

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 Molecular Genetics of the CAS, v. v. i.

Evaluated teams and their leaders:

1. Laboratory of Viral and Cellular Genetics (Jiří Hejnar)
2. Laboratory of Immunobiology (Dominik Filipp)
3. Laboratory of Molecular Pharmacology (Jaroslav Blahoš)
4. Laboratory of RNA Biology (David Staněk)
5. Laboratory of Transgenic Models of Diseases (Radislav Sedláček)
6. Laboratory of Cell and Developmental Biology (Vladimír Kořínek)
7. Laboratory of Mouse Molecular Genetics (Jiří Forejt)
8. Laboratory of Signal Transduction (Petr Dráber)
9. Laboratory of Biology of the Cell Nucleus (Pavel Hozák)
10. Laboratory of Biology of Cytoskeleton (Pavel Dráber)
11. Laboratory of Epigenetic Regulations (Petr Svoboda)
12. Laboratory of Transcriptional Regulation (Zbyněk Kozmik)
13. Laboratory of Structural Biology (Pavčina Maloy Řezáčová)
14. Laboratory of Genomics and Bioinformatics (Michal Kolář)
15. Laboratory of Genome Integrity (Zdeněk Hodný)
16. Laboratory of Cell Differentiation (Petr Bartůněk)
17. Laboratory of Cancer Cell Biology (Libor Macůrek)
18. Laboratory of Leukocyte Signalling (Tomáš Brdička)
19. Laboratory of Haematooncology (Meritxell Alberich Jorda)
20. Laboratory of Cell Motility (Vladimír Varga)
21. Laboratory of Adaptive Immunity (Ondřej Štěpánek)
22. Laboratory of Genome Dynamics (Keith Caldecott)
23. Laboratory of Integrative Biology (Martin Gregor)
24. Laboratory of Germ Cell Development (Zdeněk Trachtulec)

Part A: Evaluation of the institute.

Strengths:

The IMG has an excellent faculty and recruits quality researchers which produce excellent to world-leading research.

The research conducted by the teams is focused on the biomedical sector.

The IMG provides a family friendly environment for young researchers.

The IMG is closely involved in multiple national/international infrastructures, joint research centers and universities, which enhance the profile of the IMG and its ability to conduct socially relevant research.

The IMG structure is favorable for conducting good science by provided core facilities and opportunities for researchers to interact.

The faculty is composed of individuals with reasonably diverse backgrounds and training.

The IMG has benefitted from the new building (BIOCEV, Vestec) which was opened in 2016. BIOCEV hosts several groups of the IMG and is reasonably close to the Krc site.

The IMG receives increasing revenues from knowledge transfer and licensing of hybridoma cell lines developed at IMG to EXBIO.

Weaknesses:

The existence of applied collaborations and transfer to social applications is below the standard of an institute that produces such high quality basic outputs. Links to clinics/clinical laboratories should be stronger.

There exists a problem with financial support as faculty are required to get 80% of their funding from sources outside the CAS.

There are only a small number of foreign researchers, which is likely due to a low pay for faculty compared to international standards.

Opportunities:

Highly important findings from basic research need to be transferred to practical applications. The IMG is planning to put more emphasis on links to clinical laboratories.

Threats:

Some groups serving as service groups could eventually be phased-out into service only due to high demand.

There is a significant administrative load as well as a demand for a large quantity of publications which could threaten research and output quality.

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

H1.1	Quality of selected outputs of Phase I
The vast majority of outputs selected for evaluation in Phase I are in the excellent category with a significant number of world-leading outputs.	
H1.2	Contribution of workers on the outputs reached
In almost all selected outputs, members of the institute account for at least 80% of the effort and hold leading roles (first, co-first and/or corresponding author) in the outputs.	
H1.3	Quality of all outputs and results
The majority of all outputs and results fall within the excellent (Q1) category with a significant level of world-leading outputs. Due to a policy of publication quantity versus quality, which is unfortunate, there are also a fair number outputs in lower tier journals which report marginal outputs.	

H1.4	The most valuable discoveries and findings in the fields, their importance for the field
<p>The IMG is involved in the main fields of:</p> <p>Cancer Biology and Genome Maintenance Mechanisms: The RECQ5 helicase was demonstrated to suppress genetic instability promoted during gene transcription. Similarly the role of PARP1 in single-strand DNA break repair, which also has a role in active transcriptional/replication processes, was further analyze and found to sense the presence of unligated Okazaki fragments. Additional studies examined the role of various signal transduction mediators (WIP1, C/EBP, GLI-1 and the JAK(V617F) mutant) on stem cell self-renewal, differentiation and hematopoietic development.</p> <p>Developmental Biology: Expression of the PAX6 transcription factor was found to be regulated by MEIS transcription factors, and TCF711 was found to actively repress WNT signaling in the neural fold epithelium in order to suppress differentiation to the neural crest fate. Moreover, major strides were made in defining the cytokine profile necessary to manipulate zebrafish hematopoietic stem cells ex vivo. A role for retroposons as modifiers of genomic evolution through expression and remodelling mechanisms was elucidated.</p> <p>Molecular Virology: Studies in avian leucosis virus, HIV, and a bat delta-retrovirus, delineated mechanisms of susceptibility, latency, and virus-host co-evolution, respectively. In addition, as the chicken model is the primary animal model of the IMG in this field, studies into chicken transgenic methodology were successfully carried-out.</p> <p>Molecular and Cellular Immunology: Studies have better defined cell-mediated immunity. These include the identification of virtual memory CD8+ T-cells, identification of the role of PSTPIP2 in neutrophil activation and autoimmunity; and the mechanism behind autoimmune polyendocrine syndrome type 1 (APS-1) and associated gastrointestinal autoimmunity. Other findings examined the role of Toll-receptor 2 in embryonic hematopoietic progenitor cell development. Other studies examined how the transmembrane adaptor protein NTAL limits mast cell chemotaxis.</p> <p>Molecular Genetics, Genomic and Disease Modeling: A role for PRDM9, a gene involved in male sterility, was found in meiotic synapsis of chromosomes. Loss of PRDM9 was shown to rescue male sterility in mouse models. Studies on ancient mitochondrial genomes have resulted in the establishment of an ancient human mitochondrial genome database. Modification of neurotransmitter signaling was better defined by examining the role of SGIP1 in regulating type 1 cannabinoid receptor (CB1R). Studies into the mechanisms involved in Netherton syndrome found a significant role for the kallikrein-related peptidases, KLK5 and KLK7, in the observed pathology. Meta-analysis studies of Bardet-Biedl syndrome patient data reveal a set of genes associated with disease phenotype, severity and prognosis.</p> <p>Biology of the Cell Nucleus, Cytoskeleton and Cellular Flagellum: A novel nuclear structure, referred to as nuclear lipid islets (NLIs), was identified. The formation of the islets requires RNA and the periphery contains RNA pol II machinery. Sequences required for splicing of long non-coding RNA were characterized. The structural proteins γ-tubulin, plectin, and those of the eukaryotic flagellum were studied with various methodologies. Findings demonstrated the pro-survival role of γ-tubulin in during neural development, plectin controls the biliary tree architecture and stability in cholestasis and its loss or mutation can contribute to biliary colitis; and a number of novel flagellum proteins were identified and found to associate with distinct structures of the flagellum.</p> <p>Structural Biology: Structural characterization of the protein interacting with the LEDGF/p75 co-transcriptional activator was found to occur through a conserved unstructured region. The study defined the structural characteristics of this binding and its binding partners. Analysis of metallocarborane sulfamides, carbonic anhydrase inhibitors, was also undertaken. Treatment of mice with these compounds had tumor inhibitory properties.</p>	

For the most part, the major findings were basic in nature adding to the mechanistic understanding of biology and disease. Some findings may have potential clinical application as biomarkers for diagnosis and prognosis; other findings are strictly mechanistic at present. On the whole, there appears to be some lack of active translational application of these findings.	
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 IMG largely carries-out basic scientific research with the objective of increasing the knowledge base, thereby enhancing the development of technologies applicable to the public as a whole. Therefore, the outputs and results from this line of research are pursuant to 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 institute’s activity on proper practice in society in the area of social sciences and humanities
<p>While the majority of research deals with basic mechanisms of development and disease progression, there are some potential translational applications of these findings which are highly relevant to society as well as to infrastructure that can facilitate their transfer into practice.</p> <p>The institute has a good Technology Transfer Office which has assisted with 38 patents, 29 new applications and 70 MTAs with commercial potential. However, actual commercialization of these technologies is limited at the present.</p> <p>As the majority of knowledge gained from the IMG activities concerns basic scientific findings, the impact of the institute on social science and humanities is minimal.</p>	
H2.3	Relation to practice
<p>Much of the outputs relate to knowledge dealing with basic mechanisms in development and disease and do not have the scope of a transferable application, so far. Certain findings though may have transferable application as diagnostic and prognostic biomarkers. These findings need to be further validated in the clinical setting.</p> <p>An example of a tangible translation to practice is represented by the basic development of monoclonal antibody technology which has resulted in the foundation of a spin-off company.</p>	
H2.4	Participation in AV21 strategy
The IMG is involved in the AV21 strategy within the programs Wellbeing in Health and Disease and Preclinical Testing of Potential Pharmaceuticals. Three areas of cross-field cooperation are followed: Genetic Factors Contributing to Disease (under QUALITAS), which uses large screens to identify cancer associated genes as markers for counseling; Organ Culture Center, which aims to establish organoid models for normal development and disease; and Preclinical Testing of Potential Pharmaceuticals, which looks to accelerate the development of novel drugs for the treatment of disease, by facilitating the basic research aspect as well as the transfer of the basic research to commercial and clinical application.	

H2.5	Cooperation with regions of the Czech Republic
<p>Investment within the BIOCEV Centre contributes to the Central Bohemian Region which surrounds Prague. In addition, the IMG cooperates with the Science and Technology Advanced Region (STAR) initiative, a non-profit organization which aims to foster interaction between research organizations, companies and investors in order to build international research and innovation. Within the STAR initiative the IMG cooperates with a number of companies. The IMG also engages in infrastructures that have significant regional impacts including CZ-Openscreen, Czech-Bioimaging, the Czech Center for Phenogenomics, and the Pan-European ELIXIR Bioinformatics Research Infrastructure-CZ.</p>	

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
<p>The IMG is the nationally leading institute in the field of molecular genetics. In the international context, it is highly visible and recognized, and in some aspects a world-leading institute.</p>	
D1.2	Scope and quality of international and national cooperation and the role of the institute in such cooperation; engagement in broad international cooperation
<p>The IMG appears in a leading role (first, co-first, corresponding) role in most of its international and national cooperations, which are often published in world-leading or excellent journals in the field. The scope of these collaborations is either access to clinical resources or of an instrumentation/technical nature. Additionally, several teams of the IMG are involved in broad international cooperations, which are limited to one or two world-leading investigators that may or may not have a leading role.</p>	
D1.3	Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)
<p>The IMG has organized/co-organized and hosted 11 international conferences, symposia or workshops that included infrastructure workshops, COST action workshops, organization workshops (FEBS and EMBO). In addition, the institute has held at least 11 practical courses in imaging, precision medicine, CRISPR/Cas9, and comparative morphology.</p> <p>Outside the institute, team members have also organized and co-organized over 15 international and national conferences, symposia and workshops; 2 FEBS practical courses and 1 EMBO practical course.</p> <p>A number of team members (usually team leaders or former team leaders) have been invited speakers to national and international platforms. Members of the IMG have also been the recipients of several nationally and internationally prestigious awards, demonstrating an international recognition of the institute and its staff.</p>	

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

D2.1	Direction in line with the perspective of the planned research directions
<p>Certain research directions have done an about-face. The IMG has already disinvested from the BIOCEV to reduce financial obligations. This move appears to be favorable to the IMG, esp. since sufficient (lab) space will be still available.</p> <p>The institute looks to establish 2-3 new junior teams through open calls.</p> <p>The IMG is also looking to stress the development of organoid technology and use of transgenic hens. Both have very practical and important research implications. While organoid development can create humanized model systems for analysis and testing of therapeutics and reduce the cost associated with the usage of mice, the use of transgenic chickens is interesting, but the application is still somewhat less clear.</p> <p>The IMG will look to converge with other CAS institute for the establishment of joint core facilities. One such facility is the Laboratory of Mass Spectrometry operated by the IMG and IP. The IMG is also cooperating to establish a central Technology Transfer Office. Oddly, the same is not being done for a centralized Mouse Facility for the CAS. Mouse facilities appear to be individual investments.</p> <p>The IMG will continue its commitment to recruiting, educating and providing a positive environment for the development of young scientists, including especially women.</p>	
D2.2	Assessment of the previous research objectives and their achievement
<p>Previous priorities centered on completion of the joint research center BIOCEV, implementation of institutional services from teams using focused technologies requiring specific instrumentation, recruitment of new group leaders and evaluation, enhancing research support for junior group leaders and post-docs.</p> <p>The IMG has achieved many of these objectives or is still in the process of achieving them. After completion of the BIOCEV, the IMG recently decided to disinvest from this center due to enhanced financial liabilities; this has worked to the favor of the IMG. Service groups have been set-up and some instrument updating is currently in progress. The IMG has done a marvelous job of recruitment of high quality faculty, which should pay-off in the future. A number of junior faculty have also been awarded funds from various sources demonstrating the competitiveness of the institute's recruited faculty.</p>	
D2.3	Assessment of implementation of recommendations from past evaluation
<p>The previous commissions' evaluations were favorable for the IMG, with few recommendations. Most of these have been effectively implemented. The exception may be in the enhancing relations with clinicians or industrial collaborations that can facilitate the transfer of knowledge gained from the findings to tangible applications.</p>	
D2.4	Success in receiving grants
<p>The IMG has great success in attracting funding from a broad number of sources; these include: ERC, NATO, UNESCO, EMBO, Human Frontiers in Science and EHA, among others. Teams at the IMG also receive a significant amount of funding from Czech sources.</p>	
D2.5	Adequacy of instrumental equipment
<p>The instrumentation is modern and up-to-date. The institute has a number of core facilities covering microscopy (light and electron), histology, flow cytometry, monoclonal Ab development, genomics/bioinformatics, etc. There has been a clear investment in bio-</p>	

imaging, which is now a CAS facility, and there is now an effort to upgrade and enhance both a mass spectrometry facility as well as a mouse transgenics facility.	
D2.6	Effectiveness of management
The institute is doing well and there appears to be a favorable organizational structure. The direction should stress more cooperation with medical personnel or industry in order to translate the excellent findings of the institute to practical applications in society.	
D2.7	Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth
<p>The IMG has done an excellent job of recruiting and retaining very good scientists. The developmental strategy of educating PhDs or Post-docs and then sending them to world-leading international labs for further growth has helped the institute immensely in recruiting high quality junior scientists.</p> <p>The age structure of the institute is adapted for continuance and growth. There is some hesitancy concerning a significant number of individuals over the age of retirement. This concern centers on the interpersonal relationships between younger team leaders and older, more experienced individuals under their oversight.</p>	
D2.8	Creating work-life balance conditions, assessment of approach towards possible gender issues
Centered on the belief of sustainability through recruiting the best scientists, the IMG follows a family friendly policy with flexible work hours, a day care/kindergarten, guesthouse, a cafeteria, gym and other benefits. The IMG looks to support women in science.	
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)

D3.1	Scope of cooperation with universities on national and international level
Cooperations with national universities have both the scope of undergraduate and graduate education as well as research. International cooperations are almost exclusively aimed at research objectives. Two exceptions to this are relations with Comenius University in Bratislava, Slovenia and the Max Plank Institute in Dresden (as some student/instructor exchange).	
D3.2	Effectiveness of joint research centres
The IMG is involved in 4 joint research centers: the BIOCEV, Tumor Ecology/Microenvironment, Molecular Medicine and Diagnostics, and RNA Biology. These joint centers have greatly enhanced the potential of the basic research findings of the institute to have a societal impact.	
D3.3	Success rate in supervision of PhD students

<p>The success rate of most PhDs is high. 57 students successfully defended their theses in the evaluation period. The finishing rate is above 80% and most of these obtain post-docs in high profile international labs throughout Europe and the USA.</p>	
D3.4	Participation of PhD students in the outputs
<p>PhD students are intimately associated with almost all institutional outputs where the IMG is the leading group (over 50% effort). In almost all cases, PhDs cover the role of first and/or co-first author. Many team leaders refer to PhD students as the main workforce in the teams.</p>	
D3.5	Participation of the institute in master or bachelor studies
<p>Faculty of the IMG have accounted for 72 BS and 169 MS level lectures and seminars at several local and regional/national universities. In addition to this, the IMG has assisted in 52 BS and 72 MS defended theses during the evaluation period. This accounts for a major contribution to university education by a primarily research institute.</p>	
D3.6	Assessment of cooperation intensity with universities in the form of teaching
<p>Faculty of the IMG account for 72 BS, 169 MS and 62 PhD level lectures and seminars at several local and regional/national universities. This accounts for a major contribution to university education by a primarily research-oriented institute/faculty. This cooperation continues to be fruitful for both the IMG and the university.</p>	

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

D4.1	Sufficiency of media strategy and activities in the area of research popularisation
<p>The IMG and its teams engage in TV interviews, press releases and radio; and have an online presence with social media platforms (Facebook, Twitter, Instagram).</p> <p>Members of the IMG also participate in annual open science activities as well as educational courses for first and second year PhD students in the areas of biomedical sciences.</p>	
D4.2	Publishing activities and its quality
<p>The IMG publishes a large number of high quality outputs in journals. Moreover, members of the institute have published three text books. In addition, the institute published and released an Annual Book 2017-2019 summarizing scientific and financial information of the institute.</p>	
D4.3	Participation in professional organisations in the area of research and development
<p>The IMG is active in organizations such as EMBO, FEBS and other national and international organizations. These are not discussed in particular detail.</p> <p>The institute cooperates with a number of private companies (DIANA Biotechnologies, EXBIO, VIDIA, SOTIO) in Research and Development, resulting in several patents.</p>	

Other comments of the commission:

The IMG demonstrates excellent, if not world-leading in some cases, research in various biomedical and basic biological fields. A main critique would be the difficulty or lack of adequate transfer/application of some of the world-leading findings to actual practice in society. A strong effort by the institute for implementing many of its findings towards clinical translation and into medical practice is needed.

Part B: Evaluation of teams

Team 1. Laboratory of Viral and Cellular Genetics

Strengths: The strengths of this team relate to the important field under investigation, which is viral and cellular control of retroviral infection and gene expression, as well as the high quality of the publications over the last 5 years and previously. The focus of this research group is clear and admirable.

Weaknesses: None really, though the focus almost entirely on avian retrovirus infection is unusual. Perhaps a degree of diversification towards other retroviral species with possibly more relevance to human retroviruses might be considered.

Opportunities: The ability to generate chickens that are resistant to retroviral pathogens is an extremely important step forward by this group and should be extended further if possible. While chickens resistant to specific ALVs, such as ALV-J, could be of commercial value, it would be even more important to generate chickens resistant to influenza A virus (IAV) as a way to reduce the likelihood of pandemic IAV variants being selected by transmission from waterfowl to chickens then on to pigs and humans. I therefore feel the laboratory should explore this possibility by reaching out to groups, perhaps in Asia, that focus on IAV in chickens.

Threats: None really, though the idiotic decision by the EU's top court that even minor CRISPR/Cas modifications make an animal GM will possibly block the otherwise great commercial potential of this research. Again, the Chinese may be more adaptable and receptive to this idea. Also, the upcoming retirement of Dr. Hejnar (not sure when) will present a major challenge going forward.

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

H1.1	Quality of selected outputs of Phase I
The laboratory submitted 18 papers for consideration in phase 1. These included several papers in top international journals, eg. Three in PNAS, and several in other excellent journals, eg. NAR, JVI, Cell Reports etc.	
H1.2	Contribution of workers on the outputs reached
Much of the work in the outputs was done in this laboratory, with several papers performed exclusively by this team and submitted by them. 16 papers out of 18 list a group member as submitting author	
H1.3	Quality of all outputs and results
Overall excellent.	
H1.4	The most valuable discoveries and findings in the fields, their importance for the field
I think the ability to generate transgenic chickens using CRISPR/Cas that are resistant to infection by ALV-J (PNAS 2020) is the most impressive achievement but some of the paleovirology work is also very impressive. Certainly, the ability to generate transgenic birds could be very important in the future for securing chicken production in the face of potential pandemics that could cross to birds, see comment on IAV above.	

H1.5	Contribution of the participation of the authors in large collaborations
The laboratory did not participate in large collaborations in this period.	

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

H2.1	Societal relevance of outputs and results pursuant to CAS and institute mission
The outputs are relevant in that 1) they relate to how HIV-1 achieves latency, an important issue related to human disease and 2) they relate to rendering chickens immune to a potentially commercially important virus, ALV-J.	
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 sure I understand this question.	
H1.3	Relation to practice
They developed a method that can be used to genetically modify chickens and other birds.	

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 is almost unique in its focus on avian retrovirology. When compared to other international teams working on animal retroviruses, I would say this team ranks in the top 10%.	
D1.2	Scope and quality of international and national cooperation and the role of the team in such cooperation; engagement in broad international cooperation
While this group does not engage in many collaborative endeavors, they did engage in important collaborations with groups in the USA (Strebel), the UK (Hajakova and Gifford) and Germany (Kaspers and Schusser). These are all very logical short term collaborations based on the need to identify collaborators with critical skills needed to advance a given research area.	
D1.3	Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)
Dr. Hajnar organized an important international virology conference in 2017 in Liblice and has been active in organizing the Retropath meeting. Dr Hajnar has also received several important awards over the last few years and routinely is invited to give international 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 research performed over this last period follows logically from earlier work.	
D2.2	Assessment of the previous research objectives and their achievement
Overall, the team has been very succesful in achieving their previous research objectives, including especially transgenesis in chickens, in my view a major achievement.	
D2.3	Assessment of implementation of recommendations from past evaluation
There were no recommendations from the past evaluation	
D2.4	Success in receiving grants
The team appears to have achieved stable funding for the next few years	
D2.5	Adequacy of instrumental equipment
Seems fine	
D2.6	Effectiveness of management
Clearly very effective management. Not sure what happens if/when Hejnar steps down.	
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 fairly flat, as is optimal, and we saw no sign of excessive turnover. The team takes on and graduates ~1 PhD student per year, which has been stable.	
D2.8	Creating work-life balance conditions, assessment of approach towards possible gender issues
Not really discussed.	
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 idea.	

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 recruits students from universities in Prag and I assume does some teaching there. The only information was that Dr. Trejbalova gave 4 lectures at the Charles University.	
D3.2	Effectiveness of joint research centres
Not applicable	

D3.3	Success rate in supervision of PhD students
The success rate is high, though degrees take a fairly long 4-6 years to complete. PhD students are routinely first authors on papers from this group.	
D3.4	Participation of PhD students in the outputs
High, they are routinely featured as first authors.	
D3.5	Participation of the team in master or bachelor studies
There were 2 B.S. and 3 M.S. students supervised over the last 5 years, compared to 5 PhD students. The latter are clearly a higher priority.	
D3.6	Assessment of cooperation intensity with universities in the form of teaching
Seems modest. See 3.1.	

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 publishes articles for the general public and has been active on Czech TV. Also active in the science fair of the CAS	
D4.2	Publishing activities and its quality
Not sure as to quality as we have not seen it and it is in Czech anyway.	
D4.3	Participation in professional organisations in the area of research and development
Not sure about this.	

Team categorisations and a brief commentary:

<input checked="" type="checkbox"/> strengthen the support of the team xxxxx <input type="checkbox"/> keep the support of the team at the current level <input type="checkbox"/> reduce the support of the team
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Other comments of the commission:

We all felt this was one of the top, if not the top, team at the Molecular Genetics Institute. Clearly deserving of continued, ideally strengthened support.

Team 2. Laboratory of Immunobiology

Strengths:

This is a young, medium-sized group (12 members) with significant experience in modern day technology and the necessary instrumentation. They have fostered very good national and international collaborations. Most of the research is focused on T-cell activation and tolerance. The group seems well organized to provide an adequate training environment for PhD student providing them with ample opportunities after graduation.

Weaknesses:

All funding is from the Czech Republic and is limited for a group of this size. Funding is short-term (3 years). There are a large number of less than Q1 level publications, likely reflective of a publish for sheer number of publications over significance of publication policy.

Opportunities:

The team has significant experience, expertise and instrumentation to be able to act as a support service or in collaboration with other CAS institutes/groups. Transgenic mice developed may have applications in studies conducted nationally and internationally.

Threats:

The greatest threat may be limited recruitment of PhD students and new faculty (low salary support) along with the fact that salary support for PhDs is limited to 4 years; after which the lab has to pay the salary from laboratory funds. The focus on various mouse models is costly and time-consuming. This is not a point of criticism (rather, it is a strength of the group and offers possibilities); however, it also emphasizes the need of institutional funding.

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

H1.1	Quality of selected outputs of Phase I
The overall quality of the selected outputs is very good. Three of the seven outputs selected in Phase I were published in journals ranked in the top quarter (top 25%) of journals in the field of study, two of these being world leading journals (top 10%). The other four were published in journals ranked in the top 50% (Q2) of journals in the field (2) or were non classified publications.	
H1.2	Contribution of workers on the outputs reached
In almost all cases the workers of the team contributed greater than 80% of the effort to the selected outputs (only one output was less; 50% effort), appearing as first, co-first, corresponding or co-corresponding on all selected outputs	
H1.3	Quality of all outputs and results
The quality of all the other outputs is in part oddly low. For such a good team, there are an unusually large number of outputs that are published in journals ranked below the top 25% of journals in the field of study.	
H1.4	The most valuable discoveries and findings in the fields, their importance for the field
<p>The importance for Toll-like receptor 2 (TLR2) in the hematopoietic development has been defined using transgenic TLR2 expressing mice and mice with targeted deletion of TLR2 in erythroid-myeloid progenitors.</p> <p>Toll-receptor signaling in the thymic epithelium was found to be highly important for monocyte-derived dendritic cell recruitment and the production of T regulatory cells.</p> <p>T-cell receptor (TCR) signaling promotes Lck redistribution.</p> <p>Loss of immuno-tolerance promotes enteric α-defensins-mediated intestinal autoimmunity/inflammation.</p>	

Cells responsible for T-cell tolerance were defined by the expression of the autoimmune regulator gene (AIRE) which is required for restricted expression of auto-antigens. The creation of conditional AIRE knockout mice has demonstrated the necessity of these novel antigen presenting cells for adaptive immune responses to blood-borne pathogens.	
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 team is involved in basic research involving T-cell tolerance/autoimmunity, T-cell activation, embryonic hematopoiesis and Toll-receptor signaling in hematopoiesis and T-cell regulation. The fruits of this research have both academic and translational importance for treating diverse chronic pathologies, thus the outputs are of high societal 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's main objective is basic science and transferring the knowledge gained to others in the science/medical field and society as a whole. The impact of the teams output on the social sciences and humanities is limited.	
H2.3	Relation to practice
The research has the future potential to lead to the better understanding of T-cell regulation, leading to novel therapies for immunology-related disorders. The implementation of this potential is some years away.	
H2.4	Participation in AV21 strategy
No information as to this point was provided by the Laboratory	
H2.5	Cooperation with regions of the Czech Republic
No information as to this point was provided by the Laboratory	

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 comparison to other teams of similar size, this team is excellent with a number of very good to excellent quality outputs. The team is in a leading position nationally, and is visible and recognized internationally.	
D1.2	Scope and quality of international and national cooperation and the role of the team in such cooperation; engagement in broad international cooperation
Although two outputs evaluated from the team in Phase I involve more than 5 groups in an international context, the team does not report any broad participation in large	

collaborations. The team does participate in several smaller informal collaborations in Europe and abroad. No national collaborations are strictly highlighted, but the team leader is closely related to Charles University.	
D1.3	Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)
Both the team leader and PhD students organize annual conferences on immunology. Students also participate in outreach opportunities to local high schools. Members of the team have been invited for 12 different national and international conference 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 team has had success with their line of research and proposes to continue with the study of T-cell tolerance, T-cell activation and gut inflammation	
D2.2	Assessment of the previous research objectives and their achievement
Previous objectives of the team's research has been highly successful in better defining mechanisms of T-cell regulation and hematopoietic development.	
D2.3	Assessment of implementation of recommendations from past evaluation
No specific recommendations were presented in the past evaluation. The team has continued to produce interesting quality work in their area of expertise. They have further invested in acquiring available transgenic/knock-out mouse strains and have enhanced ties with collaborators.	
D2.4	Success in receiving grants
The group has been successful on the national front for receiving grant support totaling about €350,000/yr. The team has not (yet) demonstrated any success with international/EU support sources.	
D2.5	Adequacy of instrumental equipment
The team has all the necessary equipment for the research they propose (FACS, super resolution microscopy, NGS and a transgenic mouse facility).	
D2.6	Effectiveness of management
The management structure 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
The lab offers a quality training experience to young researchers (PhDs) which typically take from 4-5 years to graduate. Most these individuals find good positions and are encouraged to find positions outside the institute, internationally if possible. Successful individuals are often encouraged to return, although salary support is often an obstacle. The age structure of the lab is highly favorable with two individuals between 55-60 years of age and the rest (10 individuals) below the age of 40. This promotes ample opportunity for continuation, growth and turnover in the next 5-10 years.	

D2.8	Creating work-life balance conditions, assessment of approach towards possible gender issues
No information as to this point was provided by the Laboratory	
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
The team cooperates with Charles University in Prague and Comenius University in Bratislava, Slovenia with teaching. In addition, the team has produced 3 BS, 4 MS and 2 PhD theses in the evaluation period with students primarily from Charles University. The team also collaborates with individuals at Charles University, the University of Defense Hradec Kralove and the Medical Faculty of Brno. On the international front, the team has several productive scientific collaborations with universities in Norway, Finland, Canada and others.	
D3.2	Effectiveness of joint research centres
No information as to this point was provided by the Laboratory	
D3.3	Success rate in supervision of PhD students
Two PhD students successfully defended their thesis in the evaluation period. Most PhD students finish within 4-5 years and obtain positions in foreign research institutes of prestige.	
D3.4	Participation of PhD students in the outputs
All major outputs during the evaluation period involved PhD students which were either first or co-first author.	
D3.5	Participation of the team in master or bachelor studies
The team is highly involved in BSc and MS studies having produced 3 BSc and 4 MSc theses in the evaluation period.	
D3.6	Assessment of cooperation intensity with universities in the form of teaching
Four of the team members are involved in MSc level course lectures at Charles University. The team leader is head of a course in Innate Immunity at Charles University and also conducts 3 lectures in Immunogenetics at Comenius University in Bratislava. For an individual whose role is primarily research, this contribution to university education is significant.	

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 provides sporadic media coverage of their research and results. For the topic and its presentation to the general public, this is probably sufficient.	
D4.2	Publishing activities and its quality
The outputs of the team are in the form of excellent to low quality publications. There is some concern that the pressure for the quantity of publications supersedes that for quality.	
D4.3	Participation in professional organisations in the area of research and development
The team leader is an Executive Committee member of the Czech Society for Immunology and most students in the lab are also society members.	

Team categorisations and a brief commentary:

<input checked="" type="checkbox"/> strengthen the support of the team <input type="checkbox"/> keep the support of the team at the current level <input type="checkbox"/> reduce the support of the team
This team is excellent with a number of very good to excellent quality outputs.

Other comments of the commission:

Team 3. Laboratory of Molecular Pharmacology

Strengths:

Genetically modified mice and antibodies.

Weaknesses:

The size of the group seems to be a significant problem. Studies of the mechanisms have not progressed to applications.

Opportunities:

The possible application of the finding to end-of-life care and/or pain management with industry.

Threats:

Within the next 5 years the team will lose one of its primary members

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

H1.1	Quality of selected outputs of Phase I
In the evaluation period the team has produced a total of two outputs which were both presented in Phase I. While both these outputs were published in journals in the top 25% in the field of study, the number of outputs is somewhat low for the period.	
H1.2	Contribution of workers on the outputs reached
The team contributed to a majority of one output and approximately 50% of the other. First author and corresponding author are from the team on one output which is predominantly authored by team members. On the second output, the team leader is listed as co-corresponding author, and he is one co-author (the only contributor from his group) on a third output.	
H1.3	Quality of all outputs and results
Outputs presented in Phase 1 were the only outputs listed by the team during the evaluation period.	
H1.4	The most valuable discoveries and findings in the fields, their importance for the field
Mechanism of GABA _B receptor and its interaction with USP14. Identification of two sites that govern G _α specificity to mGluR. Interaction of SGIP1 and the cannabinoid receptor (CB1R). Establishment of SGIP1-null mice.	
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 team studies neurotransmitter/pain receptors and how pain is perceived. Pain control in end-of-life care as well as by non-addictive means has significant relevance to 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
<p>As a basic science oriented team, the group has a good handle on the mechanism they are studying but has not begun to seek how to translate their findings into society where it could have significant impact in the clinical setting for pain management. There is some doubt whether cannabinoid receptors are still relevant to this line of research and if this small group will be able to compete with other groups. The applications of the team's findings are long-term possibilities. The impact to social sciences and humanities is minimal.</p>	
H2.3	Relation to practice
<p>Despite the doubts mentioned above, further development of this team's findings could have a significant impact in the clinic for non-addictive pain management strategies.</p>	
H2.4	Participation in AV21 strategy
<p>No information as to this point was provided by the Laboratory</p>	
H2.5	Cooperation with regions of the Czech Republic
<p>No information as to this point was provided by the Laboratory</p>	

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
<p>The team is visible and recognized nationally. Production from the team is of good quality but below expected standards of similar teams in similar institutes.</p>	
D1.2	Scope and quality of international and national cooperation and the role of the team in such cooperation; engagement in broad international cooperation
<p>During the evaluation period, the scope and quality of collaborations was extremely limited, but the quality of the few outputs was good. The majority of the productive collaborations mentioned have occurred outside the timeframe of the present evaluation period.</p> <p>The team does not engage in any broad international cooperations.</p>	
D1.3	Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)
<p>There is very limited participation in any scientific community activities by the team.</p>	

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

D2.1	Direction in line with the perspective of the planned research directions
<p>The development of SGIP1 models during the evaluation period is key to the future directions of the planned research. The group plans to determine what role SGIP1 has in controlling nociception in pain models, response to cannabinoid receptors and tolerance to opiates.</p>	

D2.2	Assessment of the previous research objectives and their achievement
Major objectives of the previous research involved the development of SGIP1 mouse models and studying of the SGIP1-CB1R relationship. These aims were accomplished.	
D2.3	Assessment of implementation of recommendations from past evaluation
As recommended, the team has invested in SGIP1 mouse models to focus their work on the SGIP1-CBR1 relationship. The team has yet to translate these findings to an application as suggested in the past evaluation.	
D2.4	Success in receiving grants
Funding is very limited with no extra-Czech funding. This may also reflect the impending retirement of the team leader.	
D2.5	Adequacy of instrumental equipment
The team seems to have all the necessary instrumentation to conduct the studies they intend. The most important of which is super-resolution microscopy.	
D2.6	Effectiveness of management
The effectiveness of the management may be highly influenced by the approaching retirement of the team leader and the knowledge that the team as is will not be in a good position to proceed.	
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 1 individual (team leader) over 60 years of age which will be going into retirement, 1 individual between 50-55 years of age and 4 individuals under 30 years of age. With the loss of the team leader to retirement, this group will probably be converted to a service or absorbed into another group as continuation and development appear to be extremely difficult.	
D2.8	Creating work-life balance conditions, assessment of approach towards possible gender issues
No information as to this point was provided by the Laboratory	
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
On the national level, the team collaborates closely with the 2nd Medical School of Charles University, Prague, for patient samples. International collaborations mainly include France (CNRS Montpeillier).	

D3.2	Effectiveness of joint research centres
Collaboration with the 2nd Medical School of Charles University resulted in one publication in 2019.	
D3.3	Success rate in supervision of PhD students
The success rate and PhD supervision is not clearly defined. During the evaluation period, one PhD thesis was successfully defended.	
D3.4	Participation of PhD students in the outputs
PhD students represent the major contribution to research outputs.	
D3.5	Participation of the team in master or bachelor studies
The team supervised 1 BS and 1 MS thesis during the evaluation period. In addition, the team leader is involved in teaching activities for both BS and MS courses.	
D3.6	Assessment of cooperation intensity with universities in the form of teaching
The team leader is engaged in teaching 1 BS and 2 MS level lectures at the 2nd Medical School, 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 activities or strategy is mentioned.	
D4.2	Publishing activities and its quality
The team has published two outputs of very good quality in the past 5 years.	
D4.3	Participation in professional organisations in the area of research and development
Extremely limited.	

Team categorisations and a brief commentary:

<input type="checkbox"/> strengthen the support of the team <input type="checkbox"/> keep the support of the team at the current level <input checked="" type="checkbox"/> reduce the support of the team
Upon the team leader's retirement, this team is likely to be incorporated/merged with another team of the institute.

Other comments of the commission:

Team 4. Laboratory of RNA Biology

Strengths: This is a well-funded, reasonably productive laboratory that is internationally recognized for their research in the field of slicing and snRNP biogenesis and assembly. The research is tightly focused and clearly human disease relevant; The team is also very successful in training PhD students.

Weaknesses: The lack of publications in top generalist journals is a concern, but the journals they do publish in are at the top of the field of cell biology and RNA biology. A potential concern is that the laboratory may be too tightly focused and may need to diversify into other aspects of RNA biology soon, as major questions around snRNP function are increasingly resolved. This could prove challenging. A minor weakness is the failure in securing international grants in the last 5 years.

Opportunities: The newly established in vivo mouse model for retinitis pigmentosa looks very promising and is currently unique.

Threats: Nothing obvious, perhaps the danger of becoming too specialized. Funding currently is very good but entirely Czech.

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

H1.1	Quality of selected outputs of Phase I
Seven outputs were listed in phase 1, including two manuscripts in NAR, one in JCB and one in Cell reports. These are high profile international specialist journals of very high quality. One review was also included.	
H1.2	Contribution of workers on the outputs reached
The Stanek laboratory contributed the first author and corresponding author on all six primary manuscripts reviewed in phase 1.	
H1.3	Quality of all outputs and results
Overall, the laboratory of RNA biology lists 13 manuscripts including 5 reviews. The best papers are the 3 in NAR, and papers in JCB and Cell Reports, which are very good. This represents an acceptable but not outstanding level of productivity.	
H1.4	The most valuable discoveries and findings in the fields, their importance for the field
I think the emerging work on retinitis pigmentosa, partly published in JCB, is the most valuable work though the work on Cajal bodies is also innovative and important.	
H1.5	Contribution of the participation of the authors in large collaborations
The team participated in a large collaborative project supported by the Czech Science Foundation in a program “Centre of Excellence” by contributing their expertise in RNA splicing, cell biology and advanced fluorescence microscopy techniques. Among the 8 teams that formed a Centre of Excellence “RNA Biology”, which published 90 scientific papers and book chapters with 15% of them in high-quality journals with IF>10.	

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

H2.1	Societal relevance of outputs and results pursuant to CAS and institute mission
The relevance is in terms of understanding the molecular mechanisms underlying the human disease retinitis pigmentosa and possible other splicing related pathologies. However, the translational potential at present is low.	
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
N/A	
H1.3	Relation to practice
N/A	

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 Stanek laboratory is certainly internationally recognized in the field of RNA splicing and snRNP biology. However, this is a very competitive area of research. I would say this group falls in the second quartile in Europe.	
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 Stanek laboratory has several ongoing international collaborations and at least two publications result from such collaborations. The collaborators are leaders in RNA biology.	
D1.3	Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)
David Stanek participated in organizing two conferences in 2017 and lists 5 invited seminars and 6 conference presentations over 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 decided to cease initial investigation of alternative splicing regulation via chromatin environment due to the technical challenges and lack of sufficient human and financial resources. This is understandable and probably a wise decision to focus the energy and limited resource on other cutting-edge research in the field.	
D2.2	Assessment of the previous research objectives and their achievement
The laboratory has made very good progress in their area of research	
D2.3	Assessment of implementation of recommendations from past evaluation

Other than recommending increased collaborations, which was achieved, there were no recommendations.	
D2.4	Success in receiving grants
The laboratory currently lists three grants, all from within the Czech Republic. No international grants, which should be a major future goal.	
D2.5	Adequacy of instrumental equipment
Good	
D2.6	Effectiveness of management
The laboratory seems well managed with good productivity and successful PhD training	
D2.7	Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth
The laboratory is basically led entirely by Dr. Stanek. It currently consists of 2 post-docs, 4 grad students (plus 1 on maternity), 2 diploma students and 1 tech. So, a young but diverse group in terms of age. This seems typical for this kind of research laboratory.	
D2.8	Creating work-life balance conditions, assessment of approach towards possible gender issues
Not discussed, though the laboratory is almost entirely female, with the exception of Stanek. Could be more gender balanced in future recruits.	
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.
Seems well integrated. The team was part of the Center of Excellence for RNA Biology that joined teams from the Czech Academy of Sciences, Charles Univ and CEITEC/Masaryk Univ. with established collaborations. The joint manuscript is currently under revision in NAR.	

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
Stanek lists a number of collaborations with prominent scientists elsewhere in Europe.	
D3.2	Effectiveness of joint research centres
Not relevant	
D3.3	Success rate in supervision of PhD students
High. Three completed their PhD over the last 5 years, none failed.	
D3.4	Participation of PhD students in the outputs
The first authors on the outputs are entirely grad students with the exception of one post-doc first author	
D3.5	Participation of the team in master or bachelor studies

The laboratory currently lists 2 diploma students and 3 graduated over the last 5 years, two of whom went on to do PhDs.	
D3.6	Assessment of cooperation intensity with universities in the form of teaching
Stanek teaches a semester long course on „RNA structure and function“ each year at Charles University. He also teaches a Doctoral level lecture once in IMG on “Regulation of RNA Splicing”.	

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

D4.1	Sufficiency of media strategy and activities in the area of research popularisation
Dr. Stanek has written an article in Czech for the popular press, has participated in „open science“, which involved bringing high school students into the lab, contributes to „open door“ day and has given several interviews to Czech radio and television.	
D4.2	Publishing activities and its quality
Not clear as these are in Czech	
D4.3	Participation in professional organisations in the area of research and development
Member of the TESCAN council and the RNA society	

Team categorisations and a brief commentary:

<input type="checkbox"/> strengthen the support of the team <input checked="" type="checkbox"/> keep the support of the team at the current level <input type="checkbox"/> reduce the support of the team
This is a solid research group working in an important but very competitive area in RNA biology. Overall, the team is productive, although publication in higher visibility journals needs to improve. Also, it would be good to obtain international funding, perhaps as part of a larger European collaboration. At present, we recommend keeping the support of the team constant.

Other comments of the commission:

Team 5. Laboratory of Transgenic Models of Diseases

Strengths:

Team 5 is the largest in the IMG and occupies an important position, based in large part on its „service“ activity as the Czech Centre for Phenogenomics (CCP). This center is of undisputed European and global importance and is the source of a multitude of national and international cooperations, many of which represent ambitious projects such as the International Mouse Phenotyping Consortium (IMPC) and INFRAFRONTIER.

Weaknesses:

With the progressive growth of its international engagement, space and consequently capacity has become a rate-limiting factor and may need to be addressed in the near future in order to avoid a reduction in the attractiveness of this center in the context of international efforts such as the IMPC. This is despite the movement of the CCP team into a dedicated new building in December 2015 at Vestec on the BIOCEV campus. Another key weakness perceived by the committee is that there is significant overlap between the research activities and the CCP and they are managed by the same Team leader. Consequently it is quite difficult to define the boundaries of research and service, especially given the very broad scope of certain research topics such as „Metabolism“ and „Physiology and transcription factors“. Furthermore, all the projects are dependent on the CCP infrastructure and expertise. It is therefore problematic to accurately judge the merits of, and so guide the research activities independently of the CCP.

Opportunities:

There is an important policy development towards preclinical development within the Framework of CAS and the Strategy AV21 and environmental impact in the context of aging as well as contract research, notably in the field of covid19-treatment development.

Threats:

The ability to recruit multidisciplinary and specialist staff is clearly essential for such a comprehensive phenotyping exercise. Ideally this requires highly trained individuals who are also of course in demand at an international level. The competitiveness of the Czech scientific environment for career development at an international level is therefore a major factor that cannot be controlled by the host institute alone. In addition, there is a threat that the scale of the CCP may be constrained given the previous investment of a custom-designed new building for the CCP and so possible limits on future investment.

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

H1.1	Quality of selected outputs of Phase I
The outputs that were selected for evaluation in Phase I were ranked well in terms of journal ranking and moderately well in terms of citation intensity.	
H1.2	Contribution of workers on the outputs reached
The Team has been the major driver in terms of the mouse-based work in each of the 18 outputs that were evaluated in Phase I. However, depending on the level of contribution of the mouse model work to the project in each paper, the overall contribution of the lab has been estimated to vary from 100% to 5% for each output.	

H1.3	Quality of all outputs and results
By virtue of the involvement of the CCP in many collaborative projects, there have been numerous (around 90) high quality publications.	
H1.4	The most valuable discoveries and findings in the fields, their importance for the field
<p>Apart from the numerous extremely valuable projects which the CCP has been engaged in, this Team has also made many important contributions within its own diverse research fields. Much of the value of their contribution to each research field centers on their generation of knock out mutant lines as well as their detailed phenotyping (so basically enabled by the CCP Service activities). Specifically: 1) Proteases in physiology and disease: Clarification of the role of kallikreins in the functional proteolytic network in the skin as well as associated pathophysiologicals such as skin inflammation. Defining the role of Trabd2 metalloproteinase in Wnt signalling and brain / head development. 2) Skeletal and tooth development and disease: Revealing the role of amelogenin, ameloblastin and FAM46 proteins by analysing bone and tooth biomineralization in mutant KO lines using sophisticated imaging approaches. 3) Metabolism: A genome wide search for genes involved in regulating metabolism as well as exploring the function of brown adipose tissue (BAT) and the constitutive androstane receptor (CAR) at the transcriptomic, metabolomic and physiological levels. 4) Ubiquitylation-mediated processes in health and disease: Providing the first insight into the role of poorly understood ubiquitin ligases such as the Cullin-RING ubiquitin ligase (CRL) and the cul4a ligase complex. 5) Gastrointestinal projects and Immunology topics: Identifying the contribution of MMP-19 function to inflammatory bowel disease and 6) Physiology and Transcription Factors: Characterizing the physiological function of the ZNF644 and Atf2 transcription factors.</p>	
H1.5	Contribution of the participation of the authors in large collaborations
In large part due to the activities of the CCP, this team has been exceptionally well integrated into several large European and global collaborations including notably the International Mouse Phenotyping Consortium (IMPC) and INFRAFRONTIER (part of the ESFRI roadmap)	

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 Topic of this Team fits perfectly within the institute mission of understanding the links between Genes and Function in terms of biochemistry, cell biology, physiology, pathology and in the context of whole organism biology. The multitude of mouse models that have been generated by this team represent not only invaluable tools for understanding how abnormal gene function underlies pathology, but also constitute useful tools for the development of novel therapeutic and diagnostic approaches in order to advance the efficacy of biomedicine.	
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
N/A	

H1.3	Relation to practice
N/A	

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
After a period of significant investment in infrastructure and expertise the CCP represents the premiere institution of its kind in the Czech republic, one of the three largest and productive in Europe and certainly a global leader in the generation and phenotyping of loss of function mouse lines.	
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 CCP occupies a key strategic position, not only generating mutant mouse lines, but also systematically phenotyping them. The „complete package“ offered by this Team makes it very attractive to national and international collaborators, as indicated by the high quality collaborative publication track record. This importance is also reflected in the CCP being one of the founders of and principal contributors to the major European consortium INFRAFRONTIER.	
D1.3	Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)
Consistent with the Team’s central role in many major international and global consortia, the leader Radislav Sedlacek is chair of many important coordinating committees such as ESFRI as well as INFRAFRONTIER GmbH. Furthermore various team members have organized and/or attended numerous prestigious national and international meetings and workshops and given many 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 research activities of this group are intertwined with the Service activities of CCP.	
D2.2	Assessment of the previous research objectives and their achievement
The previous commission commended the laboratory for its high quality of projects, its expertise and ideal age distribution as well as its effective implementation of cutting edge technology. However, they also highlighted financial modalities as a potential threat to the CCP. This was based on the observation that all the projects undertaken were in the form of collaborations and so external collaborators did not fully cover costs.	
D2.3	Assessment of implementation of recommendations from past evaluation
The CCP has clearly continued to invest in its internationally leading position and has benefited from relocation of all units to the new building at the BIOCEV campus in Vestec.	

<p>Each phenotyping activity has been integrated into a comprehensive phenotyping pipeline and also two new units: „Metabolomics“ and „Electrophysiology“ have been incorporated to expand the repertoire of the CCP. Importantly a Bioinformatics unit was established in 2017 as a key tool to support large scale data acquisition, integration and sharing. Most recently this has led in 2019 to the integration of the CCP and IMPC consortial databases which has enabled it to more effectively make data publically available. Due to the development of CCP in the context of the program 'large research infrastructures' (MEYS), the CCP and the research group have now been separated (although both under the leadership of R. Sedlacek who is the PI). However, this commission feels there is still too much overlap between service and research, a situation that makes a reasonable assessment of the Research activities problematic. We advise the complete separation of Research with the appointment of an independent PI. Regarding the threat of the financial modalities, the Team has adapted its portfolio to create more of a mixture of „services“ where costs are fully covered and „collaboration“ where costs are not fully covered by the external users. Furthermore, a long-term contribution to financial support from the national roadmap for 'large research infrastructures' (MEYS) programme has been secured. However, as for all other Teams that have been evaluated in this round, the commission remains concerned that the economic consequences of the pandemic restrictions for the world economy, may well threaten the level of overall funding, including that from CAS as well as from the IMG.</p>	
D2.4	Success in receiving grants
<p>Based on its national and international high visibility and strategic importance, this team at CCP has been very successful in acquiring national and European funding. This is added to the relocation to the BIOCEV center which represented a significant local financial investment in CCP.</p>	
D2.5	Adequacy of instrumental equipment
<p>The relocation of this team to the BIOCEV campus buildings has permitted the updating and effective integration of specialized infrastructure to create a comprehensive phenotyping pipeline that employs internationally competitive, state-of-the-art analytical instrumentation.</p>	
D2.6	Effectiveness of management
<p>By virtue of the inclusion of the CCP, this team represents by far the largest group at the IMG. Its size, complexity and dynamics inevitably place extra demands on management, in order to ensure effective administration and organization. The success of the CCP is a clear indication of a successful management structure. However, given the scale of the CCP operation, (108 employees) compared with the Research team (15 people), the commission feels that a more effective management structure would be to have entirely separate Team leaders for the research and service activities.</p>	
D2.7	Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth
<p>A clear priority for this team is to minimize the turn over of the more highly qualified and dedicated staff of experts and technical assistants – in order to ensure the long term competitiveness of the service offered. The policy of encouraging international recruitment, is vital to increase the chances of attracting experts in particular fields. Furthermore, the increasing number of users has helped to drive an increase in the hiring</p>	

<p>of new technicians to meet the increased demand. The age structure of the team is excellent with a bias towards younger members. With this in mind, it should be stressed that the diverse activities on-going within this team, makes for an excellent multidisciplinary training for young scientists. The commission feels that the continued engagement of this team in major, highly visible international projects will be vital to ensure that this center continues to attract and maintain the best scientists. The ability to offer internationally competitive salaries to expert researchers will also be vital to ensure the continued success of recruitment to this team.</p>	
D2.8	Creating work-life balance conditions, assessment of approach towards possible gender issues
<p>There seems to be a reasonable gender balance within this team</p>	
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.
<p>N/A</p>	

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
<p>This team has been very actively involved in training Bachelor, Master and doctoral students as well as hosting lectures courses and seminars. Through its support of the BIOCEV project, this team has also been a major source of support for cooperation between universities and CAS institutes.</p>	
D3.2	Effectiveness of joint research centres
<p>The BIOCEV project represents a strategically vital joint research center that involves close cooperation between several Universities, including Charles University, Masaryk University, Olomouc University, University of South Bohemia, Mendel University in Brno and others as well as several CAS institutes. The CCP is of key importance for this project due to its provision of a unique combination of infrastructure and expertise that serves many national and international users and so very much represents a lighthouse project for the IMG, the CAS and the Czech Republic. The leader of Team 5, R. Sedlacek designed and implemented the NPUII project that ensures financing of the majority of groups in the BIOCEV project.</p>	
D3.3	Success rate in supervision of PhD students
<p>The number of successfully completed PhD projects as well as the publication record of these students points to an overall very successful supervision of PhD students by this group.</p>	
D3.4	Participation of PhD students in the outputs

PhD students are clearly actively encouraged to participate in many of the collaborative projects pursued by the lab.	
D3.5	Participation of the team in master or bachelor studies
This team has been very actively involved in training Bachelor and Master students in the theory and application of the latest tools and approaches for establishing genetically modified lines of mice and phenotyping them. As a measure of the success of this approach, many Bachelor students continue to study for their Masters degree in the team and also many Master students carry on to study for their Doctoral thesis here.	
D3.6	Assessment of cooperation intensity with universities in the form of teaching
Based on its wealth of expertise in the development and application of key mouse genetic technologies and its unique multidisciplinary training environment, this Team has very logically been actively engaged in a large number of University teaching activities including practical training, lecture courses and seminars.	

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 has been very active in conveying the impact and importance of its work by its regular appearance in TV, radio, the internet and social media, as well as in public open days. This has very effectively show-cased the importance of the CCP activities. This is a vital activity that should be encouraged in the future, not only to contribute to popularizing science but in the long term to foster political support for this important activity.	
D4.2	Publishing activities and its quality
Consistent with the international importance and visibility of CCP, this Team has been very active in preparing newspaper and magazine articles aimed at popularizing their activities. This commission encourages them to maintaining these very positive efforts as it will hopefully pay dividends later in terms of fostering political support.	
D4.3	Participation in professional organisations in the area of research and development
Consistent with the strategic importance of the CCP, this team is actively involved in many professional organizations, notably those linked with the maintenance of large infrastructures. Thus, Radislav Sedlacek has served as chair on the ESFRI and INFRAFRONTIER committees and as a member of the IMPC steering committee. Also, he has been a member of the EASAC genome editing Working group and the council for large infrastructures for research, development and innovation, the Ministry of Education, Youth and Sports, Czech Republic.	

Team categorisations and a brief commentary:

- | |
|---|
| <input checked="" type="checkbox"/> strengthen the support of the team
<input type="checkbox"/> keep the support of the team at the current level
<input type="checkbox"/> reduce the support of the team |
|---|

<p>This team, notably the CCP, clearly offers great strategic value for the IMG, representing a „lighthouse“ activity. However, this commission believes that it would be very valuable to fully separate the research and service activities of this team. While certainly dependent on the CCP infrastructure, the research activities would benefit from more independent scrutiny. If they were split, then we would recommend an increase in support for the research team.</p>
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Other comments of the commission:

Team 6. Laboratory of Cell and Developmental Biology

Strengths:

- High scientific output (35 articles listed in the report (plus 7 other outputs) and 4 pubmed entries under Korinek V in 2020 and 2 pubmed entries under Korinek V so far in 2021)
- Good size of the group with several PhD students (8 researchers; 7 other workers; 5 PhD students listed in 2019)
- High significance of research topics
- Specialized methodology- mouse models of cancer, organoids, iPS cells, scRNA-seq and mass spectrometry
- Good complementarity of the various research topics
- Top heavy group: 3 PI's (Lanikova heads the group working on hematological malignancies, Valenta (who was a PhD student in the lab) just returned from a very long postdoc with Konrad Basler where he published several high impact papers)
- Extensive collaborative network (national, within as well as outside the institute, and international)
- Good use of state-of-the-art techniques including bioinformatics
- Good access to patient specimens
- Good funding
- Good age structure of the group

Weaknesses:

- Financial dependence on short term grants
- High cost, relatively speaking, of animal research

Opportunities:

- Moving away from animal models to organoids and cell reprogramming and differentiation techniques
- Making increasing use of patient samples (eg, whole exome sequencing of individuals suffering from selected hematological disorders)
- Lanikova's research theme is well integrated in the hematological community; Valenta brought a new complementary topic (mesenchymal and stromal cells);
- International exchange of people between Zurich (K. Basler lab), Salt Lake City (J. Prchal lab) and Prague

Threats: Financial dependence on short term grants

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

H1.1	Quality of selected outputs of Phase I
The quality of selected outputs is excellent to outstanding.	
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. (however one should note at this point that most of the Valenta papers listed were done when he was a postdoc with Konrad Basler in Zurich).	

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 excellent to outstanding.	
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 and future therapies.	
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
'several patents' is mentioned in the report but no details are provided	
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 is making very significant contributions in their three research themes	
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 with significant contributions to the collaborative work.	
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 several lectures at national and international meetings; he was also a co-organizer of an EMBO workshop which took place in Brno.	

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 full 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 with a high quality.	
D2.3	Assessment of implementation of recommendations from past evaluation
The group made great stride in implementing the recommendation of the last evaluation by increasing further their participation in outreach activities (it seems that they were already doing it and that the last evaluation failed to recognize it).	
D2.4	Success in receiving grants
They have been successful in attracting several grants (national) and the main PI should be in a good position to apply for an ERC grant, which should be a priority.	
D2.5	Adequacy of instrumental equipment
The equipment appears to be excellent	
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
The HR policy of the group appears to be excellent.	
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.
This point was not addressed	

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
The Laboratory was not involved in joint research centers with universities	

D3.3	Success rate in supervision of PhD students
Several theses (4) were defended during 2015-2019; several doctoral students (2) currently in the laboratory.	
D3.4	Participation of PhD students in the outputs
Very good	
D3.5	Participation of the team in master or bachelor studies
substantial teaching by two of the PIs of the group with 6 master and bachelor students who successfully defended their thesis during 2015-2019 and 5 currently under training.	
D3.6	Assessment of cooperation intensity with universities in the form of teaching
Two of the PIs of the group are participating in teaching in several 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 laboratory is very active in outreach activities	
D4.2	Publishing activities and its quality
No popular science publication was mentioned.	
D4.3	Participation in professional organisations in the area of research and development
The leader is involved in several boards and committees.	

Team categorisations and a brief commentary:

<input checked="" type="checkbox"/> strengthen the support of the team <input type="checkbox"/> keep the support of the team at the current level <input type="checkbox"/> reduce the support of the team
This team is doing excellent work in highly significant biomedical areas, is very active, and still on an upward trajectory. The three main research topics are well designed with strong preliminary data and excellent follow-up plans. The team is poised to make high impact and significant contributions towards understanding the biology of normal and transformed adult stem cells in the gastrointestinal tract and hematopoietic system. An increased support of the team is recommended, but continued support at the current level is also possible.

Other comments of the commission:

Team 7. Laboratory of Mouse Molecular Genetics

Strengths:

- Good, but not excellent, scientific output (10 articles listed in the report for the 2015-2019 period; 1 entry on Pubmed in 2020; 2 entries on Pubmed in 2021)
- Several publications in broad impact journals (2 eLife papers in 2018; 1 PLoS Genetics paper in 2016)
- Unique/niche question (hybrid sterility/speciation/Prdm9)
- Good reputation in the international mouse genetics community
- Several strong international collaborations

Weaknesses:

- Limited funding
- Very small size of the group whose average age is clearly rather old (in 2019: 3 researchers and 4 other workers; one student just joined the group for his PhD)
- Decreasing productivity of the group in the past 5 years
- No outreach activities according to the information on page 15 (but on page 12, it is written that the head of the lab was involved in some TV discussions about science)
- No teaching activities outside the lab

Opportunities: none identified besides continuing the traditional studies

Threats: Limited funding; highly specialized and rather small field

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

H1.1	Quality of selected outputs of Phase I
The output quality has been good 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 quality of the work is very good to excellent.	
H1.4	The most valuable discoveries and findings in the fields, their importance for the field
The most valuable discoveries in the field, which took place many years ago, were excellent, with a couple of them being outstanding.	
H1.5	Contribution of the participation of the authors in large collaborations
The team was involved many years ago (2004) in the collaborative cross. At this time, the team is not part of a large collaboration.	

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 good long term potential.	
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

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 hybrid sterility/speciation and the discovery of Prdm9 in these processes (Science paper from 2009); the contribution seems to have greatly 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 is now involved in several 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 several lectures 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 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 but this was very limited in scope.	
D2.4	Success in receiving grants
There seems to be minimal grant funding.	

D2.5	Adequacy of instrumental equipment
The equipment appears to be excellent.	
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.
This point was not addressed.	

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 engaged in international collaborations; no evidence of national collaborations or mentoring of junior faculty locally or nationally.	
D3.2	Effectiveness of joint research centres
D3.3	Success rate in supervision of PhD students
No thesis defended in 2015-2019.	
D3.4	Participation of PhD students in the outputs
Very good.	
D3.5	Participation of the team in master or bachelor studies
None.	
D3.6	Assessment of cooperation intensity with universities in the form of teaching
None.	

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

D4.1	Sufficiency of media strategy and activities in the area of research popularisation
Participation in some TV discussions about science.	
D4.2	Publishing activities and its quality
None.	
D4.3	Participation in professional organisations in the area of research and development
The leader is involved in several boards and committees.	

Team categorisations and a brief commentary:

<input type="checkbox"/> strengthen the support of the team <input type="checkbox"/> keep the support of the team at the current level <input checked="" type="checkbox"/> reduce the support of the team
This team has done outstanding work in the past but appears to be fading away in many regards.

Other comments of the commission:

Team 8. Laboratory of Signal Transduction

Strengths:

- FcεRI signalosome as research subject of high potentials for translation
- highly qualified multidisciplinary team
- many national and international collaborations
- regular invitations to international conferences
- students and post-docs well educated to find positions to continue their careers, both in the Czech Republic and abroad (academic and industry)
- use of sophisticated instrumentation and research facilities
- communication of science also to the public
- well elaborated research plan for the next period
- regular teaching at the university
- generation of unique reagents such as DNA aptamers and monoclonal antibodies

Weaknesses:

- age distribution of group members
- increasing bureaucratic burdens (PI is also institute director)
- translation to medical applications could be improved

Opportunities:

- well elaborated working plan
- very good international partners
- well embedded in international network
- novel methodological approaches
- access to well equipped core facilities
- potential for own (young investigator) sub-groups

Threats:

- the group pursues a large panel of projects
- to get international funding for all the projects
- long term financial situation

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

H1.1	Quality of selected outputs of Phase I
High quality outputs also in national and international collaborations Most publications with corresponding author of the group Publications in many fields of research	
H1.2	Contribution of workers on the outputs reached
Out of 23 papers published in 2015-2019, PhD students are co-authors of 12 of them Presentations of results of PhD students at national and at international conferences.	

H1.3	Quality of all outputs and results
<p>High quality outputs in good to high quality journals Publications in many fields of research Special focus on reviews on mast cell activation, new findings in FcεRI and KIT receptor signaling, biophysical, microscopic, and functional studies of immune receptors, and the role of ORMDL proteins Compared to the size of the group relative low publication number (16) but high number of reviews. 8 publications from the MCI subgroup.</p>	
H1.4	The most valuable discoveries and findings in the fields, their importance for the field
<p>The work is focused on molecular mechanisms governing signal transduction from plasma membrane immunoreceptors, especially FcεRI and cKit, and the role of plasma membrane signalling complexes (signalosomes) and cross-talk of their key components involving other receptors, proteins, lipidic environment, and regulation during mast cell activation.</p> <ul style="list-style-type: none"> - ethanol inhibits FcεRI signaling under <i>in vivo</i> conditions - miltefosine modulates mast cells both at the plasma membrane and in the cytosol by inhibition of cPKCs - Gal3 is an important regulator of mast cell surface molecules - Single-nucleotide polymorphism studies on 17q12-q21 and the environment of the human orosomucoid-like (<i>ORMDL</i>)3 gene in the context of the risk of asthma and other inflammatory diseases - New regulatory roles of C-terminal Src kinase CSK in FcεRI-mediated mast cell activation - the role of cytoskeletal protein 4.1R in FceRI signaling and mast cell chemotaxis 	
H1.5	Contribution of the participation of the authors in large collaborations
<ul style="list-style-type: none"> - founding member of COST EU action BM1007, Mast Cells and Basophils – Targets for Innovative Therapies, - founding member of the European Mast Cell and Basophil Research Network (EMBRN) with more than 300 members - strongly involved in EU cooperations - bilateral cooperations 	

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

H2.1	Societal relevance of outputs and results pursuant to CAS and institute mission
<p>Basic research in one of the major fields of the institute with high potential of translation into medicine.</p> <p>Activities in boards and committees:</p> <ul style="list-style-type: none"> - Membership of international societies: American Society of Microbiology, American Society for Cell Biology, The American Association of Immunologists, Biochemical Society Advancing Molecular Biosciences, and Czech Immunological Society - Reviewer for national funding organizations - Board members of CAS institutes - Member of scientific journal editorial boards 	

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
<p>The research is driven by basic findings and investigations with a very high potential for clinical transfer and maybe also therapeutic target identification in the immune system. The research can also have an impact on the understanding and influencing early signalling pathway activities in immune-system diseases and cancer. Appropriate human models should be further favoured and potential clinical partners can be contacted for cooperation.</p>	
H2.3	Relation to practice
<p></p>	
H2.4	Participation in AV21 strategy
<p>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</p>	
H2.5	Cooperation with regions of the Czech Republic
<p>Prague area and Krč campus, cooperation with Charles university and Technical university, Prague</p>	

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
<p>The research quality is at the top international level.</p>	
D1.2	Scope and quality of international and national cooperation and the role of the team in such cooperation; engagement in broad international cooperation
<p>actively involved in 3 EU joint research activities with multinational partners. Founder member of 2 activities bilateral collaborations with 7 academic partners from 4 countries (France, Israel, USA, Schweden)</p>	
D1.3	Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)
<p>active in organization of conferences on national (yearly in the institute). 9 invitations to international congresses</p>	

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
<ul style="list-style-type: none"> - Clearly defined, well designed goals - Executed with competence - Partly funded internationally - Sophisticated instrumentation applied - Clear output - well ranked publications but lower number 	
D2.3	Assessment of implementation of recommendations from past evaluation
The recommendations were taken seriously and started to be fulfilled in international cooperations	
D2.4	Success in receiving grants
successful on the national, bilateral, international (EU) level	
D2.5	Adequacy of instrumental equipment
The opportunities of sophisticated instruments and modern core facilities at IMG are highly adequate for the research of the group	
D2.6	Effectiveness of management
The group leader is very effective if one considers his workload as director of IMG and his other activities in committees and boards in which he is involved.	
D2.7	Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth
<p>Competent team for the projects of the research.</p> <p>The age structure <50 is well balanced but the number of group member >60 is relatively high. The future of the members of the MCI laboratory has to be addressed.</p> <p>Students and post-docs find positions to continue their careers, both in the Czech Republic and abroad (academic and industry).</p>	
D2.8	Creating work-life balance conditions, assessment of approach towards possible gender issues
<p>Work-life balance conditions are offered in the frame of the institute and the campus.</p> <p>Gender issues may be improved together with the age structure.</p>	

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.
Data not available	

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 and Technical University through teaching activities Five doctoral, four master and four bachelor students were formed in the evaluation period	
D3.2	Effectiveness of joint research centres
Participation in joint facilities	
D3.3	Success rate in supervision of PhD students
Very good (6)	
D3.4	Participation of PhD students in the outputs
PhD students are co-authors of 12 of 23 papers out of which 16 were evaluated in phase I	
D3.5	Participation of the team in master or bachelor studies
master (4) and bachelor (4) students supervised until defence	
D3.6	Assessment of cooperation intensity with universities in the form of teaching
strong participation in regular bachelor and master study courses	

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

D4.1	Sufficiency of media strategy and activities in the area of research popularisation
active in many lectures for general public, popularization publications, open door activities	
D4.2	Publishing activities and its quality
Interviews	

D4.3	articipation in professional organisations in the area of research and development
Member of the council and boards of scientific societies and journals	

Team categorisations and a brief commentary:

<input type="checkbox"/> strengthen the support of the team
<input checked="" type="checkbox"/> keep the support of the team at the current level
<input type="checkbox"/> reduce the support of the team
<p>The Signal Transduction Laboratory performed well in the evaluated period of 2015-2019. It has published regularly in good and very good international peer-reviewed journals in its field. It has produced solid research results. Original research reagents have been developed and commercialized. The laboratory is well integrated into the Institute of Molecular Genetics and into the Czech and international research landscape.</p> <p>In the future, a research focus on fewer projects should be considered. Focusing on only a few topics and increasing manpower for these projects would certainly be helpful in generating results that are suitable for high-impact journals. The analyzes planned for the future on ORMDL proteins in the synthesis of bioactive lipids and mast cell signaling are a step in the right direction.</p>

Other comments of the commission:

Team 9. Laboratory of Biology of the Cell Nucleus

Strengths: This is a team focused on understanding the functional interplay between chromatin and nuclear components including phosphoinositides, lamin A and nuclear myosin I, which is an important topic and the team has made some impact in our understanding of eukaryotic gene regulation. Another major strength is the team's advanced microscopy skill in both light and electron microscopy that has contributed to not only their own research but also collaborative work with a number of high impact publications, including Cell Metabolism (2015; 2019), eLife (2017), Nat. Comm (2019). The team's pursuit of novel nuclear organelles such as nuclear lipid islets (NLIs) is also a strength.

Weaknesses: The lack of publications in top journals as the senior corresponding author. However, Dr. Hozak did publish a few solid research papers in J. Cell Sci., and he has been successful as the Director of Czech-Biolmaging, that produced high impact publications out of this fantastic infrastructure.

Opportunities: The technical skills in advanced microscopy and recently findings on NLIs look very promising to make a significant impact on the field. The NCB manuscript on NLIs seems to be promising and worth fighting to get it published.

Threats: Nothing is serious. The team may need to be more focused on the future aims/directions (4 of them) by balancing those ambitious goals with the realistic outcomes that can be achieved within the funding period.

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

H1.1	Quality of selected outputs of Phase I
Publications of 3 x Journal Cell Sci, 1x CMLS, and 1x Cells were selected. IF ranges 4~6, which is decent but not great. Should focus more on quality than quantity in future publications.	
H1.2	Contribution of workers on the outputs reached
Out of 5 outputs evaluated within Phase I, 3 were completed fully in Dr. Hozak's laboratory, 2 with major contributions through majority coauthors working on the project.	
H1.3	Quality of all outputs and results
Overall, a total of 46 articles in journals with impact factor were listed, among which are high impact studies (Cell Metabolism, eLife, Nat Comm., Cell Reports) as coauthors; a number of senior authorship publications are in reasonably good journals like JCS, CMLS and Sci. Reports. This represents an acceptable level of productivity.	
H1.4	The most valuable discoveries and findings in the fields, their importance for the field
I think the discovery of novel nuclear membraneless organelles such as Nuclear Lipid Islets or NLIs, which is part of the Nat Cell Biol manuscript mentioned, is the most valuable work and important for the field.	
H1.5	Contribution of the participation of the authors in large collaborations
Not relevant.	

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

H2.1	Societal relevance of outputs and results pursuant to CAS and institute mission
The relevance is in terms of understanding the molecular mechanisms of the relationship between nuclear compartmentation and regulation of gene expression, the nucleoskeleton and functions of nuclear lipids, which has direct implications in human diseases such as laminopathies.	
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
N/A	
H1.3	Relation to practice
N/A	

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 Hozak laboratory is certainly well recognized nationally for his directorship of the national research infrastructure Czech-Biolmaging with major contributions to a number of high-profile publications resulting from the services provided. His own research on the biology of cell nucleus has a steady output with relatively limited impact during the past 5 years. However, the lab is poised to make a major impact in the field internationally with the new directions in the coming 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
<p>The Hozak laboratory participated in a large 8-year project granted by the Technological Agency of the Czech Republic, managed by the Fisher Scientific, which allowed them to use their technical skills and knowledge on advanced microscopy for national cooperation with other research teams yielding significant outputs.</p> <p>International cooperation is related to the open access of Czech-Biolmaging infrastructure, directed by Dr. Hozak, to other users from the Europe, with major contribution of the team to the high profile research outputs (Cell Metabolism; Nature Plants etc.)</p>	
D1.3	Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)
Dr. Hozak participated in organizing one national workshop and one international conference in 2018 and 2019 related to cellular structure and chromosome research. He was also invited to give 9 prestigious lectures (plenary/invited) internationally over 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 existing and future research directions are in line with what has planned.	
D2.2	Assessment of the previous research objectives and their achievement
The laboratory has made good progress in their area of research	
D2.3	Assessment of implementation of recommendations from past evaluation
The main recommendation from the past evaluation was to continue in the ambitious projects and further focus on the underlying mechanisms, which has been followed.	
D2.4	Success in receiving grants
The laboratory seems to be supported mainly by the Infrastructure grant. Need to secure internal or external research grants.	
D2.5	Adequacy of instrumental equipment
Excellent.	
D2.6	Effectiveness of management
The laboratory seems well managed while providing excellent services to others.	
D2.7	Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth
The laboratory is led entirely by Dr. Hozak. It currently consists of 1 Master student and 9 Doctoral students. So, age-wise it is a young group. However, it is advised to recruit experienced postdoc to boost the productivity.	
D2.8	Creating work-life balance conditions, assessment of approach towards possible gender issues
Well discussed concerning the gender policy and work-life balance, particularly for the maternal leave policy and arrangement.	
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.
It is well integrated.	

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
Dr. Hozak has a broad scope of cooperation with universities within Czechia and scientists elsewhere in Europe through the Czech-Bioluming infrastructure.	
D3.2	Effectiveness of joint research centres
Not relevant	
D3.3	Success rate in supervision of PhD students

Four out of 9 PhD students successfully defended their PhD over the last 5 years. Unclear what happened to the remaining 5 PhD students.	
D3.4	Participation of PhD students in the outputs
Great. All his lab major publications and other contributing publications involve his PhD students.	
D3.5	Participation of the team in master or bachelor studies
The laboratory currently lists only 1 Master student, and 0 bachelor student over the past 5-year period.	
D3.6	Assessment of cooperation intensity with universities in the form of teaching
Pavel Hozák is a full professor at the Charles University in Prague, where he is now involved mostly in post-doc training.	

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

D4.1	Sufficiency of media strategy and activities in the area of research popularisation
Dr. Hozák participated in two TV discussions and two TV news programs	
D4.2	Publishing activities and its quality
Dr. Hozak published two newspaper articles on advanced microscopy contribution to current biomedicine.	
D4.3	Participation in professional organisations in the area of research and development
Dr. Hozak worked for all five years on the editorial board of the Scientific America – Czech edition.	

Team categorisations and a brief commentary:

<input type="checkbox"/> strengthen the support of the team <input checked="" type="checkbox"/> keep the support of the team at the current level <input type="checkbox"/> reduce the support of the team
This is a research group combining Infrastructure support to others with their own research interest employing multidisciplinary approached to understand the relationship between nuclear compartmentalization and regulation gene expression, the nucleoskeleton and functions of nuclear lipids. As the Director of Czech-Biolmaging infrastructure, Dr. Hozak led an efficient team providing excellent services to others with contributions to high profile publications. As an independent researcher, they do have reasonable output with decent publications. However, the team is advised to recruit experienced postdoc(s) to facilitate their research aims and boost quality of publications, also try to secure national and European grants to sustain their own research lines. At present, we recommend keeping the support of the team constant.

Other comments of the commission:

Team 10. Laboratory of Biology of Cytoskeleton

Strengths:

- interesting and well defined research topics
- successful in grant acquisition
- focus on basic research with potential for medical applications
- cutting-edge research methodology and tools
- successfully active in knowledge transfer and industry cooperation
- highly qualified team members
- active cooperation with universities
- organization of international conferences

Weaknesses:

- highly dependent on relatively short-term grants
- no European grants
- some delays in achieving high-impact publications

Opportunities:

- further development of the national and international cooperation network
- cooperation with medical research institutions and clinics
- additional active research collaborations with companies
- well-developed activity plan

Threats:

- lack of public funding for research due to Covid crisis
- difficulties in finding highly motivated students
- in general, hardly competitive salaries of scientific staff

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

H1.1	Quality of selected outputs of Phase I
Excellent quality of the selected papers in quality level 2 and 3, with an appropriate proportion of reprint authors.	
H1.2	Contribution of workers on the outputs reached
From 18 articles with impact factors published in the evaluation period, 9 contained major contributions from the team; 10 publications were co-authored by PhD students.	
H1.3	Quality of all outputs and results
Almost all scientific papers were published in journals with impact factor, indicating the generally high scientific quality of the results. An important additional output is the commercialisation of monoclonal antibodies against cytoskeletal proteins by companies.	
H1.4	The most valuable discoveries and findings in the fields, their importance for the field
The main focus is basic research on molecular mechanisms of microtubule nucleation and organisation in cells under normal and pathological conditions. Among the most important	

discoveries is the characterisation of gamma-tubulin isotypes as well as gamma-tubulin mutations linked to brain malformations. Further important aspects are the dysregulation of microtubule proteins in cancer cells as well as the modulation of microtubules by nanosecond electropulses. Since microtubules are an important target for chemotherapy, the findings may open new opportunities in cancer chemotherapy.	
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
Based on excellent scientific research, the results may potentially contribute to make chemotherapy more specific against tumor cells, which would be of considerable societal relevance. Moreover, by providing new monoclonal antibodies as a research tool, the team makes an important contribution to the scientific community. These approaches fit well to 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
Knowledge transfer into practice is an important integral part of the Laboratory, as exemplified by the commercialisation of hybridoma cell lines producing monoclonal antibodies as a research tool in cooperation with companies.	
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.	
H2.5	Cooperation with regions of the Czech Republic
Prague area and Krč campus; Brno hospital	

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 well connected to international and national research institutions in USA, Canada, France, Sweden and Greece. Also collaborations at the national level with other CAS institutes as well as intramural cooperations within the IMG are well developed.	
D1.3	Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)
Members of the Laboratory have been active in (co-)organizing several international and European conferences as well as in organizing the Czech Cytoskeletal Club, indicating a respected leading role in the field. In addition, team members have been invited for lectures at international conferences.	

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 life-cell imaging and super-resolution microscopy offer novel methodological strategies towards new scientific insights.	
D2.2	Assessment of the previous research objectives and their achievement
The Laboratory successfully followed the previous research objectives in most of the planned lines of research. The only exception was the research plan for an EU project on the cross talk between mast and glioma cells, which was eventually not funded. The alternative approach was a stronger focus on gamma-tubulin research, including the modulation of microtubules by nanosecond electroimpulses, which turned out to be an excellent choice.	
D2.3	Assessment of implementation of recommendations from past evaluation
The recommendations have been successfully implemented, resulting in new interesting, successful collaborations and in the outlicencing of hybridoma cell lines to pharmaceutical companies.	

D2.4	Success in receiving grants
The Laboratory has been successful in receiving grants from National funding sources but was not successful with any European grant proposal. In total, sufficient grant money could be received in order to successfully cover 78 % of the budget by grant money.	
D2.5	Adequacy of instrumental equipment
The equipment seems to be appropriate	
D2.6	Effectiveness of management
The management seems to be adequate and effective for this relatively small team.	
D2.7	Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth
The team claims to follow the HR policy of the Institutem which seems to be successful, including career and qualification measures. The age structure of the team is well balanced, however, the proportion of young scientists (PhD students) could be increased.	
D2.8	Creating work-life balance conditions, assessment of approach towards possible gender issues
There is no indication of gender balance in the written report.	
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.
Data not available	

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 are quite active cooperations with Faculties of Charles University in Prague, including teaching several research-based courses and membership in scientific bodies and PhD programmes.	
D3.2	Effectiveness of joint research centres
N/A	

D3.3	Success rate in supervision of PhD students
Team members have been successfully supervising PhD students, 2 PhD students defended their theses within the evaluation period.	
D3.4	Participation of PhD students in the outputs
PhD students co-authored 10 out of 18 publications in peer-reviewed journals and presented their outputs at international conferences.	
D3.5	Participation of the team in master or bachelor studies
The Head of the Laboratory has been involved in 5 Master courses each at 2 different Faculties of Charles University.	
D3.6	Assessment of cooperation intensity with universities in the form of teaching
See the comment above; the thesis of one Master student has been supervised.	

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 Laboratory have been actively contributing to popularization of research, e.g. by regular participation in Open Doors Days and several Press releases.	
D4.2	Publishing activities and its quality
Data not available	
D4.3	Participation in professional organisations in the area of research and development
The Laboratory is active in cooperation with companies by commercialization of hybridoma cell lines (4 licence contracts). On this successful basis it is suggested to consider additional active research collaborations with companies.	

Team categorisations and a brief commentary:

strengthen the support of the team XX keep the support of the team at the current level reduce the support of the team
This relatively small sized group is working effectively and uses future directed technologies. The group has demonstrated that they are able to acquire licences and industry money. However, for such a small group it is difficult to participate in large EU collaborations due to the time-consuming and complex administrative work required. We

therefore suggest to keep the support of the group at the current level and encourage them to obtain additional, longer lasting grants in order to establish a better basis on human resources for larger collaborations.

Other comments of the commission:

Team 11. Laboratory of Epigenetic Regulations

Strengths: The team is well recognized internationally and has fruitful international collaborations. The team developed and established a unique portfolio of methodologies and mammalian models. Good productivity in high profile journals.

Weaknesses: There are no obvious weaknesses. However the team is focused on long term and high cost projects what could put them under pressure in the field of outputs/productivity.

There is some concern that the truncated form of Dicer they discovered in mouse oocytes, while very interesting, is only found in rodents and not in any other mammalian species, including humans. As such the relevance to human disease is likely limited and this could eventually turn into a dead end.

Opportunities: As the team leader said, the main opportunity represents expansion into virology and zoology, though relevance to human disease needs to be more carefully considered

Threats: There are no obvious threats. However research activities of the group are costly so they depend on grants, which could be complicated mainly during/after COVID pandemic.

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

H1.1	Quality of selected outputs of Phase I
<p>The team leader selected 6 outputs for Phase I evaluation. All of these outputs are published in high level Journals (Q1).</p> <p>Phase I evaluation:</p> <p>The productivity of the team in excellent outputs (per FTE/ with reprint author from the institute) is over average in World-Leading category.</p> <p>Based on Phase I evaluation it is obvious that selected outputs are excellent.</p>	
H1.2	Contribution of workers on the outputs reached
<p>Outputs evaluated within Phase I – 100%, 2* 90%, 3* 60%, 20 % contributions</p> <p>Overall: More than half manuscripts with main contribution, other manuscripts are with significant contribution.</p>	
H1.3	Quality of all outputs and results

<p>The publication record (24 manuscripts – 21 articles in journals with impact factor, 7 of them in Q1, 8,85 FTE) of the team is very good with some outstanding publications in highly recognized international journals.</p> <p>Important part of published outputs represent valuable review articles.</p> <p>Moreover the team leader is an author of a very nice and useful e-book: Introduction to RNAi and miRNA pathways.</p>	
H1.4	The most valuable discoveries and findings in the fields, their importance for the field
<p>One of the most valuable discoveries is the suggestion that miRNA inactivity in oocytes is likely common in mammals. Very interesting is the finding that miRNAs simply do not adapt their expression to the increasing cytoplasmic volume of the growing oocyte and become diluted to the point where their activity does not make a significant impact on the expanded maternal transcriptome. Also of interest is the follow up work looking at the more active truncated Dicer enzyme found in rodent oocytes, and efforts to express this isoform in somatic cells to see if protective antiviral RNAi can be induced.</p> <p>The team has produced unique mammalian models (such as DicerX mouse model, hamster piRNA knock-out).</p>	
H1.5	Contribution of the participation of the authors in large collaborations
<p>The team participates only in small collaborations.</p>	

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

H2.1	Societal relevance of outputs and results pursuant to CAS and institute mission
<p>The focus of the team perfectly corresponds with the IMG mission of understanding of molecular principles.</p>	
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
<p>The group is focused on basic research so there is no relevance to evaluate knowledge transfer into practice.</p>	
H1.3	Relation to practice
<p>Antiviral and therapeutic potential of short Dicer could have a relation to practice in the future, at least in animals.</p>	

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 team activity, the laboratory is nationally and internationally in a very good position.	
D1.2	Scope and quality of international and national cooperation and the role of the team in such cooperation; engagement in broad international cooperation
<p>Team has a huge, strong and fruitful network of national and international collaborations.</p> <p>International cooperation: University of Zagreb, Slovak Medical Uni, Slovakia, Regensburg University, Germany, MRC, Edinburgh, UK, University of Tokyo, Japan, IMBA, Vienna, Austria, University of California, Davis, USA</p> <p>National cooperation: CEITEC, Institute of Animal Physiology CAS , Biological center.</p>	
D1.3	Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)
<p>Team leader is a member of several committees/boards. The team organized 8 conferences/workshops during the evaluation period.</p> <p>The team leader was invited to give 7 lectures.</p> <p>Of note, the team leader was elected EMBO Member on 5/2018.</p>	

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 plans for the future are well set, with good attention to foundation. Future plans logically follow previous research but should perhaps seek to more clearly emphasize relevance to human disease.	
D2.2	Assessment of the previous research objectives and their achievement
The team had several aims during the evaluated period, all of them were successfully accomplished, and more importantly, they have set up the basis for an excellent research line in the next years.	
D2.3	Assessment of implementation of recommendations from past evaluation
<p>The team was advised to consider stronger focus and collaboration with a strong bioinformatics team on site.</p> <p>I completely agree with the team leader's approach to recommendations.</p> <p>Regarding on site collaboration with bioinformaticians there is an excellent collaboration with Vlahovicek's group (Zagreb), so I don't see any reason to change it.</p> <p>Regarding the stronger focus, it could be sometimes complicated, it is true that it depends mainly on obtained funding.</p>	

D2.4	Success in receiving grants
The success in receiving grants is great. Nearly 90% of the group budget comes from grants. Moreover the group has not only CZ grants, but also EU grant .	
D2.5	Adequacy of instrumental equipment
Instrumental equipment in IMG is adequate.	
D2.6	Effectiveness of management
Effectiveness of management is excellent. On top of that, I really appreciate the originality in how the team leader completed materials for Phase II evaluation. He is the type of person the research area really needs.	
D2.7	Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth
The professional structure is very good. The team is relatively small and young. Average group size is 8 people including the principal investigator. Into the team are hired the best candidates based on their skills and motivation. The team leader highly supports career and qualification growth of all members.	
D2.8	Creating work-life balance conditions, assessment of approach towards possible gender issues
There seems to be nice work-life balance and recruitment of the team aims at a gender balance.	
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 mainly with Charles University.	
D3.2	Effectiveness of joint research centres
Not applicable.	
D3.3	Success rate in supervision of PhD students
The number of PhD theses defended (3) in the evaluation period is good. Moreover PhD students often continue their career abroad.	

D3.4	Participation of PhD students in the outputs
Participation of PhD students in the outputs is high. In some manuscripts they featured as first authors.	
D3.5	Participation of the team in master or bachelor studies
During the evaluation period, the lab hosted five MSc. students and no bachelor.	
D3.6	Assessment of cooperation intensity with universities in the form of teaching
The teaching activities are based on lectures of the team leader (regular lectures of Epigenetics and Advances in Molecular Biology and Genetics).	

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 leader is very active in the area of research popularization. During the evaluation period he had several appearances in TV and radio, commenting on own research or events in science. He is also active on Social media (Twitter) and is the original co-author of the project and member of the board of Bioskop.	
D4.2	Publishing activities and its quality
The team leader prepared two articles about research for general public and provided some interviews for journals (5).	
D4.3	Participation in professional organisations in the area of research and development
The team leader provided lectures for general public (for example: DNA slabikář, Darwinovo tornádo na vrakovišti: Recyklace DNA, přetváření a vznik genů,...).	

Team categorisations and a brief commentary:

- strengthen the support of the team
- keep the support of the team at the current level XXXXX**
- reduce the support of the team

According to my opinion the team has a great value for IMG/CAS. They are working on challenging long term projects. I really appreciate the individuality of the team leader, he is the type of person the research area really needs. Excellent are also outreach efforts of the team leader.

Other comments of the commission:

Team 12. Laboratory of Transcriptional Regulation

Strengths: Interesting and important topic, that is developmental regulation of eye formation. Well funded with good productivity (30 papers listed in the 2014-19 period), with several in top journals (Nat. Commun., Nat. Cell Biology, Nature, PLoS Genetics). Several international collaborations that are clearly helpful.

Weaknesses: An excessive number of publications were in relatively low impact journals and many had Dr. Kozmik as a middle author. I especially advise to reduce the number of papers submitted to „pay-to-publish“ journals such as PLoS One and Scientific Reports.

Opportunities: The laboratory has developed some very interesting in vivo models, specifically to look at eye development in mice and invertebrate development in Amphioxus.

Threats: None apparent, but a focus on higher impact journals is advised.

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

H1.1	Quality of selected outputs of Phase I
<p>10 outputs were selected, out of 30 total. These include some high impact papers, as noted above, but seem to have been primarily selected based on the fact that team 12 contributed the first and corresponding authors in all cases.</p> <p>Phase I evaluation:</p> <p>The productivity of the team in excellent outputs (per FTE/ with reprint author from the institute) is under average in both World-Leading (WL) and WL+ Internationally Excellent categories. Moreover, there is no output in WL category.</p>	
H1.2	Contribution of workers on the outputs reached
<p>team 12 contributed the first and corresponding authors in all cases.</p>	
H1.3	Quality of all outputs and results
<p>A PLoS Genetics and a Current Biology paper are high impact, the rest either in good specialist journals or in a big open access journal</p>	
H1.4	The most valuable discoveries and findings in the fields, their importance for the field
<p>I feel the dissection of the role of Meis homeobox genes in mouse eye development, and the definition of redundant enhancers flanking Pax6, was the best work from this period. However, the Amphioxus work was also impressive.</p>	
H1.5	Contribution of the participation of the authors in large collaborations
<p>Dr. Kozmik participated in a large pan-European consortium looking at the Amphioxus genome and contributed to a Nature publication on this topic.</p>	

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

H2.1	Societal relevance of outputs and results pursuant to CAS and institute mission
This research sheds light on mechanism underlying the aberrant development of the eye in some patients, eg aniridia. However, I do not see any translational potential at this time	
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
N/A	
H1.3	Relation to practice
N/A	

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
While team 12 works in a quite specialized niche, I feel that their work is overall high impact and well regarded, with an international reputation. Therefore, they compare well to other groups working in this field in Europe.	
D1.2	Scope and quality of international and national cooperation and the role of the team in such cooperation; engagement in broad international cooperation
Team 12 seems exceptionally collaborative, with publications over the last 5 years with several groups in Europe, the USA and in Taiwan.	
D1.3	Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)
Over the 5 year period, Dr Kozmik gave six international invited lectures and Dr. Antosova gave one, which seems on the low side	

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 work performed over the last 5 years provides a logical extension of previous research from this group and future plans, in the realm of mouse eye and Amphioxus development, seem equally logical, though perhaps not that innovative.	
D2.2	Assessment of the previous research objectives and their achievement
Previous research objectives have been largely met.	

D2.3	Assessment of implementation of recommendations from past evaluation
The only recommendation was to be more focused in terms of model organisms, which was achieved by dropping the cnidaria model	
D2.4	Success in receiving grants
Very good, with ~2.5 million Euro in external grant funding over the last 5 years, plus institutional funding. Efforts to obtain grants from outside the Czech republic need to be re-emphasized.	
D2.5	Adequacy of instrumental equipment
Good	
D2.6	Effectiveness of management
This team seems to be largely directed top down by Dr Kozmik. The team lists 3 senior researchers and 16 junior.	
D2.7	Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth
Not clear. However, the success rate of PhD students is good	
D2.8	Creating work-life balance conditions, assessment of approach towards possible gender issues
Not discussed	
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 clear	

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
Seems good. Collaborations with faculty at the University of Curych and Charles university are listed, as well as with UCSD and scientists at several universities via the Amphioxus consortium. Many collaborative manuscripts over this period.	
D3.2	Effectiveness of joint research centres
N/A	
D3.3	Success rate in supervision of PhD students
High, no supervised students failed and six graduated and went on to post-docs, four internationally.	

D3.4	Participation of PhD students in the outputs
Several published papers featured grad students as first author and all 11 students published outputs in this 5 year period.	
D3.5	Participation of the team in master or bachelor studies
Minimal. 11 PhD students over this period with only one MS and zero BS students. The team should be more active.	
D3.6	Assessment of cooperation intensity with universities in the form of teaching
Modest. Dr. Kozmik reaches a 5 lecture course at Charles University each year and Dr Pergner apparently teaches at Ostrava University	

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

D4.1	Sufficiency of media strategy and activities in the area of research popularisation
This should be improved. The only output listed is a popular article in Czech written by Pergner and Soukup. Nothing listed for Dr. Kozmik.	
D4.2	Publishing activities and its quality
Good productivity (30 papers listed in the 2014-19 period), with several in top journals (Nat. Commun., Nat. Cell Biology, Nature, PLoS Genetics). However, an excessive number of publications were in relatively low impact journals and many had Dr. Kozmik as a middle author, though this speaks to his many collaborations. I especially advise to reduce the number of papers submitted to „pay-to-publish“ journals such as PLoS One and Scientific Reports. I see recent 2020 papers in PNAS and eLife, which is very good.	
D4.3	Participation in professional organisations in the area of research and development
Not clear, though Dr Kozmik does serve on two editorial boards. No conference or workshop organization was listed.	

Team categorisations and a brief commentary:

<input type="checkbox"/> strengthen the support of the team <input type="checkbox"/> keep the support of the team at the current level XXXXX <input type="checkbox"/> reduce the support of the team
This is a tightly focused research team that has been productive over the last five year period, though impact could be improved. Very collaborative, but outreach efforts are weak. Efforts to obtain international funding, perhaps as a collaborative team, should be emphasized. Overall, I expect the team to continue to do well.

Team 13. Laboratory of Structural Biology

Strengths: Very active in tackling structural studies targeting disease-related factors.

Weaknesses: The team belongs to 2 institutes (IMG and IOCB). This may represent a difficulty for optimal and efficient management.

Opportunities: The team has access to support services from two institutes, which is definitely a strong opportunity.

Threats: The number of short-term projects seems a bit too large. The team leader should aim at tackling medium-to-long term project (5-7 years).

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

H1.1	Quality of selected outputs of Phase I
Outputs were published in prestigious Journals but they were very poorly cited.	
H1.2	Contribution of workers on the outputs reached
Contributions were always significant (first or corresponding authors in most outputs).	
H1.3	Quality of all outputs and results
Quality of the outputs is quite reasonable. It is harder to assess their scientific impact as more than 50% (25 of 40) are described as N.A. in the bibliometric parameters of all outputs document. Nevertheless, the i10 indice from Google scholar indicates a value of 42 for the last 5 years, clearly demonstrating that the team leader is nicely cited, and so that her research outcome is influencing the field.	
H1.4	The most valuable discoveries and findings in the fields, their importance for the field
One significant discovery, the use of Carboranes as highly selective inhibitors.	
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
The team succeed in providing the society potential new drugs, therefore fulfilling one of the institute missions.	

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 very aware of potential applications of their research and the IMG is supporting the translation of fundamental research activities. No specific action in the area of social sciences and humanities.	
H1.3	Relation to practice
One patent (Europe and USA) for carborane-based inhibitors of human carbonic anhydrase IX. In the IMG document „research_for_practice“, there is no indication of specific revenues emanating from team 13.	

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
Hard to perform as the team is a mix up of two teams (the other one being part of the IOCB). From personal experience, the team is rather efficient and likely compares very well with other international team in other prestigious institutes (especially in Europe).	
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 a couple of established international collaborations on the two main research outcome (carbonic anhydrase inhibitors and LEDGF/p75 partners). The team is mostly providing structural models. No engagement in broad international collaboration.	
D1.3	Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)
The team leader has participated to several conferences or practical courses and gave 3 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
Yes	
D2.2	Assessment of the previous research objectives and their achievement
Very good.	

D2.3	Assessment of implementation of recommendations from past evaluation
Most recommendation were not followed (BIOCEV connection and joining IOCB). Increasing the number of PhD was done to its maximum to avoid decreasing supervision quality.	
D2.4	Success in receiving grants
The team is well financed	
D2.5	Adequacy of instrumental equipment
Excellent	
D2.6	Effectiveness of management
P. Rezacova seems to be an excellent team leader.	
D2.7	Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth
The team is doing well considering its position between 2 institutes.	
D2.8	Creating work-life balance conditions, assessment of approach towards possible gender issues
The team head is a woman who is taking the gender issue very seriously.	
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.
Data not available	

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
Mostly teaching	
D3.2	Effectiveness of joint research centres
None.	

D3.3	Success rate in supervision of PhD students
Good as the team had 3 thesis defended during the period of evaluation.	
D3.4	Participation of PhD students in the outputs
Almost all the publications of the team have one or more PhD students as author.	
D3.5	Participation of the team in master or bachelor studies
Limited teaching at the bachelor but nice teaching at the Master level.	
D3.6	Assessment of cooperation intensity with universities in the form of teaching
According to the team size (small), the collaboration is effective.	

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

D4.1	Sufficiency of media strategy and activities in the area of research popularisation
None	
D4.2	Publishing activities and its quality
None	
D4.3	Participation in professional organisations in the area of research and development
None	

Team categorisations and a brief commentary:

<input type="checkbox"/> strengthen the support of the team <input type="checkbox"/> keep the support of the team at the current level <input checked="" type="checkbox"/> reduce the support of the team
The team should merge with IOCB team 6

Other comments of the commission: Recommendations are similar to the previous evaluation: Merging with IOCB or IBT as the topics and techniques (structural biology of disease related proteins) are highly similar.

Team 14. Laboratory of Genomics and Bioinformatics

The Laboratory of Genomics and Bioinformatics is a medium-sized laboratory in the Institute of Molecular Genetics. Its research activities consist of the development and application of bioinformatic tools and in providing next-generation sequencing services to the scientific community, including single cell transcriptomic analyses. Thematically, a very diverse set of topics has been developed. Within the past period (2015-2019), major articles involving the Laboratory of Genomics and Bioinformatics were published in the fields of “Cancer Biology”, “Retrovirology”, “Transcription”. In addition, the laboratory showed interest in distantly related topics, such as evolution of photoreceptor genes, genetic analyses of microorganisms and the study of songbirds. This plethora of topics not only indicates the broad interest of this group, but also that their research is entirely based on collaborations.

Strengths:

The laboratory is well equipped with Illumina sequencers and a 10x Genomics Chromium Controller for single cell analyses. It is adequately equipped with computational resources and has a dedicated and well-educated staff. Specific technologies, such as library preparation from degraded samples or the preparation of long DNA samples for nanopore sequencing have been mastered by the staff. The laboratory has longstanding partnerships with other laboratories, mainly at the Czech Academy of Sciences.

Weaknesses:

The total dependence on collaborations is the weak point of this laboratory. Due to its scientific performance, it has managed to establish and maintain many collaborations, but with the increasing availability of alternative, cheaper commercial solutions for large scale sequencing, potential collaborators may progressively turn away towards other services.

Opportunities:

The sustained development of its own research activities could serve to strengthen the independence of this team from the activities of other laboratories. Such a set of research activities should be firmly associated with this laboratory and make it recognizable in Europe and the world.

Threats:

The major threat for this laboratory is that other private or public sequencing service laboratories are progressively becoming more competitive. Besides knowledge and know-how, much of this growing success is dependent on a significant reduction in the price of services and on this basis, developing countries may become very competitive in the near future.

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

H1.1	Quality of selected outputs of Phase I
<p>The quality of the outputs is very good. Four of the fourteen outputs are within the first quartile and another five in the second quartile, four and one in the third and fourth quartiles respectively.</p> <p>It should be noted that only 14 out of 80 outputs in total were evaluated in phase I.</p>	

H1.2	Contribution of workers on the outputs reached
<p>The contribution of the team to the outputs was between 10-30% with respect to co-authors on the papers. The team was represented as corresponding author on four out of the fourteen outputs evaluated. These data indicate that the team is strongly involved in providing bioinformatic and sequencing services to the research community.</p>	
H1.3	Quality of all outputs and results
<p>The evaluated outputs were published in very good and excellent journals including Proc Natl Acad Sci USA (PNAS) and Nature Communications (Nat Comm) with members of the team as co-authors. This indicates that the services of the team are highly appreciated by internationally excellent groups.</p>	
H1.4	The most valuable discoveries and findings in the fields, their importance for the field
<p>Important discoveries that were co-authored by the team include the molecular characterization of hematopoietic precursor cells (Nat Comm) and the discovery of a novel endogenous retrovirus in bats (PNAS).</p>	
H1.5	Contribution of the participation of the authors in large collaborations
<p>The team participated in large national and international collaborations as contributor (Center for Tumor Ecology – Research of the Cancer Microenvironment supporting Cancer Growth and Spread; National node of European Life Science Infrastructure for Biological Information [ELIXIR Europe]), but except for one publication, not as corresponding author.</p>	

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

H2.1	Societal relevance of outputs and results pursuant to CAS and institute mission
<p>The team pursued some outreach activities, such as contributions to radio programmes or scientific popularization for schools.</p>	
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
<p>N/A</p>	
H1.3	Relation to practice
<p>N/A</p>	

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 longstanding collaborations mostly at the national level. It is well equipped and has a strong publication record.	
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 involved in the ELIXIR European program. In addition, it has national collaborations, many of which are within the Institute of Molecular Genetics or at other Czech Academy of Sciences institutes. The quality of collaborations is very good.	
D1.3	Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)
Participation in the organization of the 43 rd FEBS Congress in Prague in 2018.	

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 plans to invest in database development (Human Ancient Mitochondrial Genomes). In addition, it plans to continue its work on tumor-stroma-interactions together with clinicians in Motol. Furthermore, the songbird project shall be continued. Finally, sequencing services will continue to be proposed to collaborators. Taken together, they plan to continue as they did before.	
D2.2	Assessment of the previous research objectives and their achievement
The team worked on improving genomic annotation, in particular in the framework of the songbird project. In an attempt to recruit more doctoral students, they have offered more technical projects.	
D2.3	Assessment of implementation of recommendations from past evaluation
The team has made a good attempt to respond to the recommendations. However, they were not able to recruit significantly more PhD students to the laboratory.	
D2.4	Success in receiving grants
The team stated that the costs of genomic research represent a problem for them, indicating that the grants they have been awarded are a limiting factor to their planned research activities.	

D2.5	Adequacy of instrumental equipment
Their current instrumentation is appropriate for the research activities. In addition, they have access to an Illumina NovaSeq machine if necessary through collaborations with BIOCEV and the company IAB.	
D2.6	Effectiveness of management
The laboratory seems to be well managed.	
D2.7	Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth
The team leader did not specifically mention particular efforts for attracting or keeping best scientists. However, it was mentioned in the last evaluation that the team should intensify the recruitment of doctoral students. Despite several efforts, the success was limited. In contrast, bachelor and master students have been successfully recruited to the laboratory which is an encouraging starting point.	
D2.8	Creating work-life balance conditions, assessment of approach towards possible gender issues
No issues were reported with respect to possible gender problems.	
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.
N/A	

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
Three team members participated in teaching at the bachelor and master level.	
D3.2	Effectiveness of joint research centres
N/A	
D3.3	Success rate in supervision of PhD students
Two doctoral students defended their thesis. In general, the success rate seems to be high. No failures were reported.	

D3.4	Participation of PhD students in the outputs
Few PhD students were affiliated with this team, but three co-authored publications. The fourth started their PhD studies in 2019 and has not yet published. A good participation in publications.	
D3.5	Participation of the team in master or bachelor studies
19 bachelor and 22 master students were trained in the laboratory.	
D3.6	Assessment of cooperation intensity with universities in the form of teaching
This Team has been very active at providing lectures for master and bachelor students in a diverse set of topics ranging from Anatomy and Human Genetics to Bioinformatics and Forensic Biology at the Charles University in Prague and the University of Chemistry and Technology, Prague.	

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

D4.1	Sufficiency of media strategy and activities in the area of research popularisation
There have been three presentations in the media over the five-year evaluation period.	
D4.2	Publishing activities and its quality
N/A	
D4.3	Participation in professional organisations in the area of research and development
The team has been represented as members of the management structure of the ELIXIR CZ project. Furthermore, Edvard Ehler is a member of the research ethics board of the faculty of Education at the Charles University and Václav Paces is an Editor of Research in Microbiology.	

Team categorisations and a brief commentary:

<input type="checkbox"/> strengthen the support of the team <input checked="" type="checkbox"/> keep the support of the team at the current level <input type="checkbox"/> reduce the support of the team
<p>The laboratory's activities are based to a large extent on collaborations. The services provided in the framework of these collaborations allowed developing projects that led to very good publications. However, the laboratory is very dependent on these outside collaborators. The future plans are in line with what they did well in the past, but they do</p>

not sufficiently take into account that they should develop their own research program which would distinguish them from other sequencing and bioinformatics services. An interesting step into a good direction is the establishment of the database of Human Ancient Mitochondrial Genomes, which seems also to help with recruiting bachelor and master students. It is hoped that some of them will stay for their doctoral thesis studies.

Other comments of the commission:

Team 15. Laboratory of Genome Integrity

Strengths:

Top tier internationally recognized lab with a large number of individuals under the age of 50. The lab maintains a large number of collaborations due to the international recognition of its former leader. Funding within the team is well sustained over the long-term with little possibility that this situation will change over the next evaluation period.

Weaknesses:

There seems to be an unusually high percentage of Q2 and Q3 publications for such a large group. There is some distance between one of the topics of research and the main focus of the team.

Opportunities:

This team has acquired instrumentation and experience in mass spectrometry and advanced proteomics that could be better used for the benefit of the CAS. The line of research on nanorods could have therapeutic potential.

Threats:

The former team leader who is internationally recognized in his field has retired; there is the possibility that his shoes will be hard to fill.

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

H1.1	Quality of selected outputs of Phase I
Seven of 13 outputs were published in journals in the top 25% for the respective field of study with two of these outputs published in top tier journals (top 10%) for the respective field of study.	
H1.2	Contribution of workers on the outputs reached
Workers of the team contributed to the majority of the outputs reached, in most cases exceeding 80% of the work involved.	
H1.3	Quality of all outputs and results
The quality of all outputs is good, in large part very good. Approximately 50% of the team's outputs were published in journals in the top 25% for the respective field of study. The other 50% of outputs are represented by an elevated number of outputs published in journals in the top 26-50% and a significant number of outputs in the top 51-75%. Although the number of outputs for the large number of individuals in this team is adequate, there is a significant drop in quality with half of the outputs being published in Q2 and Q3 level journals. Citation frequency of the outputs is overall good.	
H1.4	The most valuable discoveries and findings in the fields, their importance for the field
<p><u>Cellular senescence:</u> Identification of the mechanism of TNFα and IFNγ induced cellular senescence. Using a proteomics approach, 70 protein markers for senescent cells were identified. Using syngeneic mice, it was determined that senescent cells secrete factors that promoted tumor growth.</p> <p><u>DNA damage and repair:</u> The role of persistent PML in the DNA damage repair was characterized as well as the presence of PML on the nucleolar surface during nucleolar stress. A role for RECQ5 helicase in suppressing transcription-associated genome instability and replication stress was defined.</p> <p><u>Cancer resistance:</u> Identification of the IFNγ/Erk pathway signaling as being a common denominator in senescence, drug-resistance, radio-resistance and anoikis.</p>	

<p><u>DNA damage in human disease:</u> 5-AC promotes a proinflammatory landscape in the bone marrow of MDS treated patients. Mutations in NAD(P)H quinone dehydrogenase 1 promote MDS development. The JAK2V617F mutation can induce an IFNγ/NF-κB inflammatory program while suppressing inflammation induced DNA damage.</p> <p><u>Novel therapeutic strategies:</u> Development and testing of gold nanrods for photothermal therapy. Also novel surfactant coatings for nanorods have been developed and tested.</p>	
H1.5	Contribution of the participation of the authors in large collaborations
<p>Four outputs involving more than 5 organizations were presented by the team for evaluation. Team members had corresponding roles in three of these outputs. The team had an additional 4 outputs involving large collaborations, in one of which team members had a corresponding role.</p>	

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

H2.1	Societal relevance of outputs and results pursuant to CAS and institute mission
<p>The research team examines cellular senescence as a result of DNA damage or pro-inflammatory cytokine signaling and its impact on disease. As such, the team aims to define mechanisms of disease with the objective to find new therapeutic approaches which will have significant relevance to society.</p>	
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
<p>The research is of a basic science/investigative research into mechanisms of homeostasis, disease and therapy resistance or novel approaches for therapy. This knowledge will be useful for establishing future therapies for diverse diseases. The knowledge will have little impact on the social sciences and humanities.</p>	
H2.3	Relation to practice
<p>Some studies within the team on nanorods may have the potential to enter into therapeutic protocols in the clinic once finalized. Basic information on the study of cellular senescence and DNA damage in disease will require further development to be put into practice.</p>	
H2.4	Participation in AV21 strategy
<p>No information as to this point was provided by the Laboratory.</p>	
H2.5	Cooperation with regions of the Czech Republic
<p>No information as to this point was provided by the Laboratory</p>	

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
<p>In comparison to other similar international and national teams, this group has excellent potential and some excellent outputs, world leading in some cases, but can be rated very</p>	

good based on the large number outputs in less than Q1 journals in the presence of a large number of individuals.	
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 involved in numerous collaborations both interdisciplinary and clinical in Prague, throughout the Czech Republic, Europe, Australia and the USA. Other than chemical synthesis of nanoparticles most all the resulting outputs were conducted with greater than 80% effort by the group. No details of broad international cooperations are given.	
D1.3	Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)
Almost all scientific community activities are being carried-out by the former team leader who serves as editorial board member, scientific commission member of several international societies, and invited lecturer. Two individuals won prestigious awards within the group. Other than the former team leader who is now in retirement, there seems to be limited additional participation in scientific community activities.	

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

D2.1	Direction in line with the perspective of the planned research directions
Planned directions of the research are in line with the teams past experience and future development directions involving DNA-damage and repair/cellular senescence. There is no mention of the future direction for the development of studies centering on DNA-damage response/inflammation and hematopoietic pathologies. Therapeutic approaches with nanorods appear to be applied to glioblastoma studies.	
D2.2	Assessment of the previous research objectives and their achievement
The previous research objectives have been met with a number of outputs to sustain this observation. In addition, there has been development of a new objective in this period aimed at the use of nanoparticles for therapy.	
D2.3	Assessment of implementation of recommendations from past evaluation
The potential threat to continuation of the research presented by the retirement of Prof. Bartek was addressed during the period by selecting a new team leader upon his retirement from an international competition. The institute has responded to this threat in the best manner possible.	
D2.4	Success in receiving grants
The team has achieved excellent results in obtaining grant funds which should remain stable for the next 3 years. With the departure of a former senior member who is a world leading scientist, the possibility to continue these results remain to be seen.	
D2.5	Adequacy of instrumental equipment
Instrumentation of the team is optimal with an increased emphasis on updating mass spectrometry/proteomic instrumentation.	

D2.6	Effectiveness of management
The prior team leader was a recognized international leader in the field who recently retired within the past 2 years. While the new team leader appears to be doing a good job, how well they can substitute the former team leader remains to be seen.	
D2.7	Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth
The recent retirement of the former team leader could have dire consequences in the future for this group, as many of the team's activities in the past have relied heavily on his presence. While he remains part of the team, other individuals need to step in and fill his shoes. The international recruitment of a new team leader has been a good start by finding a high quality lab head. In the next 5-10 years four of the senior members will be in retirement. There are a number of members under 50 years of age so there is significant space for development. How well these individuals are developed remains to be seen.	
D2.8	Creating work-life balance conditions, assessment of approach towards possible gender issues
No information as to this point was provided by the Laboratory.	
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
The current team leader and team members are engaged in primarily teaching activities with the Faculty of Science at Charles University in Prague. The team lists 23 (15 national and 8 international) cooperations which have resulted in 11 outputs during the evaluation period. The exact level of cooperation with these institutes is not clear. A clear cooperation has been established between the team and physicists at the Czech Technical University, chemists at the University of Hradec Kralove, and clinicians at the 2nd Faculty of Medicine of Charles University in designing and modifying gold nanorods for photothermal therapy. This demonstrates a strong translational capacity and commitment.	
D3.2	Effectiveness of joint research centres
No information as to this point was provided by the Laboratory.	
D3.3	Success rate in supervision of PhD students
The team has produced 3 (+1 in consultation) PhD students that have defended their theses during the evaluation period. For the institution and team this is clearly a positive result.	

D3.4	Participation of PhD students in the outputs
Approximately half of the outputs from the team in the evaluation period involved PhD students. About half of these involved PhDs as first and co-first authors.	
D3.5	Participation of the team in master or bachelor studies
Members of the team, led by the team leader, are responsible for delivering lectures on aging/cellular senescence/carcinogenesis and genome integrity/carcinogenesis/aging at Charles University for BS and MS level studies. In the evaluation period, the team has demonstrated good productivity in BS and MS training, producing 4 BS and 3 MS theses defended.	
D3.6	Assessment of cooperation intensity with universities in the form of teaching
Members of the team, led by the team leader, are responsible for delivering lectures on aging/cellular senescence/carcinogenesis and genome integrity/carcinogenesis/aging at Charles University for BS, MS and PhD level students demonstrating a good level of interaction with the university.	

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

D4.1	Sufficiency of media strategy and activities in the area of research popularisation
Media strategies are somewhat limited with the former team leader J. Bartek being the main face of the team.	
D4.2	Publishing activities and its quality
The team has published numerous outputs; slightly over 50% of excellent to good quality.	
D4.3	Participation in professional organisations in the area of research and development
Participation in professional organizations is limited to the former team leader, J. Bartek	

Team categorisations and a brief commentary:

<input type="checkbox"/> strengthen the support of the team <input checked="" type="checkbox"/> keep the support of the team at the current level <input type="checkbox"/> reduce the support of the team
Please enter your comment here While the progression of this team over the past evaluation period is excellent, there is significant concern that the loss of the former team leader J. Bartek, who has bared most of the responsibility for scientific community activities and has been the international face of the team/institute, will have dire consequences if younger team members do not begin to fill these roles. This makes it somewhat problematic to evaluate the team at this time point.

Other comments of the commission:

Team 16. Laboratory of Cell Differentiation

Strengths: The science output, the development of infrastructure, the development of methods, data analysis approaches, the collaborations, the positioning in the international community are very strong points of the team. This group is excellent in many aspects. The infrastructure they are in charge of, is extremely well driven, with a lot of method developments on the entire process of chemical screening and with appropriate organisation.

Weaknesses: The group is big but has many projects on many different models, plus an infrastructure to support. It might be then difficult for the team and team leader to focus and valorize the projects appropriately. The team has published in high impact factor journals mainly on the development of methods, even though most of their projects have high potential. The team would benefit from hiring senior postdocs.

Opportunities: The team is producing amazing science and running an outstanding platform of chemical biology. The team might focus a bit more on the valorisation of their excellent work inputs.

Threats: The multiplicity of the models and tasks performed by the leader might be overwhelming.

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

H1.1	Quality of selected outputs of Phase I
The output quality is excellent but could be outstanding given the scientific interests and skills in the team.	
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 excellent.	
H1.4	The most valuable discoveries and findings in the fields, their importance for the field
The development of the chemical biology platform at all levels is outstanding.	
H1.5	Contribution of the participation of the authors in large collaborations
The team is involved in four large collaborations through the OPENSREEN platform. Their contribution is outstanding.	

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 a high potential but needs to be better translated into patents.	

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 patents and lots of potential to be beneficial to society.	
H1.3	Relation to practice

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 a leader in chemical biology and the techniques around it. The team is well integrated within the international community.	
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 highly engaged in international collaborations.	
D1.3	Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)
The team has organized four conferences/workshops and five of the team members have been invited to give one or several 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 research planned is excellent and logical. The number of projects might be too high on too many model organisms.	
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 implemented the recommendation of the last evaluation by participating more in outreach activities.	
D2.4	Success in receiving grants
They have been successful in attracting several grants (national and European).	
D2.5	Adequacy of instrumental equipment
The equipment is excellent. Together with method development this is a strength of the team.	

D2.6	Effectiveness of management
The management seems efficient regarding integration into the scientific community, development of the chemical biology platform, patent production, PhD supervision etc..The output of publication could be slightly better handled.	
D2.7	Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth
Good.	
D2.8	Creating work-life balance conditions, assessment of approach towards possible gender issues
The leader took the opportunity to delegate tasks (mainly his deputy on the screening platform). The situation for him is getting better. The team leader and deputy team leader are male, most of the other members 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.

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 is highly integrated at the national and international levels mainly due to the platform activities and the zebrafish work.	
D3.2	Effectiveness of joint research centres
N/A	
D3.3	Success rate in supervision of PhD students
High. Five PhD students defended during the evaluation period.	
D3.4	Participation of PhD students in the outputs
Excellent.	
D3.5	Participation of the team in master or bachelor studies
The team has welcomed two master students and two bachelor students. This number is rather low compared to the total number of workers in the group, although of course many of the employees of the screening platform are technical staff.	

D3.6	Assessment of cooperation intensity with universities in the form of teaching
The team is involved in teaching to a large extent. Four team members are participating in teaching in several 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
The team uses the media Twitter and is regularly present in different newspapers. So the implication of the team in media is rather low.	
D4.2	Publishing activities and its quality
The team has written numerous chapters in professional books. No other popular science publications have been mentioned.	
D4.3	Participation in professional organisations in the area of research and development
Excellent. The leader and deputy are involved in many boards and committees.	

Team categorisations and a brief commentary:

<input checked="" type="checkbox"/> strengthen the support of the team <input type="checkbox"/> keep the support of the team at the current level <input type="checkbox"/> reduce the support of the team
Please enter your comment here

Other comments of the commission:

Team 17. Laboratory of Cancer Cell Biology

Strengths: The ability to combine molecular and cell biology techniques with experiments in animal models in combination with clinical data.

Functional network of international and national collaborations.

A valued member of the ENIGMA consortium with technical know-how in developing robust cell-based assays using CRISPR/Cas9 technology.

Weaknesses: There are no obvious weaknesses. They have only problem with lack of experienced researchers at the postdoctoral level.

Opportunities: Main opportunities are clinical collaborations and focusing on translation research. Another opportunity is the novel mechanism of oncogene activation (including a transgenic mouse model).

Threats: There are no obvious threats. The team has only problem to find experienced and highly motivated postdocs.

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

H1.1	Quality of selected outputs of Phase I
<p>The team leader selected 6 outputs for Phase I evaluation. All of these outputs are published in high level Journals.</p> <p>Phase I evaluation:</p> <p>The productivity of the team in excellent outputs (per FTE/ with reprint author from the institute) is under average in both World-Leading (WL) and WL+ Internationally Excellent categories. Moreover, there is no output in WL category.</p>	
H1.2	Contribution of workers on the outputs reached
<p>Outputs evaluated within Phase I – 2 outputs with 100% contribution, 4 outputs with high contribution.</p> <p>Overall: More than half manuscripts with main contribution, other manuscripts are with significant contribution.</p>	
H1.3	Quality of all outputs and results
<p>The publication record (23 manuscripts – 19 articles in journals with impact factor, 8 of them in Q1; 7,52 FTE) of the team is good with some publications in highly recognized international journals.</p>	

H1.4	The most valuable discoveries and findings in the fields, their importance for the field
<p>The most valuable findings are 1) Discovery of the truncated PPM1D mutants in cancer patient. They conclude that truncation of PPM1D/WIP1 may modulate the therapeutic effect of chemotherapy and may also represent a potential pharmacological target (Burociová et al., 2019 Cell Death & Disease) and 2) Identification of deleterious germline CHEK2 mutations and their association with breast and ovarian cancer.</p> <p>From the methodological point of view, they routinely mastered newly developing techniques including CRISPR/Cas9-mediated gene editing and work with mouse models.</p>	
H1.5	Contribution of the participation of the authors in large collaborations
<p>The team was the main coordinator of an international PHOSCAN project supported by Norway funds and participates in the national infrastructure CZ-OPENSREEN.</p>	

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

H2.1	Societal relevance of outputs and results pursuant to CAS and institute mission
<p>The focus of the team perfectly corresponds with the principal mission of IMG - experimental biology research. Social relevance of outputs is high mainly in the area of CHEK2 mutations and their association with breast and ovarian cancer.</p>	
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
<p>The researchers should try to be more pro-active in finding funding within translational medicine financing authorities/agencies.</p>	
H1.3	Relation to practice
<p>The team has some applied results such as monoclonal antibodies (anti-PPM1D/Wip1, anti-mGluR1b) and probe for detection of PPM1D gene amplification by FISH method.</p>	

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 team activity and productivity, the laboratory is nationally and 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
<p>The team has engaged in very nice active and productive international collaborations with several experts in the field of the DNA damage checkpoint (such as NKI, Amsterdam, Karolinska Institute, Stockholm, University of Groningen, Groningen, Barts Cancer Institute, London). They have very good joint publications in EMBO Journal, Aging Cell and Nature Communications.</p> <p>Very important are also national co-operations (mouse models, replication stress).</p>	
D1.3	Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)
<p>The team is active in organizing of conferences and workshop. They organized an international meeting of ENIGMA consortium. In addition, they organized three workshops focusing on Molecular genetics of cancer and five annual meetings of the Cell cycle and checkpoint network.</p> <p>There were no invited lectures or awards.</p>	

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 plans for the future are well set, with good attention to detail. Future plans logically follow previous research but should perhaps seek more to clinical use.	
D2.2	Assessment of the previous research objectives and their achievement
The team had several aims during the evaluated period, all of them were successfully accomplished, and more importantly, they have set up the basis for an excellent research line in the next years.	
D2.3	Assessment of implementation of recommendations from past evaluation
The principal investigator started as a junior group leader in 2013 and his laboratory was positively evaluated in 2015. Since then, the group was promoted to a senior status. There were no recommendations.	

D2.4	Success in receiving grants
The team is very successful in receiving grants. Moreover, the group has not only CZ grants, but also an EU grant .	
D2.5	Adequacy of instrumental equipment
Instrumental equipment in IMG is adequate.	
D2.6	Effectiveness of management
Effectiveness of management is excellent.	
D2.7	Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth
The professional structure is good. The team is relatively young. Average group size was 10 people including the principal investigator, lab manager, 2-3 postdoctoral fellows, 4- 6 PhD students and 2-3 master/bachelor students, and 1 lab manager. Moreover, I really appreciate that main language of the laboratory is English which helps students in their communication skills and future careers.	
D2.8	Creating work-life balance conditions, assessment of approach towards possible gender issues
There seems to be nice work-life balance and recruitment of the team aims at a gender balance.	
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 mainly with Charles University.	
D3.2	Effectiveness of joint research centres
Not applicable.	
D3.3	Success rate in supervision of PhD students
The number of PhD theses defended (3) in the period is very good. Moreover, two of graduated PhD students currently work as postdoctoral fellows in life science abroad (Denmark, US).	

D3.4	Participation of PhD students in the outputs
PhD students represent the main workforce in the Laboratory of Cancer Cell Biology and thus they participate in main research outputs.	
D3.5	Participation of the team in master or bachelor studies
The team is involved in master and bachelor studies (3 master, 2 bachelor). They are opened to students at all levels of their scientific carriers and, moreover, they hosted several ERASMUS+ students from other EU countries.	
D3.6	Assessment of cooperation intensity with universities in the form of teaching
The PI regularly participates at a course “Advances in Mol Biol and Genetics” organized yearly by IMG. The team could be more active in teaching for semestrial lectures, seminars and courses in partnering 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 leader had a discussion in the Czech Television and participates in the public day at IMG presenting cell biology principles to high school students.	
D4.2	Publishing activities and its quality
There are no publishing activities for general public. The team should be more active in outreach activities using publishing materials.	
D4.3	Participation in professional organisations in the area of research and development
The team did not participate in courses and lectures for general public.	

Team categorisations and a brief commentary:

<input type="checkbox"/> strengthen the support of the team <input checked="" type="checkbox"/> keep the support of the team at the current level <input type="checkbox"/> reduce the support of the team
According to my opinion the team has a great value for IMG/CAS. The team is productive, has a strong research program, engages in active international/national collaborations, but teaching activity are relatively weak. Efforts to increase the clinical use of outputs should

be emphasized. Overall, I expect the team to continue to do well and recommend keeping the support at the current level.

Other comments of the commission:

Team 18. Laboratory of Leukocyte Signalling

Strengths:

The team demonstrates a number of significant collaborations. PhD training offers a good experience with a number of career opportunities available to graduates. There appears to be one individual that functions as a publicist in the team, which may be considered a strength (V Horejsi). Being a small/mid-sized group, the team publishes very well with most outputs being in the top Q1 of journals with about a third of these being top tier journals. Much of the work has direct clinical relevance. About 50% of the funding for this team is from EU funds. The team's record benefitted from the integration of V. Horejsi (+ team members).

Weaknesses:

The contribution of some team members to the outputs is difficult to determine in some cases. Thus some team members may not have contributed to any outputs in the evaluation period. There appears to be one individual that functions as a publicist in the team, which may be considered a weakness (V Horejsi). There is a high dependence on mouse models which is both time consuming and expensive. Comparable to other groups, this may create problems related to the dependence on grant funding which is often short-term (3 years).

Opportunities:

With the development of in vitro modelling systems, some studies can be conducted in vitro in place of mice. Mouse models developed may have applications to the international scientific community. There appear to be sufficient data from basic studies for the development of compounds with therapeutic potential.

Threats:

The fact that the former IMG director became part of the team leaves some question as to who truly leads the team. Age is becoming a serious issue for this group; out of 13 individuals, 3 are over the age of retirement (65 years), two are between 50-60 and 8 are under 50 years (5 are less than 35 years of age).

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 overall very good. Of the 4 selected outputs, half were published in journal in the top 25% (Q1) for the respective field, one was in Q2 and one was not classified; thus demonstrating adequate quality for a group this size. As numerous other outputs were published in Q1 journals, two being in the top 10% of journals in the field, it is somewhat confusing as to why a Q2 and an non classified output were selected for Phase I.	
H1.2	Contribution of workers on the outputs reached
In each of the selected outputs, the first and corresponding authors are from the team, and the team contributed a minimum 70% of the effort to the output.	
H1.3	Quality of all outputs and results
The overall quality of outputs was very good, 2 were excellent. Of the 12 outputs during the evaluation period, 7 were published in Q1 journals 2 of 7 being in journals in the top 10% of the respective field. Another 2 outputs were in Q2 journals, 1 in a Q4 and 2 non-classified. This represents almost 1 output/team member with more than half the outputs in Q1 journals. The total outputs and quality are more than adequate for the team. Still, given the significant effort and complexity of some studies, and the results obtained, it is wondered why some papers were only published in IF 4 - 5 journals.	

H1.4	The most valuable discoveries and findings in the fields, their importance for the field
<p>Identification and study of novel membrane adaptor proteins (SCIMP and PSTPIP2) involved in Src signal transduction using cell lines and knockout mouse models.</p> <p>SCIMP and PSTPIP2 were found to regulate inflammation by regulating cytokine-mediated signaling in leukocytes.</p> <p>PSTPIP2 was found to regulate Nox2 dependent ROS production, inflammation and bone damage. Loss of PSTPIP2 was found to result in exaggerated inflammation in response to stimulation of diverse receptors.</p> <p>OPAL1 is expressed in ETV-RUNX1 leukemia and is associated with favorable prognosis. OPAL1 activates multiple E3 ubiquitin ligases from the NEDD family which negatively regulate CXCR4, critical for retention and function of HSCs. This study demonstrated that in OPAL1 null mice HSC engraftment is enhanced, thus OPAL1 may inhibit homing and engraftment of leukemic stem cells to the bone marrow making them more vulnerable to chemotherapy.</p> <p>The transmembrane adaptor protein LST1 was found to be necessary to inflammatory colitis.</p>	
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
<p>The team studies the basic science of hematopoietic signaling with emphasis on leukocytes and inflammation in various diseases. The outputs and results increase the knowledge base for this field and have future applications to the development of novel therapeutic approaches; thus there is significant societal relevance to this line of research. The outputs and results fall within the CAS and institute mission.</p>	
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
<p>The team engages in basic research which may have future potential for implementation into clinical practice for patient care. The impact on the social science and humanities is minimal.</p>	
H2.3	Relation to practice
<p>The understanding of basic biological mechanisms as a result of the team's research and outputs has the potential to be further exploited for future development of small molecule inhibitors or bio-compounds to treat patients. The further extension of clinical collaborations is advised.</p>	
H2.4	Participation in AV21 strategy
No information as to this point was provided by the Laboratory	

H2.5	Cooperation with regions of the Czech Republic
No information as to this point was provided by the Laboratory	

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 nationally leading, and is highly visible and recognized in the international context. In comparison to research teams at similar national and international institutes, the team is an excellent one mainly for its size and productivity in the area of basic research applicable to medicine.	
D1.2	Scope and quality of international and national cooperation and the role of the team in such cooperation; engagement in broad international cooperation
While the team does not engage in any broad international cooperations, it boasts a number of national and international cooperations of proven significance throughout Europe and Australia which have resulted in 8 outputs from 2016-present; most of these in top ranked journals.	
D1.3	Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)
Primarily two members of the team (T Brdicka and V Horejsi) are responsible for scientific community activities. These activities include: editorial duties (Horejsi), workshop organization (Horejsi), invited lectures (Brdicka and Horejsi), a number of local/national awards (Horejsi), panel/board/faculty memberships (Brdicka and Horejsi). While these represent important contributions from the team, they are somewhat limited. There is room for additional team members to be involved.	

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 programmed activities for the 2020-2024 period are in line with the prior research directions. The team plans to continue studies on the transmembrane adaptor proteins identified by generating mice with targeted cell compartment knockouts.	
D2.2	Assessment of the previous research objectives and their achievement
This is the first evaluation. No comment.	
D2.3	Assessment of implementation of recommendations from past evaluation
No comment as this is the first evaluation.	
D2.4	Success in receiving grants
The team is very successful in obtaining support, with about 50% of the team's funding coming from EU sources.	

D2.5	Adequacy of instrumental equipment
All necessary instrumentation is available and up-to-date.	
D2.6	Effectiveness of management
The management seems to be extremely effective during the evaluation period and has continued to show great capacity up to the present.	
D2.7	Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth
The structure of the lab is somewhat concerning, with 3 members in retirement. Another pair of individuals is approaching retirement. Most of the development strategy centers on obtaining good PhD students and making them competitive for international positions. Whether any of these individuals will return to the team as junior scientist is not mentioned. The team is looking to acquire a post-doc.	
D2.8	Creating work-life balance conditions, assessment of approach towards possible gender issues
No information as to this point was provided by the Laboratory	
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
Most national university activities are associated with Charles University and involve both teaching activities and student training. Other notable national cooperations are with research institutes. On the international level the team has small but productive cooperations with the University of Birmingham, UK and the University of Queensland, Australia at the level of visiting scientist and reagent exchange/scientific collaboration.	
D3.2	Effectiveness of joint research centres
No information as to this point was provided by the Laboratory.	
D3.3	Success rate in supervision of PhD students
PhD students in this team have been very productive with significant authorship on 5 of 12 outputs from the team. During the evaluation period the team supervised 6 PhD students, two of which successfully defended their theses and a third which finalized and submitted the thesis in early 2020. Each of these PhD students has obtained excellent post-doc positions at nationally and internationally renowned institutions and labs.	
D3.4	Participation of PhD students in the outputs
The participation of PhD students has been instrumental in producing 5 of the 12 outputs. In these outputs, PhD students were first or co-first author.	

D3.5	Participation of the team in master or bachelor studies
Two members of the team (T Brdicka and V Horejsi) were responsible for teaching a course in Immunology for BS, MS and PhD level students for the entire evaluation period. In addition, the team has supervised 2 BS and 2 MS students producing 1 BS and 1 MS theses defended, during the evaluation period.	
D3.6	Assessment of cooperation intensity with universities in the form of teaching
Two members of the team (T Brdicka and V Horejsi) were responsible for teaching a course in Immunology for BS, MS and PhD level students for the entire evaluation period.	

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

D4.1	Sufficiency of media strategy and activities in the area of research popularisation
Numerous articles, interviews, radio/TV presentations are noted by the team. These are attributable to V Horejsi only. Approximately 20 hrs of secondary school presentations are also highlighted, although the individual contributions of team members to this activity are not denoted. There needs to be some spreading around of this activity in the team for continuance.	
D4.2	Publishing activities and its quality
Publishing activities and the quality thereof are more than adequate for a group of this size and organization.	
D4.3	Participation in professional organisations in the area of research and development
Two individuals of the team participate in professional organizations/activities (T Brdicka-Faculty of 1000; Doctoral Studies Board-Immunology, Charles University; and V Horejsi-Czech Science Foundation panel N. 302, Editor Immunology Letters. This is limited for the team's expertise.	

Team categorisations and a brief commentary:

<input checked="" type="checkbox"/> strengthen the support of the team <input type="checkbox"/> keep the support of the team at the current level <input type="checkbox"/> reduce the support of the team
This team has published numerous very good and a few excellent publications. It was very successful in applying for domestic and European grants. The outputs and results increase the knowledge of leukocyte function and may have relevance for the development of novel therapeutic approaches.

Other comments of the commission:

Team 19. Laboratory of Haematooncology

Strengths: The team is focused on an interesting and important topic in the field of haematooncology. As a “Junior” group, this team has had excellent productivity and is well recognized internationally. Moreover, it has successfully established fruitful international and national collaborations. The team has also developed and established a unique portfolio of techniques and animal models.

Weaknesses: The small size of the group places a limitation on the scale of projects that can be pursued and places a reliance of external collaborations.

Opportunities: There are many potential opportunities from clinical collaborations and as a result of being promoted to “Senior group” status

Threats: Research activities of the group are costly so they are dependent on grants, a situation that could be complicated as a result of the COVID pandemic.

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

H1.1	Quality of selected outputs of Phase I
<p>The team leader selected 3 outputs for Phase I evaluation. All of these outputs are published in high level Journals (Q1).</p> <p>Phase I evaluation:</p> <p>The productivity of the team in excellent outputs (per FTE/ with reprint author from the institute) is over average in both World-Leading (WL) and WL+ Internationally Excellent categories.</p> <p>Therefore, based on the Phase I evaluation it is clear that the selected outputs are excellent.</p>	
H1.2	Contribution of workers on the outputs reached
<p>Outputs evaluated within Phase I – 90%, 80%, 20 % contributions</p> <p>Overall: 6 publications with main contributions, 11 manuscripts are collaborations.</p> <p>This reflects very positively on the productivity of the team and its fruitful collaborations.</p>	
H1.3	Quality of all outputs and results
<p>The publication record (17 manuscripts, 4,08 FTE) of the team is very good with some outstanding publications in highly recognized international journals.</p>	

H1.4	The most valuable discoveries and findings in the fields, their importance for the field
<p>One of their main findings is identifying novel C/EBPα target genes (EVI2B, C/EBPγ) and defining of their function in granulopoiesis. Moreover, they have elucidated the role of selected miRNAs (miRNA-182 and miRNA-143) in the regulation of cell differentiation.</p> <p>Finally they have also found that the ZNF143 protein is an important regulator of the myeloid transcription factor C/EBPα.</p> <p>These clearly represent highly significant results.</p>	
H1.5	Contribution of the participation of the authors in large collaborations
<p>No participation in large collaborations during this period.</p>	

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

H2.1	Societal relevance of outputs and results pursuant to CAS and institute mission
<p>The focus of the team perfectly corresponds with the principal mission of IMG - experimental biology research. Their discoveries in the field of haematooncology have high potential for clinical use, so there is a clear, high societal relevance.</p>	
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
<p>As the team cooperates with international pharmaceutical collaborators (France), there is high potential for knowledge transfer into the practice in the form of novel drugs.</p>	
H1.3	Relation to practice
<p>N/A</p>	

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
<p>Based on the team's activity, the laboratory is nationally and internationally in a great position, the success is particularly noticeable when considering the relatively small number of staff and the fact that it is a "Junior group".</p>	
D1.2	Scope and quality of international and national cooperation and the role of the team in such cooperation; engagement in broad international cooperation
<p>The Team has a strong and fruitful network of national and international collaborations.</p> <p>IMG cooperation: Laboratory of Leukocyte Signaling, Laboratory of immunobiology, Laboratory of Cell and Developmental Biology</p>	

<p>Other national cooperations: Laboratory of Molecular Neurobiology (FGU), Laboratory of Metabolism of Metals of Tumor Cells (IBT), Childhood leukemia research Prague (CLIP) - Motol hospital and 2nd Faculty of Medicine.</p> <p>International cooperation: Boston Children's hospital (Boston, USA) and Harvard Medical School (Boston, USA)</p>	
D1.3	Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)
<p>The team leader is a member of several committees/boards. The team organized 4 conferences/workshops during the evaluation period. The team leader was invited to give 6 lectures.</p> <p>It can be concluded that the team is very active particularly when considering the relatively small number of staff and the fact that it is a "Junior group".</p>	

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

D2.1	Direction in line with the perspective of the planned research directions
<p>The plans for the future are well set, with good attention to detail and methodology.</p>	
D2.2	Assessment of the previous research objectives and their achievement
<p>The team had three main aims during the evaluated period, all of these aims were successfully accomplished, and more importantly, they have created the basis for an excellent line of research in the next years.</p>	
D2.3	Assessment of implementation of recommendations from past evaluation
<p>The team was established in 2015, and consequently did not have a previous evaluation.</p>	
D2.4	Success in receiving grants
<p>The success in receiving grants is very good. Only 10% of the group budget comes from the IMG institutional money, 90% are grant-derived. Moreover, the group has not only CZ grants, but also benefits as a participant in and funding by a Horizon 2020 ITN Marie Curie project.</p>	
D2.5	Adequacy of instrumental equipment
<p>Instrumental equipment in the IMG is adequate.</p>	
D2.6	Effectiveness of management
<p>Effectiveness of management is excellent.</p>	

D2.7	Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth
The professional structure is good. The team is relatively young. Professional development is provided for all members of the laboratory (courses, seminars, conferences and congresses).	
D2.8	Creating work-life balance conditions, assessment of approach towards possible gender issues
There seems to be good work-life balance and recruitment of the team aims at a gender balance.	
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.
N/A	

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 successful collaboration with Charles University. The cooperation is in research and also in teaching.	
D3.2	Effectiveness of joint research centres
Not applicable.	
D3.3	Success rate in supervision of PhD students
The number of PhD theses defended (2) in the period is very good particularly considering the team size and the fact that it is a “Junior group”.	
D3.4	Participation of PhD students in the outputs
In all published manuscripts, Ph.D students play a major role.	
D3.5	Participation of the team in master or bachelor studies
The team participates in master studies (2 master, 0 bachelor). Perhaps the participation of bachelor and master students could be higher.	
D3.6	Assessment of cooperation intensity with universities in the form of teaching
The teaching activities are mostly based on lectures of the team leader. The activity is high (40 lectures during the evaluation period).	

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 participates every year in the IMG open doors event, where secondary school students visit the institute.	
D4.2	Publishing activities and its quality
The team published 2 articles in the Journal Vesmir (2015 and 2017).	
D4.3	Participation in professional organisations in the area of research and development
The team did not participate in courses and lectures for the general public.	

Team categorisations and a brief commentary:

X strengthen the support of the team <input type="checkbox"/> keep the support of the team at the current level <input type="checkbox"/> reduce the support of the team
There was a unanimous verdict this was one of the top teams at the Molecular Genetics Institute particularly considering the fact, that it is a “Junior group”. Clearly deserving of continued, ideally strengthened support of the team and a logical next step is that this team should be promoted to “Senior” status.

Other comments of the commission:

According to our opinion, this team should certainly be promoted to “Senior group”.

Team 20. Laboratory of Cell Motility

Strengths:

- very well defined scientific subject
- well defined questions and approaches of investigations
- multidisciplinary group of young scientists
- well balanced group
- use of sophisticated instrumentation
- motivated group, a prerequisite for young students' supervision
- EMBO Installation Grant

Weaknesses:

- Czech funding: starting conditions of a young investigator group

Opportunities:

- benefits of the EMBO Young Investigator Program
- sophisticated equipment of core facilities in the institute
- EMBO high quality educational activities
- capability of performing advanced experiments in trypanosomes and mammalian systems; translation of research to humans
- international funding for larger and more ambitious projects

Threats:

- end of long term funding and international funding (EMBO Installation Grant, Purkyne Fellowship, Marie Curie Individual Fellowship) without equivalent prolongation

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

H1.1	Quality of selected outputs of Phase I
Only one publication considered due to the start in 2016. Although the article is of high quality, a general conclusion of the quality cannot be given	
H1.2	Contribution of workers on the outputs reached
Small group and only 3 articles. So all are contributing	
H1.3	Quality of all outputs and results
Although the articles are of high quality, a general conclusion of the quality cannot be given due to the start of the group in 2016	
H1.4	The most valuable discoveries and findings in the fields, their importance for the field
Due to research on highly experimentally tractable trypanosomes, it was possible to identify for the first time a possibly complete complement of flagellum tip-localizing proteins in an organism. The major scientific subjects: processes that occur at the tip of the flagellum/cilium, how are they orchestrated, which proteins are involved.	

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
Basic research on a unique research object but pursuant to CAS and institute goals	
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
Potentials are existing but it is too early for a final statement	
H2.3	Relation to practice
N/A	
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
Very well networking in the Czech Republic: <ul style="list-style-type: none"> - Parasitology Institute of the Czech Academy of Sciences, Ceske Budejovice - University of Ostrava - Department of Parasitology, Charles University, Prague - Masaryk University, Brno - On campus core facilities 	

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 only laboratory studying the flagellum/cilium, which is capable of performing advanced experiments on both trypanosomes and mammalian systems. This allows to validate and to study mammalian orthologs of trypanosome flagellum tip-localizing proteins, with the	

potential of identifying novel ciliopathy proteins. This is superior to common collaborations between a laboratory studying trypanosomes and a laboratory studying mammals, as it enables instant and direct communication and interactions.	
D1.2	Scope and quality of international and national cooperation and the role of the team in such cooperation; engagement in broad international cooperation
Well embedded in EMBO activities and networking opportunities Very engaged to establish and sustain international collaboration, however so far most on bilateral level: <ul style="list-style-type: none"> - Max Planck Institute of Molecular Cell Biology and Genetics, Dresden, Germany - University of Nottingham, UK - ENS, Paris, and Curie Institut, Orsay, France 	
D1.3	Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)
Very active and innovative: <ul style="list-style-type: none"> - 2018: organization of the first Czech Cilia Meeting at the IMG with about 35 scientists. This meeting catalysed the formation of a community. - 2019: organization of the second Czech Cilia Meeting at the IMG with international participation of scientists from Austria, Poland, and the Slovak Republic. This led to creation of a Central European community. - 2019: together with other Czech EMBO Installation Grantees organization of the EMBO Young Scientists forum in Prague - Establishing of the Cytoskeleton Seminars Prague, a series of lectures on biology and biophysics of the cytoskeleton 	

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

D2.1	Direction in line with the perspective of the planned research directions
Clear planning with detailed work-packages in line with the starting projects	
D2.2	Assessment of the previous research objectives and their achievement
Group has been recently established	
D2.3	Assessment of implementation of recommendations from past evaluation
Not applicable	
D2.4	Success in receiving grants
Highly successful: <ul style="list-style-type: none"> - EMBO Installation Grant - Purkyne Fellowship - Marie Curie Individual Fellowship 	

D2.5	Adequacy of instrumental equipment
The opportunities of sophisticated instruments and modern core facilities at IMG are highly adequate for the research of the group	
D2.6	Effectiveness of management
Highly motivated group that has managed to build up an effective laboratory and group infrastructure	
D2.7	Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth
Young scientists; group under development	
D2.8	Creating work-life balance conditions, assessment of approach towards possible gender issues
Small group gender balanced. Work-life balance conditions are offered in the frame of the institute and the campus.	
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.
Data not available	

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
So far collaborations with several university groups have been started	
D3.2	Effectiveness of joint research centres
Not involved	
D3.3	Success rate in supervision of PhD students
Cannot be given, group recently established	
D3.4	Participation of PhD students in the outputs

Cannot be given, group recently established	
D3.5	Participation of the team in master or bachelor studies
master (1) and bachelor (1) students supervised until defence	
D3.6	Assessment of cooperation intensity with universities in the form of teaching
Is envisaged	

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

D4.1	Sufficiency of media strategy and activities in the area of research popularisation
Group has been recently established. Popularisation is planned	
D4.2	Publishing activities and its quality
Not applicable	
D4.3	Participation in professional organisations in the area of research and development
Establishment of national organisation envisaged	

Team categorisations and a brief commentary:

<input type="checkbox"/> strengthen the support of the team <input checked="" type="checkbox"/> keep the support of the team at the current level <input type="checkbox"/> reduce the support of the team
Please enter your comment here

Other comments of the commission:

Team 21. Laboratory of Adaptive Immunity

Strengths:

This is a large group that has recently been formed. The team leader of this junior group is an internationally recognized researcher with an ERC grant. All current members are young (less than 45 years of age). A significant amount of extra-Czech funding from diverse agencies. There are many good international collaborations. Excellent PhD training opportunities.

Weaknesses:

Excessive administrative burden. Poor institutional funding/support. Lack of an individual dedicated to public relations activities.

Opportunities:

There is room for establishing significant outreach activities which can enhance the public image of the team.

Threats:

The extreme youth of the team may cost some level of experience necessary to for this team to reach its best potential. Continuation of funding upon expiry of the ERC grant in 2023 (and the EMBO Installation Grant in 2020).

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

H1.1	Quality of selected outputs of Phase I
Three of 17 outputs were selected for Phase 1. These consisted of 1 output in a top 10% journal, 1 output in a Q2 journal and 1 output in a not classified journal, representing a modest output. The exact reasoning for the selection of the Q2 and non-classified output when an additional 7 Q1 outputs were available is unclear.	
H1.2	Contribution of workers on the outputs reached
Members of the team compose the majority of the authors as well as being first, co-first and/or corresponding author on each of the selected outputs. Based on the authorship the level of contribution by the team is over 60% in each of the selected outputs.	
H1.3	Quality of all outputs and results
The team produced a total of 17 outputs during the evaluation period, 5 of which were published in top 10% journals, 3 in the Q1 journals, 2 in Q2 journals, 4 in Q3 journals, 1 in a Q4 journal and 2 non-classified journals. Of these, team members were first, co-first or corresponding author on 7 of these outputs. The outputs and quality of the results reached are excellent for a newly established team.	
H1.4	The most valuable discoveries and findings in the fields, their importance for the field
<p>Identification of CD45 as a signal gatekeeper regulating T-cell activation based on antigen affinity allowing for T-cell activation only in the presence of high-affinity antigens.</p> <p>Phosphorylation of Y132 on LAT by ZAP-70 regulates the kinetics of T-cell activation. The rate of phosphorylation governs the degree of response to antigen recognition.</p> <p>Lck tyrosine kinase serves as a bridge between ZAP-70 and its target LAT</p> <p>RAC and CDC42 mediated actin rearrangements, not LFA-1 signaling, regulate the affinity threshold of CD8 T-cell activation.</p> <p>Prr7 has a dispensable role in TCR signaling.</p> <p>NEMO activation following TNFα treatment is required for the activation of non-canonical IKKs, TBK and IKKϵ, to prevent cell death.</p>	

<p>Components of the linear ubiquitin chain assembly complex (LUBAC) are necessary to prevent autoimmunity and inflammatory disease. Loss of certain components results in embryonic lethality.</p> <p>Defining signaling in ciliary transport and the genes that are involved in this complex.</p>	
H1.5	Contribution of the participation of the authors in large collaborations
<p>The team contributed to 7 large collaborations (more than 5 teams) of which they represented either first or corresponding author in 1 of 7 outputs.</p>	

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

H2.1	Societal relevance of outputs and results pursuant to CAS and institute mission
<p>The team is involved in basic research into the mechanism of T-cell activation, autoimmunity and ciliogenesis. As alternations in these mechanisms contribute or are the cause of multiple pathologies this work both for the basic knowledge gained and its translational potential are relevant to the CAS and its mission.</p>	
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
<p>The basic knowledge gained from the team's studies has the potential to contribute to and influence translational aspects of therapies aimed at autoimmune/immunological diseases which can have a significant impact on society in the form of novel therapeutics. Over the period of the evaluation most studies were centered on the mechanism and not translational aspects, although some application as clinical markers is presented. The team's impact on social science and humanities is limited.</p>	
H2.3	Relation to practice
<p>Most of the outputs in the evaluation period are related to basic mechanisms of T-cell activation and signaling. Current use of this knowledge for translational applications is not apparent. Data from studies on ciliogenesis, mutations and expression of proteins in the Bardet-Biedl syndrome complex may be clinically relevant as markers of disease, but analysis of this possibility was not initiated during the evaluation period.</p>	
H2.4	Participation in AV21 strategy
<p>No information as to this point was provided by the Laboratory.</p>	
H2.5	Cooperation with regions of the Czech Republic
<p>No information as to this point was provided by the Laboratory.</p>	

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
<p>This is a large relatively new group doing outstanding basic research. Clearly they are at the avant-garde of similar national and international teams. The team needs active</p>	

translation of its findings into the clinic in order to reach full potential, but due to the recent establishment of the team, this is not yet a critical point.	
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 boasts an impressive list of international collaborations. Of outputs from these collaborations the team represents the lead group in 50%. The team is also involved in several broad international outputs where their contribution is marginal as they represent the primary group in 1 of 7 outputs of this category. In all outputs resulting from national collaborations, the team represents the lead group. It is likely the relatively new formation of the team has a significant influence on these metrics.	
D1.3	Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)
The team leader acts as reviewer for a number of journals and granting agencies, has organized the EMBO Young Scientist Forum, and is the invited speaker for a number of international lectures. Both the team leader and P Draber have received national awards. The team leader has also been involved in community outreach activities as a panel member for the European Youth Parliament conference. The team was also involved in hosting a high school student. These activities are significant but covered almost entirely by the team leader; involvement of additional team personnel in these activities would be an improvement.	

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 plans of the team are in line with the previous research direction and outputs, thus building on these findings. Most of these relate to mechanistic studies. The team plans to continue to investigate the diversity of CD8+ T-cells by analyzing transcriptomics and the establishment of transgenic mice. The team also plans the further analysis of LCK-CD4 and LCK-CD8 interactions and the study of T-regulatory cells in the CD8-mediated autoimmune diabetes. This work has already contributed to several high impact publications.	
D2.2	Assessment of the previous research objectives and their achievement
This is a newly formed team. No comment.	
D2.3	Assessment of implementation of recommendations from past evaluation
This is a newly formed team. No comment.	
D2.4	Success in receiving grants
The team is one of the better funded groups in the IMG with an average annual budget of €625,000. Funds have been awarded from both national and international/European (SWF, ERC, EMBO) sources.	
D2.5	Adequacy of instrumental equipment
Instrumentation is sufficient and up-to-date for the studies undertaken by the team.	
D2.6	Effectiveness of management

The team leader seems to be an ambitious young scientist with a lot of potential. While still early in his leadership role, he has already demonstrated an effective management strategy.	
D2.7	Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth
The team is an extremely young, numerous group with a large amount of money to recruit and pay top post-docs. Age issues should not be a factor for several decades and there is room for growth and turn-over in the team. The extensive international collaborations also give any PhDs the opportunity for international experience in top labs. While these should make for excellent training of scientist in this team (the leader is doing a good job), a difficulty is always presented in keeping well trained scientist beyond the level of post-doc due to lower salary/benefits as compared to other EU and international posts (factors beyond the control of the leader).	
D2.8	Creating work-life balance conditions, assessment of approach towards possible gender issues
No information as to this point was provided by the Laboratory.	
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
The team cooperates with Charles University in Prague on teaching activities and with the First Medical Faculty of Charles University on scientific studies. In addition, there are a number international cooperations with universities in Austria, Switzerland, United Kingdom and the USA, but these appear to be all scientific in nature with no education objectives.	
D3.2	Effectiveness of joint research centres
No information as to this point was provided by the Laboratory.	
D3.3	Success rate in supervision of PhD students
During the evaluation period the team supervised 4 PhD students, one of which defended their thesis. What this PhD student did after completing the thesis defense is not described. Due to the relatively new establishment of the team, it is difficult to determine a success rate.	
D3.4	Participation of PhD students in the outputs
PhD students represent the major workforce of the team and are involved in all outputs. During the evaluation period 4 PhDs were supervised and contributed to the outputs.	
D3.5	Participation of the team in master or bachelor studies
The team leader engages in 9 BSc lectures in immunology, and 5 MSc level seminars in immunology per semester at Charles University, Prague. In addition, the team has	

supervised the theses of 5 BSc and 6 MSc students with 3 BSc and 4 MSc theses defended, during the evaluation period.	
D3.6	Assessment of cooperation intensity with universities in the form of teaching
The team leader engages in 9 BSc lectures in immunology, and 5 MSc level seminars in immunology per semester at Charles University, Prague. No other individuals are involved. This represents an intense level of cooperation for a team leader in a strictly research institution.	

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

D4.1	Sufficiency of media strategy and activities in the area of research popularisation
No specific media strategy exists.	
D4.2	Publishing activities and its quality
No publications in the area of research popularization were listed.	
D4.3	Participation in professional organisations in the area of research and development
No information as to this point was provided by the Laboratory.	

Team categorisations and a brief commentary:

<input checked="" type="checkbox"/> strengthen the support of the team <input checked="" type="checkbox"/> keep the support of the team at the current level <input type="checkbox"/> reduce the support of the team
This group is led by an excellent young researcher with a very good publication record. Because the Laboratory was newly established by the IMG, the commission recommended to keep the support at the current level. It should be strengthened, if its performance continues at the current level.

Other comments of the commission:

Team 22. Laboratory of Genome Dynamics

Strengths:

This group has a strong focus on mechanistic, disease-related discovery science. It has a consistently high impact research output and high levels of research funding. Also its status as a „Guest“ group has provided a unique opportunity to benefit from being affiliated with two high-level institutes, based in two different countries, that has lead to a varied and vibrant research environment in this team.

Weaknesses:

For some unclear reason, the institute (or CAS?) policy of penalizing the declaration of multiauthor, collaborative papers involving coauthors outside of the IMG (which include paradoxically, Caldecott's UK lab), put this team at a disadvantage in this assessment exercise, since many of its most important high impact publications fall into this category through no fault of its own. Not only the team but also the institute suffers as a result, with the nonsensical situation that publications in *Nature* where the Team is the main player, are not counted!! In the report on research activity, there was also a noted weakness in terms of outreach and participation in education. While the successful training of PhD students in the group was well noted, other areas were more poorly represented (e.g. participation in providing undergraduate lectures or public open day events). It may well be that the logistics of the management of this Team (split between the UK and Czech republic), was not conducive to this Team becoming fully engaged in such activities. However, this issue should be a point of focus for the future as this team becomes more centrally based at IMG.

Opportunities:

As well as the unique benefits open to this research Team by virtue of its Guest status and therefore the links with two different and complementary research environments in two different countries, a highlight of this Team's development has been the fostering of the career of the Senior Scientist and deputy leader of this Team, Hana Hanzlikova. She is set to lead this team as it becomes firmly established at IMG, and seems strategically well placed to apply for an ERC Consolidator Grant as well as GACR funding.

Threats:

Like all basic research activities in the world, the continuing pandemic will place new challenges on financial support in the future. However, the consistently strong research track record and output leaves the commission confident that this Team is well prepared to survive. While the future change in the organization of the Team – with the transition to leadership by Hana Hanzlikova and away from its current „Guest“ status, could theoretically be viewed as a potential threat, the commission is confident that this should instead be viewed as an opportunity.

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

H1.1	Quality of selected outputs of Phase I
The outputs that were selected for evaluation in Phase I were all ranked well in terms of journal ranking and moderately well in terms of citation intensity. However the commission feels that the institute policy of penalizing the declaration of multiauthor, collaborative papers involving coauthors outside of the IMG, puts this team at an unnecessary and unfair disadvantage.	

Phase I evaluation: The productivity of the team in excellent outputs (per FTE/ with reprint author from the institute) is above average in both World-Leading (WL) and WL+ Internationally Excellent categories.	
H1.2	Contribution of workers on the outputs reached
In all four outputs, members of Team 22 occupied First and Corresponding author positions while additional authors not linked with this team were clinicians or researchers who provided materials and services. This reflects the strong and leading position this team holds in its research field.	
H1.3	Quality of all outputs and results
Looking at the complete publication record of this Team, it is difficult not to be impressed by the consistent and strong scientific output, with publications in high impact journals including Nature, Nature Communications, Molecular Cell, Nucleic Acids Research and EMBO Reports. This is clearly a Team that occupies a leading position in this important research field. Such a shame some of these publications were not deemed worthy of scrutiny in Phase I of the evaluation proces.	
H1.4	The most valuable discoveries and findings in the fields, their importance for the field
This team has contributed many seminal discoveries in the study of single stranded DNA breaks, their repair and their contribution to neuropathologies.	
H1.5	Contribution of the participation of the authors in large collaborations
N/A	

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 Topic of this Team fits perfectly within the institute mission of understanding the links between Genes and Function at the levels of biochemistry, cell biology, physiology, pathology and whole organism biology. The emerging picture of the contribution of ssDNA repair systems to neuropathology and in particular the Team's discovery that PARP inhibitors have the potential to prevent aberrant neuronal activity, places their basic research into a position of potentially high clinical relevance. This includes a better understanding of the mechanisms and potential therapeutic routes for treating seizures and neurodegeneration.	
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
N/A	
H1.3	Relation to practice
N/A	

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
<p>This Team, by virtue of its high quality research activities and its bridging activities between the IMG and the MRC Genome Damage and Stability Centre in Sussex, UK, places it as one of the leading labs worldwide in the study of the function of DNA damage and its repair mechanisms. It most certainly should be viewed as a „lighthouse“ project for the IMG and its wise mission to encourage international engagement in its research.</p>	
D1.2	Scope and quality of international and national cooperation and the role of the team in such cooperation; engagement in broad international cooperation
<p>The structure of this team – essentially acting as a bridge between two European centers of research excellence puts it into a uniquely powerful position of illustrating the huge potential of the „Guest“ Team strategy of the IMG. This has not only paid dividends in terms of scientific output, but it has also illustrated how this approach can serve as a strong foundation for career development of gifted scientists within the CAS institute system.</p>	
D1.3	Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)
<p>Reflecting the leading position of this Team in the worldwide research community studying DNA damage repair and its role in physiology and pathology, the Team leader has been invited to present their work in many high ranking international meetings including Cold Spring Harbour meetings, Gordon Conferences and EMBO workshops. Caldecott is also an elected member of EMBO and the UK academy of Medical Sciences as well as an editorial board member of the journal <i>DNA repair</i></p>	

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

D2.1	Direction in line with the perspective of the planned research directions
<p>The research activities of this group are extremely well focused on addressing the overall mission of 1) Understanding the endogenous sources of single stranded DNA breaks (SSBs), exploring how SSBs cause neuropathology and 3) Using this basic knowledge to guide clinical opportunities. The Team should be commended on ensuring that these research directions are complementary to those of Caldecott's UK-based lab. This represents an important guarantee that this Guest lab benefits maximally from its joint affiliation status.</p>	
D2.2	Assessment of the previous research objectives and their achievement
N/A	
D2.3	Assessment of implementation of recommendations from past evaluation
N/A	
D2.4	Success in receiving grants
<p>This Team has been extremely successful in terms of procuring funding. As well as the ERC Advanced Grant held by Caldecott that has recently been extended by 6 months, the</p>	

<p>team has also been successful in other competitive grant awarding schemes such as the GAUK financial support for their PhD student.</p>	
D2.5	Adequacy of instrumental equipment
<p>The team's access to institute infrastructure in two different centers has provided optimal instrumentation for its various research activities.</p>	
D2.6	Effectiveness of management
<p>The management of this guest team has faced additional challenges compared with other groups which are based permanently at IMG. Namely, it has had to effectively coordinate two sets of research activities based in two different countries. In this regard, the management of Team 22 has been very effective. This has included defining overlapping research goals and the sharing of resources, infrastructure and funding. Regular videoconference meetings as well as the exchange of personnel has also been a key element of the strategy to ensure effective management. While Caldecott has remained based in the UK, Hana Hanzlikova has become primarily based at the IMG and so between them they have able to effectively contribute to local mangement of the Team.</p>	
D2.7	Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth
<p>This team represents a relatively small but well balanced group with equal numbers of post docs and PhD students together with one technician. During the evaluation period, one PhD student has successfully developed into a very productive team member. She successfully obtained a GAUK grant and has gone on to have one first author publication and one coauthored publication.</p>	
D2.8	Creating work-life balance conditions, assessment of approach towards possible gender issues
<p>With the exception of the Team leader, all other members are female and so ensuring gender balance does not seem to be an issue. The Binational foundation of this Team has also served as an important support for the work-life balance of the deputy team leader Hana Hanzlikova, enabling her to move back to her country of origin after a research period in the Caldecott lab in the UK.</p>	
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.
<p>N/A</p>	

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
<p>Apart from the active engagement of this team in the training of PhD students during the evaluation period, there has been limited cooperation with universities.</p>	
D3.2	Effectiveness of joint research centres
<p>N/A</p>	
D3.3	Success rate in supervision of PhD students
<p>During the evaluation period, one PhD student has successfully developed into a very productive team member. Also, in the Caldecott lab in the UK, many PhD students have successfully completed their studies pointing more generally to the existence of a very successful supervision strategy for PhD students being implemented in this team</p>	
D3.4	Participation of PhD students in the outputs
<p>PhD students are clearly actively encouraged to become central contributors to the scientific output of the lab. Reflecting this, the first PhD student has gone on to have one first author publication and one coauthored publication.</p>	
D3.5	Participation of the team in master or bachelor studies
<p>Apart from the supervision of one Master student, this Team has not been active at the level of contributing to bachelor study programmes. The commission feels that the Guest status of this team and its split base in the Czech republic and UK systems was not entirely conducive to full engagement in the Czech University teaching system. However, we are confident that going forwards, because of the high relevance of its research topic and the high quality of its research output, as well as its installation as a full member of the IMG, this team will become a valued participant in University teaching.</p>	
D3.6	Assessment of cooperation intensity with universities in the form of teaching
<p>This Team generally appears not to have been so active at the level of university teaching. The commission feels that the Guest status of this team and its split base in the Czech Republic and UK systems was not entirely conducive to full engagement in the Czech University teaching system. However, we are confident that because of the high relevance of its research topic and the high quality of its research output, as well as its future installation as a full time member of the IMG, in the future this team will become a valued participant in University teaching.</p>	

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

D4.1	Sufficiency of media strategy and activities in the area of research popularisation
None reported	
D4.2	Publishing activities and its quality
None reported	
D4.3	Participation in professional organisations in the area of research and development
Caldecott is an elected member of EMBO and so is clearly an important player in guiding research and development at the European and worldwide levels.	

Team categorisations and a brief commentary:

<input checked="" type="checkbox"/> strengthen the support of the team <input type="checkbox"/> keep the support of the team at the current level <input type="checkbox"/> reduce the support of the team
<p>We feel that this group should be regarded as having great value for the IMG at both the academic and strategic levels. It is an endorsement of the policy of the institute to encourage International input to the institute's research activities. The result has been the creation of a team that fits perfectly the core missions of the institute, that serves as a bridge with another internationally recognized research center in the UK, and which has been extremely successful at the level of scientific output and prestigious, high level funding in what is a competitive and highly relevant research field. This winning formula has also been successful in supporting the career development of a talented female Czech researcher who will be a key player in the future development of this Team as we move into the next funding period. Most definitely a „lighthouse“ project.</p>

Other comments of the commission:

The commission actively encourages the institute to support the transition of Hana Hanzlikovato the lead position of Team 22 in the future. In addition, we would encourage this Team to engage more in University teaching and outreach activities in order to profit fully from its many positives. We interpret the lack of activity for this team in both areas as a „by-product“ of the unique situation of being „split“ between two countries. Therefore, we are confident that this will be resolved as we move forward into the next funding/evaluation period.

Team 23. Laboratory of Integrative Biology

Strengths:

A new and growing medium-sized group. Has established a mouse model for hepatic stenosis. Has number of good national and international collaborations. Publishes relatively well. There is a lot of background diversity within the same group offering numerous training and career development opportunities to team members.

Weaknesses:

Gender diversity (83% of the personnel are female). Extensive use of mouse models which are costly and time consuming. Short-term (3 year) funding by the Czech granting agencies. High demand for publication quantity versus quality.

Opportunities:

Increasing workforce diversity. Using or establishing valid in vitro models to substitute mice. Translation of plectin expression/mutation findings to clinical applications.

Threats:

There is a high probability for the periodic loss of key personnel necessary for the continuation of the research projects

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

H1.1	Quality of selected outputs of Phase I
Of 12 total outputs, 1 excellent output was selected which represented a large international cooperation where the team served in a leading role. This output was published in the top 10% of journals in the respective field.	
H1.2	Contribution of workers on the outputs reached
7 of the 15 authors on the selected outputs were of the team with two co-first authors and the corresponding author members of the team. The majority of work for this output was contributed by the team.	
H1.3	Quality of all outputs and results
In total, the team has produced 12 total outputs, 2 entirely within the team and the others national (4), small international (1) and large international (5) cooperations. Of these outputs 4 were published in Q1 journals, 3 in Q2, 1 in Q3 and 4 in Q4. While a third of the outputs are in high ranking journals, there are a large number of outputs placed in lower tier journals, which may reflect the demand of publication quantity over quality pointed out by the team leader.	
H1.4	The most valuable discoveries and findings in the fields, their importance for the field
<p>Establishment of targeted plectin-deficient mice and isoform-specific plectin knock-in cell lines, as well as CRISPR/Cas9 technology for the manipulation of plectin in diverse cell lines.</p> <p>Discovery that plectin deficiency leads to biliary epithelial instability and the inability to activate a cholestasis-induced adaptive response.</p> <p>Loss of ADAM10 in the murine liver results in hepatocyte necrosis and liver fibrosis through increased MET signaling and recruitment and differentiation of liver progenitor cells.</p> <p>Finding that plectin expression is reduced in ulcerative colitis patients and its reduced expression correlates to disease severity. Ulcerative colitis resulted from decreased stability of the intestinal lumen, enhance permeability and inflammatory lesions.</p>	

Discovery that MMP-19 is required for regulating the innate immune response and maintaining the intestinal epithelial barrier function partially through the generation of CX3CL1 processing. Dysregulation of MMP-19 results in exacerbated colitis.	
H1.5	Contribution of the participation of the authors in large collaborations
Of 5 outputs derived from large international collaborations, the team served the leading role in 3 having team members appearing as first or corresponding author.	

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

H2.1	Societal relevance of outputs and results pursuant to CAS and institute mission
The main focus of the team is the analysis of plectin function in gastrointestinal disease. As results of alteration in plectin have repercussions on ulcerative colitis, hepatic necrosis/fibrosis and potentially hepatic cellular carcinoma, the outputs and results from this research have significant societal relevance to healthcare and thus fall within the mission and scope of the CAS and associated institutes.	
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 conducted by the team is basic in nature and seeks to define the role of plectin gastrointestinal disease. Most of the current knowledge is applicable to the clinic for markers of disease and disease progression, although this aspect has not been fully evaluated. As this knowledge has applications in the health field it has usefulness to society (health science), but its use in social science and humanities is limited.	
H2.3	Relation to practice
Certain findings dealing with plectin expression and mutation in ulcerative colitis may have significant usefulness if translated to the clinic for patient diagnostic and analysis purposes. At the moment this application of the findings is apparently not being actively followed.	
H2.4	Participation in AV21 strategy
No information as to this point was provided by the Laboratory.	
H2.5	Cooperation with regions of the Czech Republic
No information as to this point was provided by the Laboratory.	

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 is an excellent team which has not yet reached its full potential. This may be due to being relatively new and the structure of the team. At present, the team is among the leading national groups, and is internationally visible.	

D1.2	Scope and quality of international and national cooperation and the role of the team in such cooperation; engagement in broad international cooperation
<p>The team boasts a number of national and international cooperations. With the exception of the IKEM, where the cooperation is clinical; other national cooperations are generally technology/know-how-related. In most cases, the team is the lead team in any outputs resulting from these cooperations. Broad international cooperations resulted in 5 outputs during the evaluation period. These cooperations are of both technical expertise and therapeutic design/translational in nature. The team took a leading role in 3 of these outputs. Geographically, however, the international cooperations are limited to neighboring countries (Austria, Germany, Hungary), leaving some potential for increasing networking activities in this regard.</p> <p>The team also participates in the COST Action "An integrative action for multidisciplinary studies on cellular networks (CA 15214 EuroCellNet).</p>	
D1.3	Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)
<p>Team members participate in the Animal Facility Committee (IMG-CAS), Attestation Board (IMG-CAS) and COST Action managing committee. The team has participated in 5 lectures at European/International conferences. Some workshop/conference organization activities could be beneficial.</p>	

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

D2.1	Direction in line with the perspective of the planned research directions
<p>The proposed direction of the research is to continue to analyze the mechanism of plectin in cell-cell interactions and mechano-signaling involving nuclear structure. Given the role of plectin in mechano-signaling and its loss as contributing to fibrosis, plectin mouse models mimicing fibrosis will be used to test novel therapies (antifibrotic and antitumor). Results on ulcerative colitis will be followed-up to assess the presence of biomarkers for prognostic and diagnostic purposes.</p>	
D2.2	Assessment of the previous research objectives and their achievement
<p>The team is a newly formed group. No previous assessment exists.</p>	
D2.3	Assessment of implementation of recommendations from past evaluation
<p>The team is a newly formed group. No recommendations exist. The team did respond to an international advisory board review in 2017, which suggested the group continue as an independent group with M Gregor as head.</p>	
D2.4	Success in receiving grants
<p>The team has been relatively successful in obtaining funding from Czech sources.</p>	
D2.5	Adequacy of instrumental equipment
<p>All necessary instrumentation is present and up-to-date.</p>	
D2.6	Effectiveness of management
<p>The management appears to be very effective. Some difficulties are presented due to dynamics of the group's demographic structure.</p>	

D2.7	Assessment of professional structure, development strategy and the strategy of keeping best scientists, age structure, career and qualification growth
<p>The age structure of the lab is appropriate with space for continued growth. Some demographics of the lab associated with gender and age and the appropriate willingness of the team leader to reach a work-life balance with his team is putting some strain on the group. There is a clear intention to put together a well experienced and well-rounded group and the recruitment of highly qualified post-docs is evident of this intent. In addition, the training of PhD students is very multidimensional making them better prepared for their future career. It is too early to determine if any of these post-docs or PhDs will progress to junior level positions.</p>	
D2.8	Creating work-life balance conditions, assessment of approach towards possible gender issues
<p>The team offers multiple possibilities to its members in order to help maintain the work-life balance, offering work from home options, part-time contracts, etc.</p>	
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.
<p>Not applicable here.</p>	

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
<p>Cooperation with Charles University is primarily at the level of student education. All other university cooperations are scientific in nature and do not involve student education or exchange.</p>	
D3.2	Effectiveness of joint research centres
<p>No information as to this point was provided by the Laboratory.</p>	
D3.3	Success rate in supervision of PhD students
<p>During the evaluation period, the team has denoted supervision of one PhD student. Currently there are five PhD students working within the team. As no students have yet to defend their thesis, it is difficult to assess the exact success rate, but PhD students in the lab have been competitive for Czech student grants.</p>	
D3.4	Participation of PhD students in the outputs
<p>While supervision of one PhD is denoted by the team, a number of outputs, grants and conferences are mentioned with at least 4 different PhDs. In any case, most PhDs finish either first or co-first on select outputs.</p>	
D3.5	Participation of the team in master or bachelor studies
<p>A member of the team, M Gregor, is responsible for giving 13 MS lectures/semester in Transgenic Models in Physiology and 2 MS lectures in Advances in Physiology and Neuroscience at Charles University in Prague. In addition, the team consulted on the MS thesis of one student.</p>	
D3.6	Assessment of cooperation intensity with universities in the form of teaching

A member of the team, M Gregor, is responsible for giving 13 MS lectures/semester in Transgenic Models in Physiology and 2 MS lectures in Advances in Physiology and Neuroscience at Charles University in Prague. Involvement of additional individuals would be a plus.

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 participates in regular Open House activities where researchers present their research to the general public. Some form of media strategy (blog, website page, etc.) would be beneficial to the group.	
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
Participation of individuals in professional organizations is not mentioned.	

Team categorisations and a brief commentary:

<input checked="" type="checkbox"/> strengthen the support of the team <input checked="" type="checkbox"/> keep the support of the team at the current level <input type="checkbox"/> reduce the support of the team
This is a newly formed team with a very good track record of high-quality publications which has not yet reached its full potential. The commission recommends to keep its support at the current level. However, support should be strengthened if the Laboratory continues to perform at the current level.

Other comments of the commission:

Team 24. Laboratory of Germ Cell Development

Strengths:

- 1) A new research team (small group) established in Jan. 2015 with well-defined research goal and tools (mouse models);
- 2) The team leader has international collaborations (with Jax lab in USA) and developed new animal models (rat and mouse) that tolerate the loss of PRDM9.

Weaknesses:

- 1) Unclear how this group would cooperate or compete with the other team led by Dr. Forejt (team 7) using the same PRDM9 mouse model and potentially some overlapping interest in studying fertility and genetics of reproduction.
- 2) Only one major publication as the corresponding author during the past 5 years. Nonetheless, this is a solid publication in Genome Research.
- 3) Lack of participation in international conferences is also a concern.

Opportunities:

- 1) Probably enhance the cooperation and/or integration with Team 7 led by Dr. Forejt to strengthen the overall research program on Germ Cell Development and Mouse Genetics in IMG.
- 2) Could work together with fertility clinics to apply basic research to treat human fertility issues.

Threats:

Nothing serious noted, except that it could be potentially disadvantageous for this young team to compete for internal/external funding with the senior team led by Dr. Forejt. Low productivity is a concern that could make external funding more difficult to achieve, as is lack of visibility at conferences.

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

H1.1	Quality of selected outputs of Phase I
Only two selected outputs were provided: 1 co-authored paper in PLoS Genetics; 1 senior author paper in Genome Research. Both are of high quality.	
H1.2	Contribution of workers on the outputs reached
Two people from the team contributed to the 11-authored PLoS Genetics paper with the team providing important datasets; First and last authors of Genome Res paper are from this team with international collaboration from USA (NIH and Jax lab)	
H1.3	Quality of all outputs and results
Both outputs are of good quality, though two seems very modest.	

H1.4	The most valuable discoveries and findings in the fields, their importance for the field
The most valuable discoveries include the finding that supervised meiotic DNA breakage and repair by homologous recombination is required for normal development of germ cells and that the histone methyltransferase PRDM9 supervises this by directing DNA breaks into less important sites.	
H1.5	Contribution of the participation of the authors in large collaborations
The team is one of 56 groups froming BIOCEV (BIOmedicine and BIOtechnology Center in Vestec). The team contributes its expertise on fertility analysis (germ cell development) to the Functional Genomics research programs.	

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 research has an implication for reproductive medicine, as it can predict that drugs or conditions inducing a mild increase in DNA breaks targeted into testes of human infertility patients with low recombination rates could improve fertility.	
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 adapted Fluorescence lifetime Imaging Microscopy (FLIM) for potential use in fertility clinics, which is also pending patent application.	
H2.3	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
A senior PI who nevertheless just started his independent career over the past 5 years after several years with the Forjet group. Compared with similar international and national institutes, this team is somewhat below average in terms of productivity.	
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 collaborations with international groups at NIH and Bar Harbor The Jackson Labs with joint publication in Genome Research with the team as the leader of the project. It also cooperates with Czech researchers with some publications, including the one on PLoS genetics.	
D1.3	Participation of the workers in scientific community activities (organizing of conferences and workshops, invited lectures, awards)

Weak. No participation of team members in organized conferences or workshops. No invited lectures or awards. One selected talk by Dr. Trachtulec in 2017 at EMBL conference on Mammalian Genetics and Genomics.

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

D2.1	Direction in line with the perspective of the planned research directions
Overall the research directions are in line with the planned directions.	
D2.2	Assessment of the previous research objectives and their achievement
The team started in January 2015 with no separate activity other than those being evaluated this year.	
D2.3	Assessment of implementation of recommendations from past evaluation
Not applicable. The team is new and undergoing its first evaluation.	
D2.4	Success in receiving grants
Not clear. I cannot find such information anywhere in the written docs.	
D2.5	Adequacy of instrumental equipment
Adequate.	
D2.6	Effectiveness of management
Not that effective considering the total of 6 members and relatively low output during the past 5 years.	
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 Bachelor, Master, and Doctoral students. Age structure is reasonably towards young as the new startup team. A PhD student initially joined in the lab then decided to leave for a fertility clinic. Unclear where those 4 Bachelor and 3 Master students go after thesis defense.	
D2.8	Creating work-life balance conditions, assessment of approach towards possible gender issues
Unclear or unacceptable. Nothing was mentioned.	
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 team is part of BIOCEV and well integrated into the large collaborative project for common service facilities, discussions, and seminars. A joint manuscript and patent are under planning.	

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 collaborations with national and international teams with joint publications (PLoS Genetics and Genome Research).	
D3.2	Effectiveness of joint research centres
The team is part of BIOCEV, a large collaborative project of the Czech Academy of Sciences with Charles University in Prague. The team is effective with a paper and a patent under planning.	
D3.3	Success rate in supervision of PhD students
D3.4	Participation of PhD students in the outputs
The PI supervises 1 PhD student and 1 already defended their thesis.	
D3.5	Participation of the team in master or bachelor studies
Currently, the PI supervises 2 Bachelor and 2 Master students, with 4 Bachelor and 3 Master students already defended their theses.	
D3.6	Assessment of cooperation intensity with universities in the form of teaching
None described. No teaching of lecture, seminars and courses was provided.	

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

D4.1	Sufficiency of media strategy and activities in the area of research popularisation
Reasonable outreach activities. 1) Made video description on their research finding; 2) Participated in annual books of IMG; 3) Participated in/contributed to BIOCEV Brochures; 4) Engaged in radio talk-interview on stem cells; 5) Appeared in news coverage for general public on their research.	
D4.2	Publishing activities and its quality
Annual books of IMG and BIOCEV Brochures. The outreach is very limited.	
D4.3	Participation in professional organisations in the area of research and development
The PI does not list any.	

Team categorisations and a brief commentary:

reduce the support of the teamXXXX

While the PI is not young, he is newly independent starting his team in Jan 2015. He has developed novel mouse and rat models to study the genetics of reproduction. During the past 5 years, the team managed to publish a paper documenting that histone methyltransferase PRDM9 is not essential for meiosis in male mice, which mimics human gametogenesis, allowing them to potentially use such mouse models to further our understanding of human gametogenesis. The PI is active in collaboration with BIOVEC groups and international teams. However, the overall output is currently unacceptably low, and the PI may need more guidance and support from senior members. Overall, the research topics and mouse/rat models developed by the team are of potential importance to the germ cell biology field but this potential remains to be realized. We felt that this laboratory, while not all bad, was nevertheless the weakest in the Institute of Molecular genetics of the CAS and we recommend reducing the current support for this team.

Other comments of the commission:

Final report was elaborated by:

Commission 5.2 - Biological sciences A

Evaluated teams No.: 1, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 17, 19, 20, 22, 24

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.: 2, 3, 15, 18, 21, 23

Commission Chair: Prof. Dr. Hans-Georg Joost

Commission Deputy Chair: Thomas Krieg

Commission Members:

Achim Aigner
Ferenc Bari
William Blalock
Nicolas Catz
Tammo Delhaas
Jeremy Fauconnier
Pawan Singal
Robert Tomanek
Viviana Trezza

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

**Statement of the Observer, representative of the CAS,
on the course of Phase II of the Evaluation**

Commission:	No. 05.2 – Biological Sciences
Institute:	Institute of Molecular Genetics of the CAS
Date of online meeting:	March 17-19, 2021
Observer:	Martin Bilej

I, the Observer representing the Czech Academy of Sciences, hereby declare that the course of Phase II of the Evaluation was consistent with the Methodology of the Evaluation of the research and professional activity of research-oriented institutes of the Czech Academy of Sciences for the period 2015-2019.

YES

NO

Specification of discrepancies (obligatory if NO was chosen) or comments:

Date: March 19, 2021

Signature:

Name Surname: Martin Bilej

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

**Statement of the Observer, representative of the CAS,
on the course of Phase II of the Evaluation**

Commission:	No. 08 - Medical and health sciences
Institute:	Institute of Molecular Genetics of the CAS
Date of online meeting:	10 March, 2021
Observer:	prof. RNDr. Blanka Říhová, DrSc.

I, the Observer representing the Czech Academy of Sciences, hereby declare that the course of Phase II of the Evaluation was consistent with the Methodology of the Evaluation of the research and professional activity of research-oriented institutes of the Czech Academy of Sciences for the period 2015-2019.

YES

NO

Specification of discrepancies (obligatory if NO was chosen) or comments:

Date: 10 March 2021

Signature:



Name Surname: Blanka Říhová