Microbiology of the Institute of Animal Physiology and Genetics, CAS. However, cooperation with national and/or international universities is lacking. | |
| **D3.2** | **Effectiveness of joint research centres** |
| The team was not involved in any joint research centre with universities. | |
| **D3.3** | **Success rate in supervision of PhD students** |
| The success in PhD training seems adequate, according to the size of team. | |
| **D3.4** | **Participation of PhD students in the outputs** |
| PhD students have ample input in the scientific output of the team and are co-authors of most papers. | |
| **D3.5** | **Participation of the team in master or bachelor studies** |
| The team leader is actively involved in teaching of graduate students at the Charles University (20 lectures/seminars). One Bachelor and 3 Master students successfully defended their theses. | |
| **D3.6** | **Assessment of cooperation intensity with universities in the form of teaching** |
| See above. | |

## Further criterion: 4. Outreach activities (D4.1-D4.3)

| D4.1 | Sufficiency of media strategy and activities in the area of research popularisation |
|---|---|
| The team participated in the annual Open Day organized by the Institute of Physiology. Other than that, no activities in research popularisation were reported. | |
| **D4.2** | **Publishing activities and its quality** |
| The commission received no information as to this criterion. | |
| **D4.3** | **Participation in professional organisations in the area of research and development** |
| The commission received no information as to this criterion. | |

**Other comments of the commission:**

# 9. Laboratory of Translational Metabolism

**Strengths:**
This is a small young team with an excellent research approach in a scientifically emerging and important area. The team has an excellent future plan for their research directions, even given the somewhat diverse directions.

**Weaknesses:**
The Laboratory is relatively small and still a young team within this evaluation. Therefore, clear 1* publications are still lacking. The research area is quite broad due to many collaborations and therefore somewhat lack a clear focus. Outreach activities and collaboration with clinical colleagues are very weak.

**Opportunities:**
The strong national and international collaboration profile in a highly emerging field renders the Team highly competitive for grant funding and internationally leading research findings.

**Threats:**
The combination of a service laboratory with own active research programme is always a challenge in any field. The current Team is not an exception.

## Main criterion: 1. Quality of results (H1.1-H1.5)

| H1.1 | Quality of selected outputs of Phase I |
|---|---|
| Overall good quality of selected outputs on a nationally leading level. The lack of 1* publications is still a weakness. | |
| **H1.2** | **Contribution of workers on the outputs reached** |
| The members of the team are in part the leading contributors. | |
| **H1.3** | **Quality of all outputs and results** |
| The outputs are in part excellent and of overall high quality. | |
| **H1.4** | **The most valuable discoveries and findings in the fields, their importance for the field** |
| The team took part in a lipidome atlas together with the former University of the Team leader, UC Davis. | |
| **H1.5** | **Contribution of the participation of the authors in large collaborations** |
| Many strong collaborative networks internationally, nationally, and within CAS. | |

## Main criterion: 2. Societal relevance (H2.1-H2.5)

| H2.1 | Societal relevance of outputs and results pursuant to CAS and institute mission |
|---|---|
| The Team has a great relevance for the institute as a whole and can be considered as one of the core teams. The research area is well-suited to support other teams with their metabolic expertise and is therefore crucial for the institute's vision of heart – brain – metabolism. | |

| H2.2 | **System functionality for knowledge transfer into practise, its usefulness for society. The impact of the team´s activity on proper practice in society in the area of social sciences and humanities** |
|---|---|
| Metabolism is a highly novel area which draws huge interest in the scientific field. | |
| **H2.3** | **Relation to practice** |
| In general, metabolism is a growing field with high practical relevant, hence the Team is ideally positioned to fulfil this role. | |
| **H2.4** | **Participation in AV21 strategy** |
| Not applicable. | |
| **H2.5** | **Cooperation with regions of the Czech Republic** |
| The team has a good collaboration structure throughout the CR. However, collaboration with clinician scientists is clearly lacking. | |

## Further criterion: 1. Position in international and national context (D1.1-D1.3)

| D1.1 | **Comparison of the team with similar international and national institutes** |
|---|---|
| The team is clearly nationally leading, but somewhat lacks international visibility (yet). | |
| **D1.2** | **Scope and quality of international and national cooperation and the role of the team in such cooperation; engagement in broad international cooperation** |
| As outlined above, the collaboration profile of the team is excellent. However, there is a threat of too many collaborations and neglecting own international visibility. | |
| **D1.3** | **Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)** |
| These activities are much limited due to Covid restrictions and cannot be evaluated sufficiently for a team only active for 2 years in CAS during this period. | |

## Further criterion: 2. Vitality, sustainability and strategy (D2.1-D2.9)

| D2.1 | **Direction in line with the perspective of the planned research directions** |
|---|---|
| The team would benefit from a clear focus on one area of metabolic research rather than trying to collaborate quite so widely. In addition, the focus on their own research structure is important. | |
| **D2.2** | **Assessment of the previous research objectives and their achievement** |
| As outlined above. | |
| **D2.3** | **Assessment of implementation of recommendations from past evaluation** |
| The team was only established during this period. | |
| **D2.4** | **Success in receiving grants** |
| Good success on a national level, while large international grants are lacking. | |

| D2.5 | Adequacy of instrumental equipment |
|---|---|
| All instrumentation is adequate at present. The team has, however, to make sure to keep up with the fast-moving metabolism field and its constantly advancing techniques. | |
| **D2.6** | **Effectiveness of management** |
| The team seems to be manged very well given the short period of active leadership within this evaluation. | |
| **D2.7** | **Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth** |
| The team is overall young with a young director. Due to the short evaluation period, the other criteria cannot be evaluated properly, however, the continuation of a former PhD student as a post-doc is already an indication for excellent career and qualification growth. | |
| **D2.8** | **Creating work-life balance conditions, assessment of approach towards possible gender issues** |
| No issue identified. | |
| **D2.9** | **Relation of the team with regard to the integration, development and sustainability of the research centre funded by the National Programme of Sustainability II.** |
| Not applicable. | |

## Further criterion: 3. Cooperation with universities and participation in education (D3.1-D3.6)

| D3.1 | Scope of cooperation with universities on national and international level |
|---|---|
| As outlined above. | |
| **D3.2** | **Effectiveness of joint research centres** |
| As outlined above. | |
| **D3.3** | **Success rate in supervision of PhD students** |
| Criterion has not been addressed. | |
| **D3.4** | **Participation of PhD students in the outputs** |
| All the PhD students seems to be highly involved in the team’s outputs. | |
| **D3.5** | **Participation of the team in master or bachelor studies** |
| None identified. | |
| **D3.6** | **Assessment of cooperation intensity with universities in the form of teaching** |
| Teaching has not been outlined and the information is missing. | |

## Further criterion: 4. Outreach activities (D4.1-D4.3)

| D4.1 | Sufficiency of media strategy and activities in the area of research popularisation |
|---|---|
| The overall outreach activities are insufficient. There are no activities mentioned who try to connect with clinician scientist. Given the „translational“ in the team’s name, this is a clear weakness. | |
| **D4.2** | **Publishing activities and its quality** |
| No publications aiming as lay members or clinical colleagues are mentioned. | |
| **D4.3** | **Participation in professional organisations in the area of research and development** |
| None identified. | |

**Other comments of the commission:**

## 10. Laboratory of Biological Rhythms

**Strengths:**
Small, well-directed team with a research area of high sociological relevance.

**Weaknesses:**
Despite the interesting research area, the chosen topics do not fit well in the overall direction of the institute. While the team is nationally leading, its international visibility is weak. Although present on a low level, translational efforts and collaboration with clinical scientists is weak.

**Opportunities:**
The team plans to move towards metabolism in order to align better with the overall institute remit.

**Threats:**
Due to the limited size of the team and the relative distance from other CAS research direction, it will be difficult to reach further international visibility in the field.

### Main criterion: 1. Quality of results (H1.1-H1.5)

| H1.1 | Quality of selected outputs of Phase I |
|---|---|
| The evaluation of Phase I showed an overall good quality of outputs, which included one 1* and 3 publications in category 1. In addition, the team is part of one patent.<br>The Team is therefore overall slightly above average within the Institute. | |
| **H1.2** | **Contribution of workers on the outputs reached** |
| The Team demonstrated good contributions to the selected outputs. | |
| **H1.3** | **Quality of all outputs and results** |
| The outputs are certainly nationally leading and internationally recognised. | |
| **H1.4** | **The most valuable discoveries and findings in the fields, their importance for the field** |
| Many aspects of circadian rhythm have been researched, in particular the hereditability of certain aspects of maternal rhythm. | |
| **H1.5** | **Contribution of the participation of the authors in large collaborations** |
| The team is slightly weak in this aspect with limited international collaboration. There is however one quite promising participation in an international translational effort for the search of circadian modulators. | |

### Main criterion: 2. Societal relevance (H2.1-H2.5)

| H2.1 | Societal relevance of outputs and results pursuant to CAS and institute mission |
|---|---|
| Circadian rhythm certainly has a huge societal relevance. However, the integration into the institute's main scientific direction is less clear. In particular psychological diseases such a | |

| | |
|---|---|
| bipolar disorder seems not to fit well in the doctrine „heart – brain – metabolism“. The metabolic and heart aspect is entirely lacking. | |
| **H2.2** | **System functionality for knowledge transfer into practise, its usefulness for society. The impact of the team´s activity on proper practice in society in the area of social sciences and humanities** |
| The team is involved in governmental decisions about time change and circadian rhythms. | |
| **H2.3** | **Relation to practice** |
| The team is involved in a translational project around circadian modulators which have moderate impact to society. | |
| **H2.4** | **Participation in AV21 strategy** |
| Not applicable. | |
| **H2.5** | **Cooperation with regions of the Czech Republic** |
| The team is overall limited in its cooperation, in particular international. But also, collaboration between the institute, within CAS, and with regions across CR is limited. | |

## Further criterion: 1. Position in international and national context (D1.1-D1.3)

| | |
|---|---|
| **D1.1** | **Comparison of the team with similar international and national institutes** |
| The Team is certainly nationally leading; however, the visibility internationally is limited. | |
| **D1.2** | **Scope and quality of international and national cooperation and the role of the team in such cooperation; engagement in broad international cooperation** |
| The international collaboration is a clear weakness of the team. This is not only reflected in limited number of collaborations on outputs but also the absence of international funding schemes. | |
| **D1.3** | **Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)** |
| There is only very limited participation in such activities. E.g. the organisation of conferences was not reported during the evaluation period. | |

## Further criterion: 2. Vitality, sustainability and strategy (D2.1-D2.9)

| | |
|---|---|
| **D2.1** | **Direction in line with the perspective of the planned research directions** |
| The plan to move towards circadian metabolomics is a clear strength due to the fit within the institute’s remit. | |
| **D2.2** | **Assessment of the previous research objectives and their achievement** |
| Not applicable. | |
| **D2.3** | **Assessment of implementation of recommendations from past evaluation** |
| Not applicable. | |

| D2.4 | Success in receiving grants |
|---|---|
| There is evidence of good national grant support with a lack of international funding. | |
| **D2.5** | **Adequacy of instrumental equipment** |
| The presented equipment seems adequate for the envisioned research questions.<br>It was not clear to the commission of why the team reported the lack of animal facility as a problem since the institute provide such facilities. | |
| **D2.6** | **Effectiveness of management** |
| The team is well managed. | |
| **D2.7** | **Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth** |
| This is a relatively small team with a good age structure. Career and qualification growth are visible. However, the limited internationality might hamper the recruitment of international competitive students and researchers. | |
| **D2.8** | **Creating work-life balance conditions, assessment of approach towards possible gender issues** |
| No issues have been identified. | |
| **D2.9** | **Relation of the team with regard to the integration, development and sustainability of the research centre funded by the National Programme of Sustainability II.** |
| No issues have been identified. | |

## Further criterion: 3. Cooperation with universities and participation in education (D3.1-D3.6)

| D3.1 | Scope of cooperation with universities on national and international level |
|---|---|
| National cooperation with universities is present and seems adequate. However, international teaching is lacking. | |
| **D3.2** | **Effectiveness of joint research centres** |
| Joint research centres have not been presented. | |
| **D3.3** | **Success rate in supervision of PhD students** |
| No issues identified. | |
| **D3.4** | **Participation of PhD students in the outputs** |
| There is good participation of PhD students in the team outputs. | |
| **D3.5** | **Participation of the team in master or bachelor studies** |
| There is no participation visible. | |
| **D3.6** | **Assessment of cooperation intensity with universities in the form of teaching** |
| Overall moderate teaching activity on a local level. | |

## Further criterion: 4. Outreach activities (D4.1-D4.3)

| D4.1 | Sufficiency of media strategy and activities in the area of research popularisation |
|---|---|
| Due to the interest of the general public in the research topic, there is sufficient outreach activity by the group. However, it is not clear of how much junior members are active in these activities. | |
| **D4.2** | **Publishing activities and its quality** |
| Good overall quality of the outreach activities. However, the presentation in social media is weak. | |
| **D4.3** | **Participation in professional organisations in the area of research and development** |
| Moderate involvement in national and international organisations on a member level. Unfortunately, only the director seems to active in these activities. | |

**Other comments of the commission:**
The lack of animal facilities which are available to the team should be discussed on an institute's level.

# 11. Laboratory of Experimental Hypertension

**Strengths & Opportunities:**
The team is well established in the local and national landscape. The team has solid expertise in the study and analysis of vascular function and hypertension in vivo and ex vivo with access to a plethora of transgenic rat models. For several years, the team has established strong local collaboration and international interactions with joint bilateral mobility projects.

**Weaknesses & Threats:**
The number of PhDs as well as the level of funding is limited compared to the number of research projects. The team has no interaction with clinical research / clinicians although some of the projects could be more translational. Attention should be paid to some projects that concern the phenotyping of animal models rather than a scientific hypothesis with a clear objective.

## Main criterion: 1. Quality of results (H1.1-H1.5)

| H1.1 | Quality of selected outputs of Phase I |
|---|---|
| The quality of selected outputs of Phase I is very good. Seven of 11 papers were published in first and second quartile journals, 2 in excellent journals (first decile). | |
| **H1.2** | **Contribution of workers on the outputs reached** |
| The team members were leading or provided essential contributions in the large majority of the outputs. More than one third of the outputs have a corresponding author from the team. | |
| **H1.3** | **Quality of all outputs and results** |
| The overall quality of all outputs is very good. Twenty three of 63 papers were published in first and second quartile journals, four in excellent journals. Citation frequency of the outputs is low. | |
| **H1.4** | **The most valuable discoveries and findings in the fields, their importance for the field** |
| The team has developed 4 topics during the evaluation period.<br>1) Altered sympathetic tone in hypertension<br>2) Abnormal vascular smooth muscle contraction in hypertension<br>3) Contribution of renin-angiotensin and endothelin systems to renal damage<br>4) Cardiovascular effects of neuropeptides controlling food intake<br>The most valuable finding that is shared by the first three topics is the mechanism by which Ca2 + signalling controls and / or regulates vascular tone and the development of hypertension. The fourth topic is an inter-institutional collaboration project. | |
| **H1.5** | **Contribution of the participation of the authors in large collaborations** |
| Not applicable here. | |

## Main criterion: 2. Societal relevance (H2.1-H2.5)

| H2.1 | Societal relevance of outputs and results pursuant to CAS and institute mission |
|---|---|
| Hypertension has become a major public health problem in industrialized societies. Understanding the fine-tuning mechanisms controlling blood pressure variation, defining disease pathogenesis and identifying therapeutic targets is undoubtedly relevant to society. Although the team lacks molecular insight as well as a translation project established with the clinic, their results and projects have obvious societal relevance and fully fit the mission of the institute. | |
| **H2.2** | **System functionality for knowledge transfer into practise, its usefulness for society. The impact of the team´s activity on proper practice in society in the area of social sciences and humanities** |
| The team‘s activity relies on preclinical studies on hypertension which, per se, limit a direct transfer to practise although the team mentions 5 licenced patents. The inter-institution topic on Cardiovascular effects of neuropeptides controlling food intake would be of interest in area of social sciences and humanities as it is related to chronic eating disorder. | |
| **H2.3** | **Relation to practice** |
| As mentioned above, the team would gain to establish collaboration with clinicians to translate to the practice. | |
| **H2.4** | **Participation in AV21 strategy** |
| No participation of the team in the AV21 strategy was reported. | |
| **H2.5** | **Cooperation with regions of the Czech Republic** |
| Only few cooperation with regions of the Czech Republic were reported. | |

## Further criterion: 1. Position in international and national context (D1.1-D1.3)

| D1.1 | Comparison of the team with similar international and national institutes |
|---|---|
| The pathophysiology of hypertension has been studied extensively in recent decades. The subject is therefore very competitive. The team is leading in the national context and is recognized and well positioned in the international landscape. A more in-depth view describing molecular signalling pathways will be invaluable for reaching the international top level. | |
| **D1.2** | **Scope and quality of international and national cooperation and the role of the team in such cooperation; engagement in broad international cooperation** |
| The team has an impressive list of collaborators within the institute (4 teams) and outside. Team members actively participate in national inter-institutional collaborations, in particular with the Institute of Organic Chemistry and Biochemistry and the Institute of Clinical and Experimental Medicine. The team has also developed international cooperation in the form of joint bilateral mobility projects with the Mossakowski Medical Research Center (Polish Academy of Sciences) and the Chang Gung Memorial Hospital (Kaohsiung, Taiwan). They also cooperate with the Institute for Normal and Pathological Physiology and the Heart Research Institute (Bratislava). Cooperation with the Institute of Cardiovascular & Medical Sciences, (Glasgow, UK) was mentioned in the presentation, but this collaboration was not | |

| | |
|---|---|
| described in the report. In summary, the international and national cooperation of the team are very good; the team's expertise on in vivo and ex vivo characterization is essential in the various collaborations. | |
| **D1.3** | **Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)** |
| The team leader co-organized the 15th international conference on endothelin. Two team members are actively involved in the journal Physiological Research as managing editor and editor in chief, respectively. Members of the team gave invited lectures. | |

## Further criterion: 2. Vitality, sustainability and strategy (D2.1-D2.9)

| | |
|---|---|
| **D2.1** | **Direction in line with the perspective of the planned research directions** |
| The projects are a continuation of the work carried out over the past 5 years. The team has extensive expertise in the pathophysiology of hypertension at both animal and organ level. The team therefore has the capacity to carry out preclinical studies and to evaluate new therapeutic strategies. However, the team should be careful not to be a service provider. | |
| **D2.2** | **Assessment of the previous research objectives and their achievement** |
| All the previous objectives have been reached with the establishment of new cooperation inside the institute. | |
| **D2.3** | **Assessment of implementation of recommendations from past evaluation** |
| The bilateral project with Ulie and Samuel Chan from Kaohsiung Chang Gung Memorial Hospital (Kaohsiung, Taiwan) has been strengthened.<br>The catalogue of strains and experimental models of rats had been enlarged significantly. | |
| **D2.4** | **Success in receiving grants** |
| The success of the grant is limited compared to the number of topics and collaborations and relies mainly on the Czech Science Foundation. The financial support coming from Novo Nordisk but also from the patents on lipid peptides are not clear. | |
| **D2.5** | **Adequacy of instrumental equipment** |
| The team is fully equipped to perform in-vivo and ex-vivo experiments on all the rat strains and models that has been developed by the team. | |
| **D2.6** | **Effectiveness of management** |
| A new leader of the team has been appointed in 2016. Dr. Ivana Vaněčková took this position after being the deputy head of the Laboratory for 3 years. The two former leaders, Dr. Jaroslav Kuneš (1985-2006) and Dr. Josef Zicha (2007-2016) are still very active. | |
| **D2.7** | **Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth** |
| The age of the structure is very heterogenic with 5 senior researchers and 5 junior researchers. Young researchers will need to be more involved in leadership. The number of PhD students is low in relation to the number of researchers qualified to supervise students. | |
| **D2.8** | **Creating work-life balance conditions, assessment of approach towards possible gender issues** |
| No information as to these criteria was presented to the commission. | |

| D2.9 | Relation of the team with regard to the integration, development and sustainability of the research centre funded by the National Programme of Sustainability II. |
|---|---|
| Not applicable. | |

## Further criterion: 3. Cooperation with universities and participation in education (D3.1-D3.6)

| D3.1 | Scope of cooperation with universities on national and international level |
|---|---|
| The team cooperates with the Charles university at the national level and has developed two joint bilateral mobility projects with the Polish academy of science and Chang Gung Memorial Hospital (Kaohsiung, Taiwan). | |
| **D3.2** | **Effectiveness of joint research centres** |
| Although the number of internal, national and international cooperation is impressive, no joint research centres were mentioned. | |
| **D3.3** | **Success rate in supervision of PhD students** |
| The number of PhD is limited with regard to the number of topics and junior/senior researchers. In the period 2015 to 2019, 2 PhD students successfully defended their theses. | |
| **D3.4** | **Participation of PhD students in the outputs** |
| Although the number of Ph.D. students is small compared to the number of junior/senior researchers and the number of projects, the participation of PhD students is very good, being first, co-authors and/or corresponding authors in the majority of the outputs. | |
| **D3.5** | **Participation of the team in master or bachelor studies** |
| The team is involved in several Master courses were the students of all degrees participates. The number of bachelor and master students supervised during the period is however limited: 1 bachelor and 3 master theses were successfully defended. | |
| **D3.6** | **Assessment of cooperation intensity with universities in the form of teaching** |
| The team leader is involved in teaching at the Charles University. | |

## Further criterion: 4. Outreach activities (D4.1-D4.3)

| D4.1 | Sufficiency of media strategy and activities in the area of research popularisation |
|---|---|
| No outreach activities for research popularization through media (web, newspapers, TV) were reported. Dr. Vaněčková and Prof. Tesař presented a lecture at the Academy of Sciences within a series of popularizing lectures. | |
| **D4.2** | **Publishing activities and its quality** |
| There is no publishing activity for popularization of research. | |
| **D4.3** | **Participation in professional organisations in the area of research and development** |
| The team is involved in a licence agreement between Novo Nordisk, the Institute of Organic Chemistry and Biochemistry, and the Institute of Physiology on the development of | |

potential drugs for obesity and type 2 diabetes mellitus. Several patents on lipidated peptides for lowering blood glucose were granted (AU2015207776, EP 3094643, CA 2935026, JP2017-505810).

**Other comments of the commission:**

## 12. Laboratory of Cellular and Molecular Neuroendocrinology

**Strengths:**
Convincing, focussed research agenda. Strong collaborations with domestic and foreign partners. Competent team leader.

**Weaknesses:**
The Laboratory has difficulties in recruiting suitable postdocs and students. So far, the group has neglected to search for connections between purine receptor function and pathophysiological conditions. The number of papers published in the evaluation period is low as compared with groups of similar size.

**Opportunities:**
The collaboration with the Institute of Organic Chemistry has the potential to identify lead substances and prove purinergic receptors as drug targets.

**Threats:**
The Laboratory is dependent on domestic grants which are short term and small. This condition prevents ambitious, risky research goals and favours planning of a fragmented concept.

### Main criterion: 1. Quality of results (H1.1-H1.5)

| H1.1 | Quality of selected outputs of Phase I |
|---|---|
| The quality of selected outputs of Phase I is good, in part very good. Three of 8 outputs were published in quarter 1, 5 in quarter 2 journals. | |
| **H1.2** | **Contribution of workers on the outputs reached** |
| There are several collaborations that resulted in joint papers where each partner laboratory contributed equally. When members of the Team were not in the lead (corresponding author), they provided essential data or methods. | |
| **H1.3** | **Quality of all outputs and results** |
| The number of outputs (10) in the evaluation period appears low as compared with groups of similar size. The quality of these outputs and results is good, a few are very good. There were no papers in excellent journals (decile 1), but the commission appreciates that the team has published nearly all of its papers in above-average journals. As shown by their citation, the papers were internationally recognized. | |
| **H1.4** | **The most valuable discoveries and findings in the fields, their importance for the field** |
| • The team has characterized ligand-gated receptor channels including the GABA-A, nicotinic, and ATP-gated P2X receptor channels in several subpopulations of pituitary cells.<br>• The team investigated the autocrine and paracrine purinergic signalling by ATP in hypothalamic nuclei, and its involvement in circadian rhythms of hypothalamic cells.<br>• The relationship between structure and function of purinergic P2X receptor-channels was studied. With the aid of the agent ivermectin and with several testosterone derivatives a model describing the allosteric receptor modulation and its functional consequences was established. In addition, amino acid residues that are critical for the function of the P2X7 receptor were identified by generation and characterization of mutants. | |

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|---|
| Hypothalamic nuclei and cells are crucial 'pacemakers' of endocrine function, and the elucidation of their molecular regulation will be essential for understanding pathophysiologic states. |

| H1.5 | Contribution of the participation of the authors in large collaborations |
|---|---|
| Not applicable here. | |

## Main criterion: 2. Societal relevance (H2.1-H2.5)

| H2.1 | Societal relevance of outputs and results pursuant to CAS and institute mission |
|---|---|
| The immediate societal relevance of results obtained within the evaluation period is limited. However, the results are relevant for our understanding of the function of the endocrine system in general. Consequently, the basic research of the Team could help understanding the pathophysiology of endocrine disease, and is therefore in line with CAS and the Institute's mission. | |
| **H2.2** | **System functionality for knowledge transfer into practise, its usefulness for society. The impact of the team´s activity on proper practice in society in the area of social sciences and humanities** |
| As elaborated above, there is a general potential of the results for knowledge transfer into practice, but it is neither concrete nor immediate. | |
| **H2.3** | **Relation to practice** |
| The research program has the potential to identify novel drug targets and lead substances, in particular after the Team was merged with the Laboratory of Pain Research. | |
| **H2.4** | **Participation in AV21 strategy** |
| No information as to this topic was provided by the Team's report or presentation. | |
| **H2.5** | **Cooperation with regions of the Czech Republic** |
| No information as to this topic was provided by the Team's report or presentation. | |

## Further criterion: 1. Position in international and national context (D1.1-D1.3)

| D1.1 | Comparison of the team with similar international and national institutes |
|---|---|
| The Team ranks among the best domestic research groups with a similar scope. In the international context, the Team is visible and recognized in the field of purinergic receptors. | |
| **D1.2** | **Scope and quality of international and national cooperation and the role of the team in such cooperation; engagement in broad international cooperation** |
| The Team is engaged in close, successful collaborations with domestic (2) and international (5) partners that led to 4 and 11 publications, respectively. In particular the collaboration with groups at the National Institutes of Health, Bethesda, USA, were important for the productivity and the international visibility and recognition of the Team. The Team is an equal partner in these collaborations and provided original and essential contributions. | |

| D1.3 | Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards) |
|---|---|
| No conferences and workshops were organized by Team members in 2015-2019.<br>Members of the Team gave a total of 6 invited lectures at international meetings/workshops.<br>The Team leader Hana Zemkova was a member of Committee 305 of the Grant Agency of the Czech Republic (2015-2019). She was Review Editor of the journals Frontiers in Cellular Endocrinology, Frontiers in Endocrinology and Frontiers in Neuroscience (2015-2019) and is Guest Editor of the Special Issue entitled "Purinergic P2 Receptors: Structure and Function", International Journal of Molecular Sciences. | |

## Further criterion: 2. Vitality, sustainability and strategy (D2.1-D2.9)

| D2.1 | Direction in line with the perspective of the planned research directions |
|---|---|
| The future research plan is a continuation of the work carried out over the past 5 years. The Team has extensive expertise in the purine receptor research and in the molecular function of ion channels. As basic, molecular research the concept is convincing and in line with the mission of the institute of Physiology. However, the commission recommends that the Team should not neglect the translational aspects of the research topic. Towards that aim, the interaction with members of the Laboratory of Pain Research and the collaboration with the Institute of Organic Chemistry could become important. | |
| **D2.2** | **Assessment of the previous research objectives and their achievement** |
| The commission concludes that the previous research objectives were overall convincing. Most, although not all, objectives were achieved. | |
| **D2.3** | **Assessment of implementation of recommendations from past evaluation** |
| According to the recommendations of the previous evaluation, the Team was merged with the Laboratory of Pain Research. This merger will enhance the potential of the Neuroendocrinology Team, in particular with regard to the translational aspects of purinergic receptor research. In addition, the Team attempted to recruit younger fellows (postdocs and students) but was only partially successful. | |
| **D2.4** | **Success in receiving grants** |
| The Team was successful in applying for domestic, mostly CRF grants; 7 proposals were accepted. There are no international (EU) grants. | |
| **D2.5** | **Adequacy of instrumental equipment** |
| All required equipment is available for the Team. | |
| **D2.6** | **Effectiveness of management** |
| Competent, strong leadership by the head of the Team. | |
| **D2.7** | **Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth** |
| This is a small Team with a skewed age structure but a favourable career and qualification development. Six of its 8 scientists are over 40, only 2 under 40. The commission recommends that the Team strengthens its efforts to recruit more suitable students. | |

| D2.8 | Creating work-life balance conditions, assessment of approach towards possible gender issues |
|---|---|
| No information as to this topic was provided by the Team. | |
| **D2.9** | **Relation of the team with regard to the integration, development and sustainability of the research centre funded by the National Programme of Sustainability II.** |
| Not applicable here. | |

## Further criterion: 3. Cooperation with universities and participation in education (D3.1-D3.6)

| D3.1 | Scope of cooperation with universities on national and international level |
|---|---|
| Cooperation with domestic universities in education is limited to supervision and teaching of bachelor and master students. There is no collaboration with universities in an international context. | |
| **D3.2** | **Effectiveness of joint research centres** |
| The commission did not have sufficient information to comment on this topic. | |
| **D3.3** | **Success rate in supervision of PhD students** |
| In the evaluation period, the Team supervised 3 PhD students who have not yet defended their thesis. | |
| **D3.4** | **Participation of PhD students in the outputs** |
| PhD students were authors or co-authors of 50% (5 of 10) of papers published by the Team. | |
| **D3.5** | **Participation of the team in master or bachelor studies** |
| The Team supervised 6 bachelor and 1 master student. It seems that it was difficult to recruit suitable students. | |
| **D3.6** | **Assessment of cooperation intensity with universities in the form of teaching** |
| Cooperation with universities is limited to 18 semesterly /lectures/seminars/courses in bachelor and master studies. | |

## Further criterion: 4. Outreach activities (D4.1-D4.3)

| D4.1 | Sufficiency of media strategy and activities in the area of research popularisation |
|---|---|
| Members of the Team organized annual lectures and demonstrations for the public ("Calcium signalling in excitable and non-excitable cells") and were involved in the "Open Science" project of the Czech Academy of Science. | |
| **D4.2** | **Publishing activities and its quality** |
| No information as to publications in the area of research popularization was given. | |
| **D4.3** | **Participation in professional organisations in the area of research and development** |

No information as to this point was given by the Team.

**Other comments of the commission:**

# 13. Laboratory of Cellular Neurophysiology

**Strengths & Opportunities:**
The team has a very good track record with a clear scientific strategy. The international positioning is also very good, with multidisciplinary methodological approaches allowing the detailed study of the structure-function and the pharmacology of ion channels in neurophysiological processes. The characterization of pharmacological compounds has in particular been the subject of several patents.

**Weaknesses & Threats:**
The team has been fundamentally remodelled during the evaluation period and the future leadership strategy is unclear. In addition, technical staff are aging, and special attention must be paid to recruiting young technicians in anticipation of future retirements. The team should also continue in its strategy of renewing methodological approaches to complement molecular and cellular electrophysiology.

## Main criterion: 1. Quality of results (H1.1-H1.5)

| H1.1 | Quality of selected outputs of Phase I |
|---|---|
| The quality of selected outputs of Phase I is very good and in part excellent. 30 of 32 papers were published in first and second quartile journals, 10 in the top decile journals. | |
| **H1.2** | **Contribution of workers on the outputs reached** |
| The team members were leading or provided essential contributions in the large majority of the outputs. | |
| **H1.3** | **Quality of all outputs and results** |
| Overall, the quality of all outputs is very good and in part excellent with a very good frequency of citations (18 outputs in the first 2 quartiles). | |
| **H1.4** | **The most valuable discoveries and findings in the fields, their importance for the field** |
| During the evaluation period, the team mainly studied the structure and function of the NMDA receptor. In particular, they characterized the molecular mechanisms that regulate and control their surface expression and trafficking. At the same time, they explored in detail the pharmacology of NMDAR and more particularly the modulation of NMDAR according to the structure and activity of steroids. The team also obtained important data in the understanding of the gating mechanisms of TRP channels, and more particularly of TRPA and TRPV which are respectively involved in the responses to pain and temperature. | |
| **H1.5** | **Contribution of the participation of the authors in large collaborations** |
| The team cooperates with a number of institutes nationally and internationally but is not part of a large consortium. | |

## Main criterion: 2. Societal relevance (H2.1-H2.5)

| H2.1 | Societal relevance of outputs and results pursuant to CAS and institute mission |
|---|---|
| NMDA receptors are essential for synaptic plasticity. They play a central role in the neural mechanisms supporting memory and learning. Although the team does not carry out a translational project directly linked to the clinic, the detailed understanding of molecular and cellular mechanisms as well as the pharmacology that regulates NMDARs is fundamental to understand neuronal physiology and / or behavioural adaptation. In this context the outputs of the laboratory for cellular neurophysiology will have middle to long term societal relevance and fully fit the mission of the institute. | |
| **H2.2** | **System functionality for knowledge transfer into practise, its usefulness for society. The impact of the team´s activity on proper practice in society in the area of social sciences and humanities** |
| The team has successfully applied for 6 patents related to NMDAR pharmacology. The impact of the team's activity on the field of social and human sciences is currently limited, although the mechanisms studied would be of interest in the context of psychiatric disorders, pain relief and cognitive function. | |
| **H2.3** | **Relation to practice** |
| The team holds six patents that would benefit from being translated in the clinic thanks to a translation project. | |
| **H2.4** | **Participation in AV21 strategy** |
| Not applicable. | |
| **H2.5** | **Cooperation with regions of the Czech Republic** |
| The team has established cooperation in the Prague area with the Institute of Organic Chemistry and Biochemistry CAS; the National Institute of Mental Health, Klecany; the Institute of Physics, Charles University and The University of Chemistry and Technology. The team also collaborates with Loschmidt laboratories of Protein Engineering in Brno and the Innovations national supercomputing centre - Technical University of Ostrava. | |

## Further criterion: 1. Position in international and national context (D1.1-D1.3)

| D1.1 | Comparison of the team with similar international and national institutes |
|---|---|
| The team is internationally competitive and has been able to develop new methodological approaches and establish the necessary collaborations to be nationally and internationally recognized. | |
| **D1.2** | **Scope and quality of international and national cooperation and the role of the team in such cooperation; engagement in broad international cooperation** |
| As mentioned above, the team has engaged in significant national and international collaborations that support the project and the team's goals. The team is not engaged in a large international consortium or a large project but has the potential to do so. | |
| **D1.3** | **Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)** |

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|---|
| Team members have important activities. The team leader organized the Czech Neuroscience Conference (3 times), he was invited to lecture in national meetings and summer courses, he is a member of several national scientific boards and committees and has received the „Honourable Mention for Medical Research and Development“ Czech Council for Health Research - Ministry of Health of the Czech Republic. Several doctoral students have been awarded, in particular Pavla Hubalkova spent a year (2018-2019) in the laboratory of Antonio Sanz-Clemente (Northwestern University in Chicago, IL, USA) as a Fulbright Visiting Student Researcher. |

## Further criterion: 2. Vitality, sustainability and strategy (D2.1-D2.9)

| D2.1 | Direction in line with the perspective of the planned research directions |
|---|---|
| Although one of the main scientific researchers moved to another institute. The scientific strategy has not been fundamentally changed and is part of the continuity of the work carried out in recent years. The research project concerning the addressing of NMDAR was abandoned but a project concerning the implication of TRPC5 in rheumatoid arthritis has emerged. | |
| **D2.2** | **Assessment of the previous research objectives and their achievement** |
| A large part of the previous scientific objectives has been fully achieved. | |
| **D2.3** | **Assessment of implementation of recommendations from past evaluation** |
| The previous commission recommended recruiting high quality postdocs as future independent team leaders to ensure leadership renewal within the team. This recommendation has been partially completed given the fact that the senior researcher present to replace the team leaders has taken the lead of another department in another institute. Note, however, the presence of postdoctoral fellows who could potentially take on responsibilities in the future. | |
| **D2.4** | **Success in receiving grants** |
| Success in obtaining grants is good but mainly based on national applications. Note, however, a very good success rate for funding PhDs and obtaining international travel grants. A grant from a major international / European research program would be a plus. | |
| **D2.5** | **Adequacy of instrumental equipment** |
| All the equipment necessary to develop the project is present or is the subject of close collaboration. Note the complementary methodological approaches to cell electrophysiology (i.e. modelling, cell imaging) to meet the scientific objectives of the team. | |
| **D2.6** | **Effectiveness of management** |
| As mentioned, the team lacks young scientist leadership and seems to be dependent on the head of the laboratory. | |
| **D2.7** | **Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth** |
| The planning of the replacement of the director and deputy director of the laboratory by the recruitment of a senior researcher failed, in particular because the senior researcher had a proposal to take the head of a department in another Institute with substantial space and financial support. The age structure of the laboratory is however very good and has the | |

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| potential to bring out young leaders to renew the dynamics of the team. Note also the imminent retirement of all technical staff. |
| **D2.8** **Creating work-life balance conditions, assessment of approach towards possible gender issues** |
| No information was presented to the commission as to this topic. |
| **D2.9** **Relation of the team with regard to the integration, development and sustainability of the research centre funded by the National Programme of Sustainability II.** |
| Not applicable. |

## Further criterion: 3. Cooperation with universities and participation in education (D3.1-D3.6)

| | |
|---|---|
| **D3.1** | **Scope of cooperation with universities on national and international level** |
| The team has many very fruitful cooperation at the national level but also with European teams and several laboratories in the USA. These cooperations are established on the basis of scientific projects either within the framework of exchange of mutations and genes or advancement of experience with high-end techniques. They resulted in joint publications and patents. | |
| **D3.2** | **Effectiveness of joint research centres** |
| The team is involved in several cooperation but not in joint research centres per se. | |
| **D3.3** | **Success rate in supervision of PhD students** |
| The rate of success in supervision of PhD is very good with 6 doctoral theses defended during the evaluation period. Note that several PhD students have moved with a senior scientist to the Institute of Experimental Medicine to form a new lab there. | |
| **D3.4** | **Participation of PhD students in the outputs** |
| The contribution of PhD students is substantial but their authorship position (first / last authors) in the various outputs as well as in patents is not clear. | |
| **D3.5** | **Participation of the team in master or bachelor studies** |
| Senior scientists have given few master and bachelor lectures at the Medical Faculties and at the Faculty of Natural Sciences and 9 bachelor theses and 5 master theses were defended during the evaluation period. | |
| **D3.6** | **Assessment of cooperation intensity with universities in the form of teaching** |
| The cooperation in the form of teaching is very limited. Two Erasmus Plus Summer Internship students from the UK were hosted in the lab. | |

## Further criterion: 4. Outreach activities (D4.1-D4.3)

| | |
|---|---|
| **D4.1** | **Sufficiency of media strategy and activities in the area of research popularisation** |
| The emeritus professor František Vyskočil has participated to several radio broadcasting programs and TV programs. The head of the team gave lectures on “Human body in health | |

| | |
|---|---|
| and disease" organized by the Czech Academy of Sciences for the public, and participated two times to the brain awareness week. | |
| **D4.2** | **Publishing activities and its quality** |
| The team has several publications in Czech for the medical community and the emeritus professor František Vyskočil published 41 Articles in "Vesmir" (Czech educational journal for the public). | |
| **D4.3** | **Participation in professional organisations in the area of research and development** |
| No information on this topic was presented to the commission. | |

**Other comments of the commission:**

## 14. Laboratory of the Neurophysiology of Memory

**Strengths:**
This is a relatively young group with a very relevant research program. Neurodegenerative diseases are at the forefront of current research interests. Furthermore, the team has a very fruitful and promising connection to clinical research and pursues many translational aspects. The funding situation is very good.

**Weaknesses:**
High-ranking publications are missing during the evaluation period. This also leads to somewhat reduced international visibility.

**Opportunities:**
Due to the young energetic group and the highly relevant research area, the team has good opportunities to flourish scientifically. The patient-oriented research aspects are also a clear opportunity for more needed high-ranking publications.

**Threats:**
Neurodegeneration is a hugely competitive field and a relatively small group might struggle to gain international visibility.

### Main criterion: 1. Quality of results (H1.1-H1.5)

| H1.1 | Quality of selected outputs of Phase I |
|---|---|
| The Team has produced a decent amount of outputs in good quality. However, overall, they are below the average of the Institute in number and – most importantly – quality. | |
| **H1.2** | **Contribution of workers on the outputs reached** |
| The team members participated in leading roles in many of the outputs. | |
| **H1.3** | **Quality of all outputs and results** |
| Overall very few high-ranking outputs. Two excellent publications according to journal quality (in the first decile) but none according to citations. Almost 50% of outputs were published in below average quality journals. | |
| **H1.4** | **The most valuable discoveries and findings in the fields, their importance for the field** |
| Alteration of brain function with D2/3 agonists, recently published in EMBO Reports. | |
| **H1.5** | **Contribution of the participation of the authors in large collaborations** |
| The team participated in a Horizon 2020 consortium. Furthermore, there are many aspects of translational science with patient involvement and collaboration with clinical scientist. | |

### Main criterion: 2. Societal relevance (H2.1-H2.5)

| H2.1 | Societal relevance of outputs and results pursuant to CAS and institute mission |
|---|---|
| The research area is of extremely high societal relevance. | |

| | |
|---|---|
| The research area would benefit from moving a bit more towards the institute's focus around metabolism. There is huge interest in the combination of neurodegeneration and metabolic changes. | |
| **H2.2** | **System functionality for knowledge transfer into practise, its usefulness for society. The impact of the team´s activity on proper practice in society in the area of social sciences and humanities** |
| Many research aspects are connected with either patients or clinical research and hence has an imminent high usefulness for society. | |
| **H2.3** | **Relation to practice** |
| As outlined above, the team has an excellent record of public relation. | |
| **H2.4** | **Participation in AV21 strategy** |
| Not applicable. | |
| **H2.5** | **Cooperation with regions of the Czech Republic** |
| The team collaborates well throughout the CR. However, the collaboration within CAS could be improved. | |

## Further criterion: 1. Position in international and national context (D1.1-D1.3)

| | |
|---|---|
| **D1.1** | **Comparison of the team with similar international and national institutes** |
| The team works on a highly competitive scientific area and therefore many international groups are very strong compared to this team. The team is nationally leading but hardly visible in the international context as judged by the lack of highly cited publications and/or international lecture invitations. | |
| **D1.2** | **Scope and quality of international and national cooperation and the role of the team in such cooperation; engagement in broad international cooperation** |
| The participation in a H2020 consortium is a plus. Furthermore, the team has many collaborations internationally. | |
| **D1.3** | **Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)** |
| Senior members of the team organized or co-organized 3 domestic conferences/workshops. No invited lectures were listed. Junior members of the team received a total of 6 awards (mostly poster or best-paper prices). | |

## Further criterion: 2. Vitality, sustainability and strategy (D2.1-D2.9)

| | |
|---|---|
| **D2.1** | **Direction in line with the perspective of the planned research directions** |
| Very good and ambitious outline of the scientific plan. There seems to be good leadership of a dynamic team. The integration into the institute's remit could be stronger. | |
| **D2.2** | **Assessment of the previous research objectives and their achievement** |

| | |
|---|---|
| As outlined above: some top publications and international recognition are missing, but other than that the team presented a dynamic outlook and previous research objectives have been met. | |
| **D2.3** | **Assessment of implementation of recommendations from past evaluation** |
| The team is one of the best implementing the past recommendation to foster collaboration with clinical colleagues and promote translatability by using clinical samples, patient data, etc. | |
| **D2.4** | **Success in receiving grants** |
| The team is very well funded and, in particular, plans to acquire ERC grants for junior members is a good strategy. | |
| **D2.5** | **Adequacy of instrumental equipment** |
| The available equipment is adequate. | |
| **D2.6** | **Effectiveness of management** |
| The team is well managed with a dynamic leadership. | |
| **D2.7** | **Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth** |
| There are clear plans to gain ESC starter grants which would much help international collaboration, available money, as well as career possibilities for junior team members. | |
| **D2.8** | **Creating work-life balance conditions, assessment of approach towards possible gender issues** |
| No information as to this topic was given to the commission. | |
| **D2.9** | **Relation of the team with regard to the integration, development and sustainability of the research centre funded by the National Programme of Sustainability II.** |
| No information as to this topic was given to the commission. | |

## Further criterion: 3. Cooperation with universities and participation in education (D3.1-D3.6)

| | |
|---|---|
| **D3.1** | **Scope of cooperation with universities on national and international level** |
| There is good collaboration on a national level while international network is solid but has room for improvement. | |
| **D3.2** | **Effectiveness of joint research centres** |
| Not applicable. | |
| **D3.3** | **Success rate in supervision of PhD students** |
| Only one PhD student successfully defended her thesis in the evaluation period. Given the size of the group, this output is clearly below average and should be improved. | |
| **D3.4** | **Participation of PhD students in the outputs** |

| | |
|---|---|
| Students seem to actively participate in the research outputs. The report of the team states that ‘most of the 17 selected papers was authored or co-authored by a student. | |
| **D3.5** | **Participation of the team in master or bachelor studies** |
| The team contributes to the education of master and bachelor students, however special teaching efforts could not be seen (29 lectures only). 11 bachelor and 10 master students finished their theses in the evaluation period. | |
| **D3.6** | **Assessment of cooperation intensity with universities in the form of teaching** |
| The teaching cooperation would benefit from more involvement of the institute in general, and this team is not an exception. | |

## Further criterion: 4. Outreach activities (D4.1-D4.3)

| | |
|---|---|
| **D4.1** | **Sufficiency of media strategy and activities in the area of research popularisation** |
| The outreach activities include patient work and press releases about scientific findings. The outreach on social media is weak. | |
| **D4.2** | **Publishing activities and its quality** |
| As above. | |
| **D4.3** | **Participation in professional organisations in the area of research and development** |
| The team participated nationally in professional organisations while the international visibility is still weak. | |

**Other comments of the commission:**

# 15. Laboratory of Developmental Epileptology

**Strengths:**
The team has a very good publication record, with some papers published in high profile journals (e.g., Nature Neurosci).
The team has a multidisciplinary nature as it collaborates with experts in various research fields. Several international collaborations have been also been established. Compared to the previous evaluation, the team increased the interaction with clinicians.

**Weaknesses:**
Despite the interaction with several international partners, the team has a limited success rate in international grant applications. There appear to be still only weak interactions between the different projects within the group. The age structure of the Team is unfavourable, and it appears to be difficult to recruit suitable junior scientists (Postdocs).
More efforts should be paid to knowledge transfer and to the interaction with stakeholders (e.g., pharmaceutical companies).

**Opportunities:**
The research goals have a high potential for translation of results into therapy; biomarkers as well as lead compounds with anti-seizure activity were already identified.

**Threats:**
Since the team is mainly dependent on national grants, the possibility of future budget cuts by the Czech government is potentially threatening.

## Main criterion: 1. Quality of results (H1.1-H1.5)

| H1.1 | Quality of selected outputs of Phase I |
|---|---|
| The quality of the selected outputs of Phase I is very good. The results have predominately been published in good quality international journals: of 19 selected papers, 6 were published in quartile 1, 10 in quartile 2 journals, 1 was excellent (first decile). Citation frequency of the outputs is modest: only 3 papers out of 19 were in the first quartile of the bibliometric analysis. | |
| **H1.2** | **Contribution of workers on the outputs reached** |
| The team members were first and/or corresponding authors in the majority of Phase I evaluated outputs. | |
| **H1.3** | **Quality of all outputs and results** |
| The quality of all outputs (54 papers) is overall very good, a few are excellent. About half of the results have been published in first and second quartile journals, 2 were published in excellent journals (first decile). Citation frequency of the outputs is modest. | |
| **H1.4** | **The most valuable discoveries and findings in the fields, their importance for the field** |
| - Clarification of the role of endothelin receptors in seizure development<br>- Identification of new therapeutic targets and biomarkers for early life seizures, identification of lead substances with anti-seizure activity.<br>- Clarification of the role of oxidative stress in the pathogenesis of epilepsy | |
| **H1.5** | **Contribution of the participation of the authors in large collaborations** |
| Not applicable here. | |

## Main criterion: 2. Societal relevance (H2.1-H2.5)

| H2.1 | Societal relevance of outputs and results pursuant to CAS and institute mission |
|---|---|
| Results that can lead to novel antiepileptic therapies have a very high societal relevance. Although it is primarily composed of basic scientists, the team intends to translate its outputs and results into clinical practice, for instance through interaction with clinicians and patient's organizations. This aim is in line with the mission of CAS and the Institute of Physiology. | |
| **H2.2** | **System functionality for knowledge transfer into practise, its usefulness for society. The impact of the team´s activity on proper practice in society in the area of social sciences and humanities** |
| As outlined above, the Team intends to translate its results into the clinical practice. In the report for this evaluation, it is claimed that some results were already introduced into the clinic, but no details were given. The team members are only marginally involved in cooperating with industrial partners, for instance in their search for novel therapeutics. | |
| **H2.3** | **Relation to practice** |
| A patent application was submitted for a novel antiepileptic agent. However, it is not entirely clear how this lead substance will be further developed and commercialized. | |
| **H2.4** | **Participation in AV21 strategy** |
| The team participates in "QUALITAS - Wellbeing in health and disease", a project of Strategy AV21 of the Czech Academy of Sciences. | |
| **H2.5** | **Cooperation with regions of the Czech Republic** |
| The team cooperates with several Czech institutes that can provide relevant contributions to its research program. | |

## Further criterion: 1. Position in international and national context (D1.1-D1.3)

| D1.1 | Comparison of the team with similar international and national institutes |
|---|---|
| The Team ranks among the leading national groups and is recognized in the international context. | |
| **D1.2** | **Scope and quality of international and national cooperation and the role of the team in such cooperation; engagement in broad international cooperation** |
| The Team very actively collaborates with 11 national Institutes and 14 international Institutes. All domestic collaborations but only 5 international collaborations led to joint publications.<br><br>In addition, the Team is a member of numerous consortia/networks in epilepsy research: the Epilepsy Research Centre Prague (EpiReC), a multidisciplinary epilepsy research centre involving preclinical and clinical researchers; the international project EPTRI, funded within the H2020-INFRADEV-01-2017 program; the ILAE/AES Joint Translational Task Force, an international group of epilepsy investigators from many countries and research organizations; the European Regional Development Fund-Project "PharmaBrain". | |

| D1.3 | Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards) |
|---|---|
| Team members serve on editorial boards of scientific journals and in grant evaluation committees. They participated in the organization of both national and international meetings and were often invited as speaker at international congresses. Five members of the team received scientific awards. | |

## Further criterion: 2. Vitality, sustainability and strategy (D2.1-D2.9)

| D2.1 | Direction in line with the perspective of the planned research directions |
|---|---|
| In the period from 2020-2024, the Team will continue research in the pathophysiological mechanisms involved in severe paediatric epilepsies and will continue to explore new non-pharmacological approaches to cure these disorders. The team members plan to formalize collaborations with industrial partners in order to develop new anti-seizure drugs for paediatric use. They will strengthen contact with clinicians and patients‘ organizations. It is recommended that a concrete concept for the involvement of external partners in the search for antiepileptic agents is developed. | |
| **D2.2** | **Assessment of the previous research objectives and their achievement** |
| The Team reached a large part of their research objectives set for the period 2015-2019. | |
| **D2.3** | **Assessment of implementation of recommendations from past evaluation** |
| As recommended in the past evaluation, the Team increased its interaction with clinicians. Compared to the previous evaluation, a higher proportion of publications involved PhD students as co-authors (from 31% to 56.2%). There has been an attempt to strengthen the synergies between the individual projects of the team, although this aspect needs to be further improved as some project still appears to deviate from the main research focus of the team. | |
| **D2.4** | **Success in receiving grants** |
| The Team was very successful in applying for national grants, a total of 15 proposals were accepted e.g. by the Czech Research Foundation. In addition, the team was partner in one big EU project (H2020-INFRADEV-01-2017 programme). | |
| **D2.5** | **Adequacy of instrumental equipment** |
| The instrumental equipment of the team appears good. | |
| **D2.6** | **Effectiveness of management** |
| Management efforts should be directed to increase the synergies between the individual projects of the team. | |
| **D2.7** | **Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth** |
| The age of the team is not well-balanced, with 11 members <35 and 7 > 60 (including 3 >70). | |
| **D2.8** | **Creating work-life balance conditions, assessment of approach towards possible gender issues** |
| There were no specific measures for work-life balance conditions and possible gender issues described by the team. | |

| D2.9 | Relation of the team with regard to the integration, development and sustainability of the research centre funded by the National Programme of Sustainability II. |
|---|---|
| Not applicable. | |

## Further criterion: 3. Cooperation with universities and participation in education (D3.1-D3.6)

| D3.1 | Scope of cooperation with universities on national and international level |
|---|---|
| The team has been involved in numerous research collaborations with national and international universities, which resulted in joint publications. The team cooperates with domestic universities in supervision and teaching of bachelor, master and Ph.D. students. | |
| **D3.2** | **Effectiveness of joint research centres** |
| The team is involved in the Epilepsy Research Centre Prague (EpiReC) and in the multicentric European Regional Development Fund-Projects "PharmaBrain". | |
| **D3.3** | **Success rate in supervision of PhD students** |
| In the period 2015 to 2019, 3 PhD students successfully defended their theses. | |
| **D3.4** | **Participation of PhD students in the outputs** |
| Compared to the previous evaluation, a higher proportion of publications involved PhD students as co-authors (from 31% to 56.2%). | |
| **D3.5** | **Participation of the team in master or bachelor studies** |
| In the period 2015 to 2019, 4 bachelor students and 16 Master students finished their thesis. | |
| **D3.6** | **Assessment of cooperation intensity with universities in the form of teaching** |
| Six members of the team gave a total of 31 seminars/lectures/courses at Czech universities. This activity was restricted to the education of bachelor and master students. | |

## Further criterion: 4. Outreach activities (D4.1-D4.3)

| D4.1 | Sufficiency of media strategy and activities in the area of research popularisation |
|---|---|
| Three team members participated to TV and radio programs. They were also involved in the Brain awareness week and in the International Epilepsy day. | |
| **D4.2** | **Publishing activities and its quality** |
| The team members authored several articles on internet and in various printed media. | |
| **D4.3** | **Participation in professional organisations in the area of research and development** |
| Not mentioned. | |

**Other comments of the commission:**

This is an active group with very good national/international collaborations. More efforts should be paid to increase the success rate in international fund raising, to publish the results of the research activities in high profile international journals and to strengthen the synergies between the individual projects carried out by the team members.

## 16. Laboratory of Computational Neuroscience

This laboratory is one of the smaller laboratories of the Institute of Physiology. It employs theoretical approaches for gaining a better understanding of how neuronal networks are established and how memory is encoded within neuronal structures. For that purpose, they utilize mathematical models for calculating neuronal activity and for modelling nerve growth as well as dendritic-axonal functional interactions underlying the establishment of neuronal circuits. These models are experimentally validated by collaborating laboratories since the Laboratory of Computational Neuroscience does not provide experimental infrastructures. They rather focus on applying their expertise in these collaborations, namely employing information theory, modelling stochastic processes and applying differential equations and statistics. The Laboratory of Computational Neuroscience works with a Supermicro SuperServer rack system for numerically intensive calculations. In addition, they own multiple licenses and use open source computational tools (Linux, R, ImageJ / Fiji, Python).

**Strengths:**

- The performance of the Laboratory of Computational Neuroscience has proven to be a key factor for the successful establishment of collaborations with excellent international laboratories in Japan, Denmark, Italy, France, the US and Switzerland.
- The contribution of the laboratory in collaborations is important, leading to publications where this group is often signed as first and/or corresponding author.
- The funding situation is comfortable and the hardware equipment is satisfactory.
- Despite a decreasing interest of the young generation in doing “hard sciences”, the laboratory has successfully recruited PhD students and postdocs in the past.

**Weaknesses:**

- The laboratory has recognized that recruiting young team members in the future will become increasingly difficult. This represents a general problem in the field of IT where it is very difficult for the academic sector to compete with industry in terms of offering attractive salaries and long-term career prospects.

**Opportunities:**

- By taking advantage of their past experience, the laboratory should approach national and international research centers working on neurobiology with projects that could be of interest for these institutions. Such an opportunity could also help to overcome national problems with funding of interdisciplinary research. Also the diverse research projects within the Institute of Physiology could logically serve as a source of funded collaborations.

**Threats:**

- Despite a funding situation that is described as good at present and that is largely independent of institutional funds, it has been recognized that the Czech Academy of Sciences is not strongly supporting interdisciplinary research. The 39 expert panels evaluate several important grant projects (https://gacr.cz/en/types-of-grant-projects/"), which, however, do not contain collaborative approaches. For a laboratory like Computational Neurobiology which does not possess its own experimental infrastructure, the lack of real interdisciplinary programs is a threat for the future.

## Main criterion: 1. Quality of results (H1.1-H1.5)

| H1.1 | Quality of selected outputs of Phase I |
|---|---|
| Eight out of the 41 publications during the period 2015-2019 were evaluated in phase I. Five of these were published in journals of the first quartile, including one in a journal, considered as top 10%.<br>However, numbers are not consistent between two files (Reports of the I phase IPHYS vs. Bibliometric parameters IPHYS for this team).<br>In the “Reports of the I phase IPHYS” file, the eight outputs are ranked as follows: 1, 1 and 6 in the first, second and third quartile, respectively.<br>Thus, no final conclusion on the quality of journals that could be addressed with the work of this team can be drawn. | |
| **H1.2** | **Contribution of workers on the outputs reached** |
| There is a very strong participation as corresponding authors in evaluated outputs. | |
| **H1.3** | **Quality of all outputs and results** |
| See H1.1 | |
| **H1.4** | **The most valuable discoveries and findings in the fields, their importance for the field** |
| The correlation of stimulus frequency with accuracy of neuronal encoding, exemplified by exposure of moths to pheromones is one of the more important discoveries of this team working with a team of collaborators based in Versailles, France (Levakova M, Kostal L, Monsempes C, Jacob V, Lucas P (2018) Moth olfactory receptor neurons adjust their encoding efficiency to temporal statistics of pheromone fluctuations, PLoS Computational Biology, 14, e1006586:).<br>The determination of how mechanical forces regulate axon fasciculation and neuronal network establishment is another important work that the laboratory has contributed to, in collaboration with a group based at Sorbonne Université in Paris, France.<br>(D. Smit, C. Fouquet, F. Pincet, M. Zapotocky, A. Trembleau: Axon tension regulates fasciculation/defasciculation through the control of axon shaft zippering, eLife 6:e19907 (2017)). | |
| **H1.5** | **Contribution of the participation of the authors in large collaborations** |
| The laboratory often contributes as corresponding or co-corresponding author in the phase I-evaluated publications that were achieved by participating in international collaborations. All of them involved cooperation between a small number (less than 5) laboratories.<br>It is mentioned that the laboratory participated in a Czech Science Foundation Project of excellence in the field of neuroscience (Ref. No. P304/12/G069), which yielded eight publications. | |

## Main criterion: 2. Societal relevance (H2.1-H2.5)

| H2.1 | Societal relevance of outputs and results pursuant to CAS and institute mission |
|---|---|
| Participation in the “IPHYS Open day” and the “Brain awareness week”. | |

| H2.2 | System functionality for knowledge transfer into practise, its usefulness for society. The impact of the team´s activity on proper practice in society in the area of social sciences and humanities |
|---|---|
| Not applicable. | |
| **H1.3** | **Relation to practice** |
| Not applicable. | |

## Further criterion: 1. Position in international and national context (D1.1-D1.3)

| D1.1 | Comparison of the team with similar international and national institutes |
|---|---|
| The laboratory is well positioned in an international context, as manifested by the successful completion of projects in cooperation with laboratories from all around the world. | |
| **D1.2** | **Scope and quality of international and national cooperation and the role of the team in such cooperation; engagement in broad international cooperation** |
| Most of the evaluated outputs concern bilateral cooperation in between this laboratory and experimental laboratories within Europe, North America and Japan. The Laboratory of Computational Neurosciences has made important contributions to these collaborations. | |
| **D1.3** | **Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)** |
| The laboratory participated in the organization of conferences and colloquia in Germany, Italy and the US. It is also involved in the Organization for Computational Neurosciences (OCNS) and participated in the local organization of its 2015 conference in Prague.<br>In addition, they also co-organize regular workshops of the OCNS and contribute to the organization of meetings hosted by other institutions. | |

## Further criterion: 2. Vitality, sustainability and strategy (D2.1-D2.9)

| D2.1 | Direction in line with the perspective of the planned research directions |
|---|---|
| The planned research is strongly based on the most successful projects from the past. They aim to follow-up their studies on neuronal mechanics and the establishment of neuronal networks. In addition, they plan to continue their work on how sensory information is integrated by olfactory systems via stochastic processes. Moreover, the team plans to elaborate a coherent perspective on neuronal information processing. | |
| **D2.2** | **Assessment of the previous research objectives and their achievement** |
| The research activities of this Team were positively evaluated in the previous evaluation (2010-2014). Since that period, the existing international collaborations have been further strengthened as evidenced by publications in high ranking journals (PLoS Comput Biol., eLife, J Roy Soc Interface etc.). | |
| **D2.3** | **Assessment of implementation of recommendations from past evaluation** |
| Many of the past recommendations were taken into consideration with respect to fostering local, national and international cooperation. Since the weaknesses and threats observed in this evaluation still concern points that were raised during the last evaluation, it is | |

| | |
|---|---|
| recognized that the team has made an important effort in coping with weaknesses and threats, but that it needs to continue trying to overcome the problems of acquisition of grants from the Czech Academy of Sciences and if this is not possible, by maintaining and establishing international collaborations that may be funded. | |
| **D2.4** | **Success in receiving grants** |
| The current situation with respect to grants provided from sources outside the CAS seems to be satisfactory. | |
| **D2.5** | **Adequacy of instrumental equipment** |
| Good. | |
| **D2.6** | **Effectiveness of management** |
| No problems were discovered by this panel. | |
| **D2.7** | **Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth** |
| The laboratory expressed their concerns about being able to attract young scientists at the doctoral level to the laboratory. As noted previously, this may not be a problem linked with failings of this Team in particular. This may well reflect a general problem in the field of IT where it is very difficult for the academic sector to compete with industry in terms of offering attractive salaries and long-term career prospects. | |
| **D2.8** | **Creating work-life balance conditions, assessment of approach towards possible gender issues** |
| No problems were detected on this issue. | |
| **D2.9** | **Relation of the team with regard to the integration, development and sustainability of the research centre funded by the National Programme of Sustainability II.** |
| Not applicable. | |

## Further criterion: 3. Cooperation with universities and participation in education (D3.1-D3.6)

| | |
|---|---|
| **D3.1** | **Scope of cooperation with universities on national and international level** |
| As explained above, the laboratory is very well integrated into cooperations, mostly at the international level.<br>It has declared that it does not participate in joint research centres at the national level. | |
| **D3.2** | **Effectiveness of joint research centres** |
| Not applicable. | |
| **D3.3** | **Success rate in supervision of PhD students** |
| No problems were detected at this level. | |
| **D3.4** | **Participation of PhD students in the outputs** |
| The PhD students participate in publications and two of them are first authors on major publications in PLoS Computational Biology and eLife. | |
| **D3.5** | **Participation of the team in master or bachelor studies** |

| | |
|---|---|
| During the evaluation period, this Team has hosted the theses for 3 Bachelor students, 4 Masters students and 5 Doctoral students. | |
| **D3.6** | **Assessment of cooperation intensity with universities in the form of teaching** |
| Based on its own expertise in the fields of mathematical modelling and biophysics, this team has provided Lectures in “Mathematical modelling in biology” and “Selected topics in mathematical modelling”(Masaryk University, Brno) as well as “Biophysics for MDs” and “Biophysics for dentists” (Charles University, 1st faculty of Medicine). | |

## Further criterion: 4. Outreach activities (D4.1-D4.3)

| | |
|---|---|
| **D4.1** | **Sufficiency of media strategy and activities in the area of research popularisation** |
| Besides participation at open days of the Institute, no particular outreach activity was reported. | |
| **D4.2** | **Publishing activities and its quality** |
| Not applicable. | |
| **D4.3** | **Participation in professional organisations in the area of research and development** |
| Not applicable. | |

**Other comments of the commission:**

## 17. Laboratory of Molecular Neurobiology

The Laboratory of Neurobiology was established seven years ago by a young group leader. Its research focuses on the identification of genes, molecular mechanism and signalling cascades that regulate neuron polarization, axonal/dendritic guidance and synapse refinement in the developing nervous system. The team has contributed important results on the collapsing response mediator proteins (CRMPs) and in particular CRMP2. They identified a second isoform for this protein, which is modified by phosphorylation and stabilized by the prolyl-isomerase PIN1. They furthermore demonstrated that CRMP2 not only mediates Sema3A-dependent axon guidance, but also Sema3F-dependent axon and dendritic spine pruning. In a collaborative effort, the team also contributed to the finding that polyglutamylation of tubulin is associated with neurodegenerative diseases.
The presentation of the laboratory's activity was perfectly organized around their scientific achievements, allowing us to fully appreciate the great work that was accomplished by this laboratory since 2014.

**Strengths:**

- This young laboratory (created in 2014) has been able to establish a considerable number of cutting-edge techniques in molecular biology, mouse genetics and microscopy. Some of these techniques are unique in the Czech Republic, enabling the team to be attractive not only as national collaborator, but also internationally.
- The team has created an important set of reagents and model organisms, notably the CRMP2 KO mice and the isoform-specific KO.
- The laboratory was very successful with obtaining national and international research grants, contributing to a stable financial situation for the next couple of years and enabling the team to solidly plan the future.
- The team is composed of young and dynamic members.

**Weaknesses:**

- The laboratory reports difficulties with recruiting postdocs due to a lack of such positions in Czech funding schemes.

**Opportunities:**

- The team leader has started to invest into the establishment of a PhD program. He should be encouraged to continue these activities, knowing that PhD students are the persons that are generally characterized by the most innovative ideas and the strongest impact on research of laboratories. This activity of the Laboratory of Neurobiology represents a great opportunity to continue developing its innovative strengths in the best possible way in the future.

**Threats:**

- At present no immediate threats could be identified for this young and dynamic team.

### Main criterion: 1. Quality of results (H1.1-H1.5)

| H1.1 | Quality of selected outputs of Phase I |
|---|---|
| Three publications were evaluated for the period 2015-2019. All three were published in very good / excellent journals. The lab head Dr. Balastik is corresponding author on two of the publications and second last author on the third. | |
| **H1.2** | **Contribution of workers on the outputs reached** |

The Laboratory of Neurobiology was leading one of the three studies, signed one paper as co-author and was represented by today's lab head as first and corresponding author on the third publication, which was still realized in part during his postdoc in Boston.

Taking into account that the lab was established in 2014 and still very small in 2015 and 2016, the contribution of the lab to publications is reasonable.

It should be pointed out that this laboratory apparently realizes what is often asked for but seldom evaluated in review processes, notably going for important discoveries rather than satisfying the demands for high numbers of publications.

| H1.3 | Quality of all outputs and results |
|---|---|

The presentation during the visit and that in the documents sent to evaluators demonstrates that this laboratory aims at realizing research which importantly contributes to scientific progress. The recently signed EMBO Reports paper shows that this small and dynamic group is able to do so.

Even if the number of publications is not very high, the quality of the research published clearly more than justifies this choice.

| H1.4 | The most valuable discoveries and findings in the fields, their importance for the field |
|---|---|

The major discoveries of the Laboratory of Neurobiology concern certainly the functions of the prolyl-isomerase Pin1 in stabilizing the CRMP2A isoform, which in turn promotes axon growth. Moreover, their research demonstrates the influence of SEM3A on regulating axon growth and collapse. They found that Sema3A activates the cyclin-dependent kinase 5 (CDK5) which phosphorylates CRMP2, leading to its destruction and thereby resulting in growth cone collapse. These results were published in Cell Reports in 2015 and EMBO Reports in 2019.

| H1.5 | Contribution of the participation of the authors in large collaborations |
|---|---|

In 2017 the team participated on of the large national program of the Czech Academy of Sciences - Strategy AV21: Research Programme: Qualitas - Wellbeing in Health and Disease: they analysed the prevalence of anti-CRMP antibodies in mothers relative to development of autism.

## Main criterion: 2. Societal relevance (H2.1-H2.5)

| H2.1 | Societal relevance of outputs and results pursuant to CAS and institute mission |
|---|---|

Not applicable.

| H2.2 | System functionality for knowledge transfer into practise, its usefulness for society. The impact of the team´s activity on proper practice in society in the area of social sciences and humanities |
|---|---|

Not applicable.

| H1.3 | Relation to practice |
|---|---|

Not applicable.

## Further criterion: 1. Position in international and national context (D1.1-D1.3)

| D1.1 | Comparison of the team with similar international and national institutes |
|---|---|
| This team has only recently been established and is in a growing phase. It is certainly already well established in their central topic and it may become an important laboratory in the field of neurobiology in the Czech Republic. | |
| **D1.2** | **Scope and quality of international and national cooperation and the role of the team in such cooperation; engagement in broad international cooperation** |
| The laboratory has listed an impressive number of national and international collaborators.<br>- Department of Paediatric Psychiatry, 2nd Faculty of Medicine, Charles University in Prague and Motol University Hospital (Asist. Prof. Iva Dudova, M.D.)<br>- Laboratory of Hematooncology, Institute of Molecular Genetics of the CAS, Prague (Meritxell Alberich Jorda, Ph.D.)<br>- Laboratory of Neurophysiology of the Memory, Institute of Physiology of the CAS, Prague (Prof. Ales Stuchlik)<br>- University of Tel Aviv, Israel (Prof. Eran Perlson, MD, Ph.D.)<br>- Institute Curie, Orsay, Paris (Carsten Janke, Ph.D.)<br>- University of Heidelberg, Germany (Gonzalo Alvarez-Bolado, MD. Ph.D.)<br>- Department of Hematology/Oncology, Beth Israel Deaconess Medical Center, Boston, USA (Prof. Kun Ping Lu, MD, Ph.D.)<br>Most of these cooperations already lead to the publications that were evaluated. | |
| **D1.3** | **Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)** |
| Dr. Balastik participated in the organization of several workshops for PhD students.<br>He was also invited to give lectures in the Czech Republic and abroad. | |

## Further criterion: 2. Vitality, sustainability and strategy (D2.1-D2.9)

| D2.1 | Direction in line with the perspective of the planned research directions |
|---|---|
| The research plan for the next five years is the continuation of the work the laboratory invested in during the past couple of years. Three objectives will be pursued. (1) The role of CRMP2A and 2B isoforms in axonal growth and collapse, taking advantage of the techniques that were established in the past. (2) The roles of transplacental transfer of anti-CRMP1 and 2 autoantibodies in the development of autism. (3) The interplay of tubulin modifications (tyrosination, glutamylation, acetylation) and CRMP2 in microtubule polymerization and depolymerization.<br>The goals are clearly defined, the techniques have been acquired and the dynamism of the group will lead the projects to success. | |
| **D2.2** | **Assessment of the previous research objectives and their achievement** |
| The lab was established after the last evaluation. | |
| **D2.3** | **Assessment of implementation of recommendations from past evaluation** |
| The lab was established after the last evaluation. | |

| D2.4 | Success in receiving grants |
|---|---|
| Excellent. Funding is secured for the upcoming period. | |
| **D2.5** | **Adequacy of instrumental equipment** |
| No problems were reported in this regard. | |
| **D2.6** | **Effectiveness of management** |
| The presentations in form of the written report and the discussion over zoom gave the impression that the laboratory is very well organized. | |
| **D2.7** | **Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth** |
| The team is composed of very young scientists in their final educational phase as doctoral students. This is a strength of the lab, since new ideas come from our youngest colleagues. However, the lab head also expressed his wish to bind some more advanced scientists to his laboratory and described difficulties with obtaining funding for postdocs. As a result, it seems to be more of a problem to recruit experienced scientists into the lab and therefore no experience has been gained so far on the ability to keep these scientists in the team. | |
| **D2.8** | **Creating work-life balance conditions, assessment of approach towards possible gender issues** |
| No gender issues were discovered during the evaluation. | |
| **D2.9** | **Relation of the team with regard to the integration, development and sustainability of the research centre funded by the National Programme of Sustainability II.** |
| Not applicable. | |

## Further criterion: 3. Cooperation with universities and participation in education (D3.1-D3.6)

| D3.1 | Scope of cooperation with universities on national and international level |
|---|---|
| As described above, the laboratory has several vivid cooperations with national and international universities. | |
| **D3.2** | **Effectiveness of joint research centres** |
| The laboratory has not shown any involvement in national research centres. | |
| **D3.3** | **Success rate in supervision of PhD students** |
| The first PhD student of the laboratory had his viva in April 2020. The laboratory is composed of PhD students and the lab head. As a consequence, all parties involved have basic interest in making the PhD studies a success. | |
| **D3.4** | **Participation of PhD students in the outputs** |
| All published studies were done by PhD students of the laboratory. | |
| **D3.5** | **Participation of the team in master or bachelor studies** |
| Supervision of one bachelor and one master student were described. | |

| D3.6 | Assessment of cooperation intensity with universities in the form of teaching |
|---|---|
| The team leader does not participate in teaching at universities.<br>He reported, however, to be actively involved in the establishment of a PhD program. This activity should be supported without any hesitation by the Institute of Physiology and by the university. This activity could be a starting point to create a PhD program similar to those at Max Planck Institute, EMBL or at IGBMC. This activity will pay off in terms of recruiting the best students to the institute. And this young group leader is in an ideal position to make it work. | |

## Further criterion: 4. Outreach activities (D4.1-D4.3)

| D4.1 | Sufficiency of media strategy and activities in the area of research popularisation |
|---|---|
| The group participates in outreach activities such as popularization of research topics, open laboratory activities or blogging. | |
| **D4.2** | **Publishing activities and its quality** |
| Not applicable. | |
| **D4.3** | **Participation in professional organisations in the area of research and development** |
| Not applicable. | |

**Other comments of the commission:**

## 18. Laboratory of Genetics of Model Diseases

**Strengths:**

- High scientific output (51 articles listed in the report)
- Unique animal model (spontaneously hypertensive rats)
- Translation potential of the findings (in regards to salt sensitive hypertension)
- Extensive collaborative network (national, within as well as outside the institute, and international)

**Weaknesses:**

- Limited funding
- Small size of the group whose average age is rather old (4.5 researchers; no students listed in 2019)
- Decreasing productivity of the group (2 entries on Pubmed in 2020)
- Decreasing opportunities of the unique animal model which currently doesn't offer the level of sophisticated genetic analysis possible with the mouse.
- Current grant support (Academic Premium) ends in 2021
- Only 2 grant applications submitted in 2020

**Opportunities:**

None identified besides continuing the traditional studies.

**Threats:**

- The mouse model keeps gaining strength relative to the rat model; increasing use of larger animals (e.g. pigs, dogs…); lack of expertise in house to take full advantage of the model (i.e. genome editing)

### Main criterion: 1. Quality of results (H1.1-H1.5)

| H1.1 | Quality of selected outputs of Phase I |
|---|---|
| The output quality has been excellent but seems to be slowing down substantially in recent years. | |
| **H1.2** | **Contribution of workers on the outputs reached** |
| The contribution of the workers in the output is excellent, many papers contain members of the team at leading positions. | |
| **H1.3** | **Quality of all outputs and results** |
| The output quality and results are mostly excellent. | |
| **H1.4** | **The most valuable discoveries and findings in the fields, their importance for the field** |
| The most valuable discoveries in the field have been mostly excellent. | |
| **H1.5** | **Contribution of the participation of the authors in large collaborations** |
| The team is involved in many collaborations (national, within as well as outside the institute, and international) and their contribution is excellent. | |

## Main criterion: 2. Societal relevance (H2.1-H2.5)

| H2.1 | Societal relevance of outputs and results pursuant to CAS and institute mission |
|---|---|
| The societal output has high potential which could be translated into patents. Furthermore, given the high incidence of high blood pressure-related pathologies, particularly in the western world, knowledge gained on the mechanisms underlying elevated blood pressure could have great biomedical importance. | |
| **H2.2** | **System functionality for knowledge transfer into practise, its usefulness for society. The impact of the team´s activity on proper practice in society in the area of social sciences and humanities** |
| No patents mentioned in the report or in the presentation. | |
| **H1.3** | **Relation to practice** |
| Not applicable. | |

## Further criterion: 1. Position in international and national context (D1.1-D1.3)

| D1.1 | Comparison of the team with similar international and national institutes |
|---|---|
| The team has contributed greatly to the rat physiology and genetics fields; the contribution seems to have diminished in the past few years. | |
| **D1.2** | **Scope and quality of international and national cooperation and the role of the team in such cooperation; engagement in broad international cooperation** |
| The team remains highly engaged in national and international collaborations. | |
| **D1.3** | **Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)** |
| The head of the laboratory was invited to give one lecture at an international meeting. | |

## Further criterion: 2. Vitality, sustainability and strategy (D2.1-D2.9)

| D2.1 | Direction in line with the perspective of the planned research directions |
|---|---|
| The research planned is logical and takes advantage of the model and the expertise of the group. | |
| **D2.2** | **Assessment of the previous research objectives and their achievement** |
| The research objectives have been reached. | |
| **D2.3** | **Assessment of implementation of recommendations from past evaluation** |
| They tried to implement the recommendation of the last evaluation by increasing their participation in outreach activities; trying to attract students has been less successful so far. | |
| **D2.4** | **Success in receiving grants** |

| | |
|---|---|
| They have been successful in attracting several grants (national) including a prestigious Academic Premium grant. | |
| **D2.5** | **Adequacy of instrumental equipment** |
| The equipment appears to be excellent. Between 2019 and 2023 the animal facility is undergoing major refurbishment which should significantly improve the animal-based experiments. | |
| **D2.6** | **Effectiveness of management** |
| The management appears to be effective. | |
| **D2.7** | **Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth** |
| Appears good. | |
| **D2.8** | **Creating work-life balance conditions, assessment of approach towards possible gender issues** |
| This point was not addressed. | |
| **D2.9** | **Relation of the team with regard to the integration, development and sustainability of the research centre funded by the National Programme of Sustainability II.** |
| Not applicable. | |

## Further criterion: 3. Cooperation with universities and participation in education (D3.1-D3.6)

| | |
|---|---|
| **D3.1** | **Scope of cooperation with universities on national and international level** |
| The team remains highly engaged in national and international collaborations. | |
| **D3.2** | **Effectiveness of joint research centres** |
| Not applicable. | |
| **D3.3** | **Success rate in supervision of PhD students** |
| One PhD thesis was defended; no students currently in the laboratory. | |
| **D3.4** | **Participation of PhD students in the outputs** |
| Not existing. | |
| **D3.5** | **Participation of the team in master or bachelor studies** |
| Some teaching by two members of the group. | |
| **D3.6** | **Assessment of cooperation intensity with universities in the form of teaching** |
| Two team members are participating in teaching in two universities in Prague. | |

## Further criterion: 4. Outreach activities (D4.1-D4.3)

| D4.1 | Sufficiency of media strategy and activities in the area of research popularisation |
|---|---|
| Lectures were given during the Days of Open Doors. | |
| **D4.2** | **Publishing activities and its quality** |
| One popular science publication was mentioned. | |
| **D4.3** | **Participation in professional organisations in the area of research and development** |
| The leader and deputy are involved in several boards and committees. | |

**Other comments of the commission:**

# 19. Laboratory of Biomathematics

**Strengths:**

- A particular strength of the team is its expertise in bioimaging and its techniques, including fluorescence microscopy, and its expertise in image analysis.

**Weaknesses:**

- The team consists of two groups (Bioimaging and Image Analysis (BIA) and Biochemistry of Membrane Receptors (BMR). The projects of these groups are very diverse and only loosely connected. It is unclear, why these groups form a team, or what added value this structure can bring.
- Each group pursues several heterogenous projects. It seems questionable, whether they have the personnel for such a broad research program. The team may lack the critical mass to succeed in a competitive field.
- Few graduate students were trained by the team, only 1 PhD student defended his/her thesis.

**Opportunities:**

- The combination of bioimaging and image analysis with biochemistry of membrane receptors could be a powerful strategy, as was shown by other groups in the field.

**Threats:**

- The major threat is a further decrease in competitiveness of the team, caused by its fragmented research program.

## Main criterion: 1. Quality of results (H1.1-H1.5)

| H1.1 | Quality of selected outputs of Phase I |
|---|---|
| The commission considers the quality of selected outputs of Phase I good, in part very good. 50% of the selected papers were published in the top 60% of journals. | |
| **H1.2** | **Contribution of workers on the outputs reached** |
| The scientists of the team were leading authors of the publications or provided essential experimental data. | |
| **H1.3** | **Quality of all outputs and results** |
| The team published a total of 62 papers in journals with impact factor within the evaluation period. The commission considers the quality of these outputs good, in part very good. However, 51% of all papers were published in low ranking journals (quartile 3 and 4), only 8% in high quality journals (quartile 1). Poor citation of the outputs. | |
| **H1.4** | **The most valuable discoveries and findings in the fields, their importance for the field** |
| According to the report of the team, the most important results were obtained in<br>• Studies of G-protein coupled receptors (GPCR) by Fluorescence Recovery after Photobleaching (FRAP),<br>• 3D imaging of structures/tissues such as islets of Langerhans or heart trabecula,<br>• Investigation of the differential expression of protein after morphine withdrawal. | |
| **H1.5** | **Contribution of the participation of the authors in large collaborations** |
| The team collaborates with several partners within the Czech Bioimaging Infrastructure. | |

## Main criterion: 2. Societal relevance (H2.1-H2.5)

| H2.1 | Societal relevance of outputs and results pursuant to CAS and institute mission |
|---|---|
| The core competence and research focus of the team is on bioimaging and image analysis, a powerful technology which is of high relevance for biomedical research. In that area, the team has published numerous papers that were recognized by the scientific community.<br>Thus, the commission concludes that these outputs are of societal relevance according to CAS and institute mission. | |
| **H2.2** | **System functionality for knowledge transfer into practise, its usefulness for society. The impact of the team´s activity on proper practice in society in the area of social sciences and humanities** |
| The commission received no information as to these criteria. | |
| **H2.3** | **Relation to practice** |
| The commission received no information as to this criterion. | |
| **H2.4** | **Participation in AV21 strategy** |
| The commission received no information as to this criterion. | |
| **H2.5** | **Cooperation with regions of the Czech Republic** |
| The commission received no information as to this criterion. | |

## Further criterion: 1. Position in international and national context (D1.1-D1.3)

| D1.1 | Comparison of the team with similar international and national institutes |
|---|---|
| The commission concludes that the team Biomathematics is recognized in the national and international context as one of the leading Czech groups in the area of Bio-Imaging. | |
| **D1.2** | **Scope and quality of international and national cooperation and the role of the team in such cooperation; engagement in broad international cooperation** |
| In its report, the team lists international collaborations with institutes in Ljubljana, Madrid, Barcelona and Tucson, USA, that led to joint publications. | |
| **D1.3** | **Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)** |
| Members of the team organized or co-organized 8 national workshops. One scientist received an invitation for a lecture (national). Lucie Kubínová, PhD. is president of the International Society for Stereology & Image Analysis since 2016. In 2015, she received the Prize of Czechoslovak Microscopy Society. | |

## Further criterion: 2. Vitality, sustainability and strategy (D2.1-D2.9)

| D2.1 | Direction in line with the perspective of the planned research directions |
|---|---|
| The research plan of the team and its pursuance is in line with the mission and aims of CAS and the Institute of Physiology. | |
| **D2.2** | **Assessment of the previous research objectives and their achievement** |
| The commission concludes that the previous research objectives were overall convincing. Most, although not all, objectives were achieved. | |
| **D2.3** | **Assessment of implementation of recommendations from past evaluation** |
| The team has analysed the recommendations of the previous evaluation, and has implemented measures to comply with some of them. However, in the previous evaluation some of the research aims e.g. molecular function of membrane receptors, opioid receptors, effects of lipids on receptor function, were criticized as lacking novelty. The commission failed to identify a convincing strategy to enhance novelty and originality. | |
| **D2.4** | **Success in receiving grants** |
| The team successfully applied for national grants from the Czech Science Foundation and the Czech-Bioimaging Infrastructure. The team listed 1 international grant (MEYS Inter Action, USA). | |
| **D2.5** | **Adequacy of instrumental equipment** |
| The equipment of the team for Bio-Imaging is excellent. | |
| **D2.6** | **Effectiveness of management** |
| The commission obtained no information as to this point. | |
| **D2.7** | **Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth** |
| The commission obtained no information as to this point. | |
| **D2.8** | **Creating work-life balance conditions, assessment of approach towards possible gender issues** |
| The commission obtained no information as to this point. | |
| **D2.9** | **Relation of the team with regard to the integration, development and sustainability of the research centre funded by the National Programme of Sustainability II.** |
| The commission obtained no information as to this point. | |

## Further criterion: 3. Cooperation with universities and participation in education (D3.1-D3.6)

| D3.1 | Scope of cooperation with universities on national and international level |
|---|---|
| The microscopy facilities of the team (4 confocal and multiphoton microscopes, 2 optical projection tomography scanners) are part of the Czech-Bioimaging infrastructure. | |
| **D3.2** | **Effectiveness of joint research centres** |

| | |
|---|---|
| Collaborative projects taking advantage of bioimaging methods are carried out with partners from the universities Charles University, Masaryk University, Brno University of Technology and Palacky University. | |
| **D3.3** | **Success rate in supervision of PhD students** |
| One PhD student successfully defended his thesis within the evaluation period. | |
| **D3.4** | **Participation of PhD students in the outputs** |
| Five students (Bachelor, Master, PhD) participated in the research leading to publications. | |
| **D3.5** | **Participation of the team in master or bachelor studies** |
| Members of the team supervised bachelor (1 thesis defended) and master studies (one thesis defended). | |
| **D3.6** | **Assessment of cooperation intensity with universities in the form of teaching** |
| Two senior scientists of the team participated in teaching (7 lectures at Charles University, Prague). The team/department organized or co-organized 13 courses supported by the Czech-Bioimaging infrastructure. | |

## Further criterion: 4. Outreach activities (D4.1-D4.3)

| | |
|---|---|
| **D4.1** | **Sufficiency of media strategy and activities in the area of research popularisation** |
| Members of the team presented their work at the 2015 Science Fair. | |
| **D4.2** | **Publishing activities and its quality** |
| The commission obtained no information as to this point. | |
| **D4.3** | **Participation in professional organisations in the area of research and development** |
| The commission obtained no information as to this point. | |

**Other comments of the commission:**

# 20. Laboratory of Mitochondrial Physiology

**Strengths:**
- well defined research topics
- strong basic research with interesting potential applications in medicine
- well established international research collaborations
- well established repertoire of modern scientific methods
- highly qualified team members with international experience
- balanced age distribution of the team members
- continuous successful acquisition of grants

**Weaknesses:**
- old animal facility
- limited availability of core facilities
- low number of employed students
- limited cooperation with universities

**Opportunities:**
- new animal facility under construction
- future existence of a graduate school as a chance to involve more students in research
- well elaborated activity plan for the next period
- continuous engagement in outreach activities in order to stimulate awareness for science in the general public and in politics

**Threats:**
- in general, problematic, hardly competitive salaries of scientific staff
- low level of cooperation with universities, accompanied by low number of students available for research

## Main criterion: 1. Quality of results (H1.1-H1.5)

| H1.1 | Quality of selected outputs of Phase I |
|---|---|
| Excellent output of papers mainly in quality level 2 and 3, with few papers also in the highest quality level 1, however, with a moderate proportion of reprint authors, very close to the average distribution at the institute level. | |
| **H1.2** | **Contribution of workers on the outputs reached** |
| The contribution of the scientists to the outputs reached was generally high, for about 1/3 of the evaluated outputs the share of the team was 100 %, about 2/3 of the outputs represent results of national and international collaborations, with significant contributions of the team members. Ph.D. students participated in 10 out of 46 outputs. | |
| **H1.3** | **Quality of all outputs and results** |
| Almost all outputs were published in journals with impact factor, indicating the generally high scientific quality of the results. | |
| **H1.4** | **The most valuable discoveries and findings in the fields, their importance for the field** |
| The focus of the team was on redox signalling and mitochondrial ultra-morphology in pancreatic cells as well as on selected metabolic processes in cancer cells. The most valuable findings include the redox regulation of insulin secretion as well as the link | |

| |
|---|
| between cristae structure and function, contributing to the understanding of the physiology of pancreatic beta cells and thus to diabetology. |

| H1.5 | Contribution of the participation of the authors in large collaborations |
|---|---|
| Not applicable. | |

## Main criterion: 2. Societal relevance (H2.1-H2.5)

| H2.1 | Societal relevance of outputs and results pursuant to CAS and institute mission |
|---|---|
| Although the main focus of the team is in basic research, the scientific outputs have potential relevance for understanding disease mechanisms in diabetology. Thus, the results might contribute to new therapeutic approaches.<br>Team members contribute to scientific community services like Editorial Boards and served in a scientific council of the Czech Science Foundation and in the Board of Directors of BIOCEV. | |
| **H2.2** | **System functionality for knowledge transfer into practise, its usefulness for society. The impact of the team´s activity on proper practice in society in the area of social sciences and humanities** |
| In addition to basic research, the team also contributes to translational research at a moderate level. Two patents have been filed in the field of photodynamic tumour therapy. Due to the mission of the institute knowledge transfer into practice there would probably be further potential contributing to knowledge transfer. | |
| **H2.3** | **Relation to practice** |
| See the comments above. | |
| **H2.4** | **Participation in AV21 strategy** |
| Research program 10: To prepare more selective biologically active compounds for modern medicine; to elucidate mechanisms governing the self-organization of macromolecules into supramolecular structures and controlling of their interactions with target molecules in living cells and tissues.<br>Research program 7: To develop innovative therapies to prevent and treat diseases of modern civilization. | |
| **H2.5** | **Cooperation with regions of the Czech Republic** |
| Prague area and Krč campus. | |

## Further criterion: 1. Position in international and national context (D1.1-D1.3)

| D1.1 | Comparison of the team with similar international and national institutes |
|---|---|
| Based on the excellent research output, the team is internationally competitive. | |
| **D1.2** | **Scope and quality of international and national cooperation and the role of the team in such cooperation; engagement in broad international cooperation** |

| |
|---|
| The team is a strong record in cooperating at the national and international level, with strong interactions in particular with well-known institutions in the USA and Germany as well as in Austria and Hungary. These collaborations are well documented with scientific publications, with important and significant contributions of team members. Most of the international collaborations are bilateral. |

| D1.3 | Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards) |
|---|---|
| Activities of team members in Editorial Boards and as Guest Editors in special issues of journals. | |

## Further criterion: 2. Vitality, sustainability and strategy (D2.1-D2.9)

| D2.1 | Direction in line with the perspective of the planned research directions |
|---|---|
| The planned research directions are well based on the previous output and are in line with the mission of the institute. The application of cutting edge technologies like super-resolution microscopy and sophisticated mathematical approaches for quantitative data evaluation offer novel methodological strategies towards new scientific insights. | |
| **D2.2** | **Assessment of the previous research objectives and their achievement** |
| Previous research objectives were well defined, of relevance for basic research as well as of potential clinical relevance. There were some constraints in achieving some of the research goals, caused in part by limited funding sources and insufficient availability of animal facilities. Nevertheless, the achievements were convincing. | |
| **D2.3** | **Assessment of implementation of recommendations from past evaluation** |
| Most of the recommendations have been successfully implemented, however, the team is still fighting with the goals of increasing both the quantity and quality of papers. | |
| **D2.4** | **Success in receiving grants** |
| There was a continuous availability of grants during the entire evaluation period. However, there seems to be a shortage of grants available for funding of PhD students. | |
| **D2.5** | **Adequacy of instrumental equipment** |
| According to the written report, a part of the instrumentation and in particular the animal facility seems to be outdated, upgrading of computers seems to be a problem due to the policy of the Czech grant agencies. On the other hand, new major equipment and services were established recently and a new central animal facility of the institute is currently under construction. | |
| **D2.6** | **Effectiveness of management** |
| The management of the team seems to be coherent and effective. | |
| **D2.7** | **Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth** |
| There is a well-balanced age distribution within the team; an important policy of the department head is the integration of the team members into a larger team, which is not a simple task with regard to the policy of the CZ grant agencies. | |
| **D2.8** | **Creating work-life balance conditions, assessment of approach towards possible gender issues** |

| |
|---|
| There seems to be a well-balanced ration among male and female scientists in the team, which seems to be supported by the HR policy of the department. |

| D2.9 | Relation of the team with regard to the integration, development and sustainability of the research centre funded by the National Programme of Sustainability II. |
|---|---|
| Not applicable. | |

## Further criterion: 3. Cooperation with universities and participation in education (D3.1-D3.6)

| D3.1 | Scope of cooperation with universities on national and international level |
|---|---|
| The department participates in the National programme of the EU project BIOCEV. Students from the department defended 3 Bachelor, 5 Masters and 2 Doctoral theses during the evaluation period. However, with respect to the number of scientists at the department there seems to be room for improvement in the number of supervised Bachelor-, Masters and Doctoral theses. | |
| **D3.2** | **Effectiveness of joint research centres** |
| Not applicable. | |
| **D3.3** | **Success rate in supervision of PhD students** |
| According to the outputs, the quality in supervising PhD students is high; however, the number of supervised PhD students is quite moderate. | |
| **D3.4** | **Participation of PhD students in the outputs** |
| PhD students contributed to about 10 (out of 46) publications during the evaluation period. The development of a graduate school would be helpful for a higher involvement of PhD students in research activities. | |
| **D3.5** | **Participation of the team in master or bachelor studies** |
| With 3 Bachelor and 5 Masters students the participation in master and bachelor studies is moderate and could be further developed. | |
| **D3.6** | **Assessment of cooperation intensity with universities in the form of teaching** |
| According to the numbers of students given above the cooperation intensity with universities has significant room for improvement. So far, the low number of students might mainly be a result of inappropriate funding for students. | |

## Further criterion: 4. Outreach activities (D4.1-D4.3)

| D4.1 | Sufficiency of media strategy and activities in the area of research popularisation |
|---|---|
| Outreach activities have not been mentioned in the report of the Laboratory. | |
| **D4.2** | **Publishing activities and its quality** |
| Not applicable. | |

| D4.3 | Participation in professional organisations in the area of research and development |
|---|---|
| The Head of the Laboratory served as member of a scientific council and in an Umbrella committee of the CZ Science Foundation. | |

**Other comments of the commission:**

## 21. Laboratory of Developmental Cardiology

**Strengths:**
Very well-established team with a long history of past achievements. One of the few teams representing the „heart“ angle of the scientific direction of the institute.

**Weaknesses:**
Overall good number of solid but not very high-ranking publications.

**Opportunities:**
The recent change in leadership has the opportunity to enhance international visibility and modernise the research field to become world-leading again.

**Threats:**
The research plan so far does not represent the opportunity outlined above and there is a clear threat that the team relies on past achievements and methodology.

### Main criterion: 1. Quality of results (H1.1-H1.5)

| H1.1 | Quality of selected outputs of Phase I |
|---|---|
| Unfortunately, none of the outputs of Phase I are considered world-leading and only a relatively small number are internationally excellent. Furthermore, the number of citations is low. Overall, the team is one of the weakest performing teams within the institute in this criterion. | |
| **H1.2** | **Contribution of workers on the outputs reached** |
| Good contribution of team members and students. | |
| **H1.3** | **Quality of all outputs and results** |
| The methodology appears overall a bit dated and should be revised with the change of the team leadership. The results are solid but lack international visibility, which is reflected in the comparably low citation count. | |
| **H1.4** | **The most valuable discoveries and findings in the fields, their importance for the field** |
| The role of chronic and intermittent hypoxia is an important scientific area in order to explain cell fate during ischemic conditions, such as heart attack and stroke. However, the field is moving towards more mechanistic insights rather than relatively simple descriptive effects. | |
| **H1.5** | **Contribution of the participation of the authors in large collaborations** |
| The team participates in one COST action. Additional international larger collaborations are missing. | |

### Main criterion: 2. Societal relevance (H2.1-H2.5)

| H2.1 | Societal relevance of outputs and results pursuant to CAS and institute mission |
|---|---|
| The societal relevance is limited. The team does not hold any patents and the translational efforts are not visible. However, the team is the leading one for the „heart“ area in the | |

| | |
|---|---|
| institute's vision of „heart brain metabolism". Therefore, is seems rather essential to enhance additional collaboration within the institute. | |
| **H2.2** | **System functionality for knowledge transfer into practise, its usefulness for society. The impact of the team´s activity on proper practice in society in the area of social sciences and humanities** |
| There are no clear plans or efforts for a translatability of the results visible. The collaboration with clinicians is lacking which might be a way forward to more impact for patient care in the future. | |
| **H2.3** | **Relation to practice** |
| As outlined above. | |
| **H2.4** | **Participation in AV21 strategy** |
| Not applicable. | |
| **H2.5** | **Cooperation with regions of the Czech Republic** |
| There is a good cooperation with groups within the CR. | |

## Further criterion: 1. Position in international and national context (D1.1-D1.3)

| | |
|---|---|
| **D1.1** | **Comparison of the team with similar international and national institutes** |
| In the past, this team used to be one of the leading teams within the institute. However, the chosen scientific path as well as the methodology appears a bit dated and would benefit from a slightly newer direction and international collaborations. Currently it appears weak compared to similar international groups. | |
| **D1.2** | **Scope and quality of international and national cooperation and the role of the team in such cooperation; engagement in broad international cooperation** |
| There is a very high national and international reputation of the outgoing director, while the new director is not yet engaged in a broad international collaboration. | |
| **D1.3** | **Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)** |
| Similar to the comments above: the previous director is well-regarded in the field, while the newly appointed director lacks international visibility. | |

## Further criterion: 2. Vitality, sustainability and strategy (D2.1-D2.9)

| | |
|---|---|
| **D2.1** | **Direction in line with the perspective of the planned research directions** |
| The team is well placed in the scientific direction of the institute; however, the collaboration and integration are not yet achieved. The outlined research directions are a bit bland and seem to be based on methods lacking novelty. | |
| **D2.2** | **Assessment of the previous research objectives and their achievement** |
| The previous assessment was much more favourable due to the past achievements of the previous director. | |

| D2.3 | Assessment of implementation of recommendations from past evaluation |
|---|---|
| Recommendations have only partly been implemented. In particular the collaboration with clinical scientists is still weak. | |
| **D2.4** | **Success in receiving grants** |
| The team showed good grant success, although high-profile international grants are lacking. | |
| **D2.5** | **Adequacy of instrumental equipment** |
| The equipment for the planned programme is available. | |
| **D2.6** | **Effectiveness of management** |
| The new director is only in post for less than a year and management can therefore not be assessed. However, so far it appears as a well-managed team. | |
| **D2.7** | **Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth** |
| This is a rather large team with many scientists and a good age structure. | |
| **D2.8** | **Creating work-life balance conditions, assessment of approach towards possible gender issues** |
| No issues regarding this topic. | |
| **D2.9** | **Relation of the team with regard to the integration, development and sustainability of the research centre funded by the National Programme of Sustainability II.** |
| No issues regarding this topic. | |

## Further criterion: 3. Cooperation with universities and participation in education (D3.1-D3.6)

| D3.1 | Scope of cooperation with universities on national and international level |
|---|---|
| There is a decent level of international collaboration present. However, clear plans to increase cooperation are missing. | |
| **D3.2** | **Effectiveness of joint research centres** |
| The team is part of a COST action. It is however not clear what their role within the consortium is and whether there is scope for increasing international visibility. | |
| **D3.3** | **Success rate in supervision of PhD students** |
| The success in PhD training seems very high. | |
| **D3.4** | **Participation of PhD students in the outputs** |
| PhD students have ample input in the scientific output of the team. | |
| **D3.5** | **Participation of the team in master or bachelor studies** |
| The team participated locally in studies while any international teaching efforts are lacking. | |
| **D3.6** | **Assessment of cooperation intensity with universities in the form of teaching** |

| |
|---|
| Teaching on local level is present. |

## Further criterion: 4. Outreach activities (D4.1-D4.3)

| | |
|---|---|
| **D4.1** | **Sufficiency of media strategy and activities in the area of research popularisation** |
| Any outreach towards clinical scientists or the general public is not outlined well, nor are there clear plans for improvements. | |
| **D4.2** | **Publishing activities and its quality** |
| The same is true for publications for the general population or activity in social media. | |
| **D4.3** | **Participation in professional organisations in the area of research and development** |
| The former director has been very active in professional organisations and it is premature to speculate about the transition towards the newly appointed director. | |

**Other comments of the commission:**

**Final report was elaborated by:**

## Commission 5.2 - Biological sciences A
**Evaluated teams No.: 2, 3, 6, 16, 17, 18, 20**

**Commission Chair: Professor Bryan Cullen**
Commission Deputy Chair: Marcela Chmelařová
Commission Members:
- Nicholas Foulkes
- Josef Glössl
- Michael Hausmann
- Stéphanie Robert
- Didier Stainier
- Martin Teichmann
- Stéphane Thore
- Jianlong Wang
- Alexandre G. de Brevern

**Commission 8 - Medical and health sciences**
**Evaluated teams No.: 1, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14, 15, 19, 21**

**Commission Chair: Prof. Dr. Hans-Georg Joost**
Commission Deputy Chair: Thomas Krieg
Commission Members:
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- Ferenc Bari
- William Blalock
- Nicolas Catz
- Tammo Delhaas
- Jeremy Fauconnier
- Pawan Singal
- Robert Tomanek
- Viviana Trezza