

**Evaluation of Research and Professional Activities of
Research-oriented Institutes of the Czech Academy of
Sciences for the Period 2020–2024**

Final Report for the Institute

Name of the Institute:

Institute of Biophysics of the CAS

Criterion: Research Quality

Summarising commentary: Institute's Research Quality

Guidelines for Commission:

Provide a summarising commentary on the institute's research quality. This commentary is based on the evaluation at the level of research teams and contains the following statements:

- What is the institute's research quality in comparison with the world level; in what research area(s) is/are the highest level achieved?
- What extraordinary discoveries (meaning new ideas, new methods, new research paths, unique results) have been achieved, and which team made these discoveries?
- In what research area(s) is there room for improvement?

If they were presented to your Commission, new research units and research-service units could be included in the summarising commentary on the institute's research quality.

Commission's evaluation:

The institute is scientifically strong with departments that pursue their aims, approaches and conduct excellent science in their fields. The institute is led by a charismatic director that has a clear vision for the institute, and tries to focus the institute on improved scientific level. The advisory board of the institute composed of world known scientists from all over the world, another indication for the quality of the IBP

As results, the institute outputs are impressive, publishing >100 research papers every year, and it is highly cited, an indication for the high quality of science.

Its work contributes mainly to fundamental science but, in some cases, practical applications are also foreseen.

Another measure for the success of an institute is the national and international collaborations of the different departments. Here, the IBP collaborates mainly locally with Czech universities and has international partners from the USA, Germany, France and Israel.

The institute has six major flag projects that are currently conducted. These projects, across the departments, are well funded and aimed at fundamental scientific questions with high relevance to the society. The main projects are:

1. Deciphering Origins of DNA replication in genome integrity.
2. Regulation of DNA replication origins during normal development and tumorigenesis
3. Checking on Replication Origins.
4. The effects of radiation and hypoxia on head and neck cancer cells: shaping the neutrophil heterogeneity.
5. Structural gymnastics of nucleic acids: from molecular principles through biological functions to therapeutic targets.
6. An integrative strategy of testing systems for identification of EDs related to metabolic disorders.
7. novel pharmaceuticals, and impact of relevant environmental/dietary toxicants, on both normal and tumor cell populations

Few major findings and achievements were conducted over the last five years:

1. Sequencing the genome of rose- this collaborative effort was published in the journal Nature

2. Structure insights into i-motif DNA- Resolving the new structure of i-motif DNA published in Nat. Comm.
3. The role of rDNA in telomere homeostasis- This important paper was published in Plant J.
4. The involvement of RNA epigenetics in DNA repair- Published in Epigenetics and Chromosomes.
5. Revealing the mode of interactions between RNA binding motifs and RNA- Published in RNA

In summary, this is an excellent institute that focus on basic science but makes a clear effort to intervene with the companies and applications that would impact the society. However, further development would be important to increase the visibility of the institute, e.g., increase the internationality of the PIs.

Criterion: Societal Relevance

Summarising commentary: Institute's Societal Relevance

Guidelines for Commission:

Provide a summarising commentary on the institute's societal relevance. This commentary is based on the evaluation at the level of research teams and contains the following statements:

- What is the societal relevance of the institute's research in comparison with the world level; what research area(s) is/are highly societally relevant?
- What extraordinary, societally relevant results, applied in practice, have been achieved, and which team achieved these results?
- In what area(s) in relation to the application of research and results for society is there room for improvement?

If they were presented to your Commission, new research units and research-service units could be included in the summarising commentary on the institute's societal relevance.

Commission's evaluation:

The institute is primarily focus on basic science. However, this scientific activity has high social relevance. The topics that focus on health and disease are obviously relevant socially. Nevertheless, it is noteworthy that the institute has introduced a detailed plan to increase its social engagement and relevance over the next years. This indicates the serious and importance that the management takes the issue of social relevance and engagement.

Thus, in comparison to other institute/university around the globe, the IBP stands well and can further be improve by continue its excellent science. A possible further developing of this aspect of the institute would be to establish an additional department that would focus on small molecular screening or protein-based screening. In conjunction with the current scientific approaches, it would provide a more applicable side of the current scientific activity of the institute. In a similar way, more specific help to formalize the links with industrial applications (and their difficulties) would be beneficial for the majority of departments.

The work on chromatin and DNA function, the overall work on DNA damage and repair, telomeres, metallodrugs, signalling pathways and environmental toxicants are fundamental

to the public health and impact our understanding of disease states, such as cancer. The activity on plants genetic, may matured into improving GM food. The nucleic acid structure and computational approaches are highly relevant for the development of diagnostic tools. These are several research activities in the IBP that emphasize its high relevance to the society.

Criterion: Management Quality

Subcriterion: Organisation of the Institute

Questions for Commission:

- Does the organisational structure of the institute correspond to the activities that are performed at the institute? Does it enable the effective performance of these activities and effective management? In the event that an organisational change took place at the institute: To what extent did the organisational change contribute to an increase in the effectiveness of the performance of activities and effective management?
- Are the staff capacities of the institute and its units adequate for the activities required? To what extent is the personnel structure of the institute and its scientific units optimal in terms of age, gender and career level?

Commission's evaluation:

The management of the IBP has several layers, and it is clearly proved itself. The institute managing director has gathered impressive known scientists for the advisory boards, led by Tom Misteli (NIH, USA). It provides an annual review of the institute by top scientists and helps the management to further develop the institute.

The manager director is an enthusiastic scientist with long term perspective and vision. The overall management is well structured and in transparent manner. It is very effective, and clearly promotes its employees and young scientists. The above leads to a constant development in the institute that is highly appreciated. The organization is clearly supporting the scientific activity and promotes the institute activity. We have noted the significant number of publications having several complementary departments.

The core facilities (FACS, microscopy, viral constructions and animal facility) provide the technological infrastructure that allows the science to further progress.

Nevertheless, we are pointing several points that may be considered in the coming years (see below as Weaknesses).

Subcriterion: Personnel Policy

Questions for Commission:

- How do you evaluate the quality of the concept and the implementation of the personnel policy? Evaluate whether system conditions are adequately set for:
 - Career and qualification growth of researchers and professional staff.
 - Education and development of PhD students and early career researchers.
 - Support for prospective researchers.
 - Work-life balance of employees.

- How do you evaluate the quality of the concept and implementation of the equal opportunities and gender policy?

Commission's evaluation:

The IBP has expanded on its plan and steps (commitment) for personnel policy. Based on this, the institute is committed to the development of its employees. It is worth mentioning that the institute awarded with HR Award in 2024 (by the European Commission). This is a major achievement for the IBP that has been recognized by the committee and it is a clear sign that the institute is well managed toward its staff.

Here we listed the most important measures that took by the institute and are the most important for the development of the institute:

- Transparent recruitment practices for staff scientists and PIs
- Support foreign staff and post-docs
- Mobility opportunities for students and post-docs
- A comprehensive Gender Equality Plan
- Increasing training courses

The principles that lay down by the institute are appreciated, however, a further improvement in gender quality should also be reflected in the level of the department heads level. We also noted the effort that the institute made in supporting the career of its employees through the encouragement to participation in international conferences, workshops, and training courses.

In summary, we were delighted to see that the personnel policy at the Institute of Biophysics is grounded in principles shaped by the European code of conduct. This is an important measure that indicates that the institute will further develop to be even a better working place.

Subcriterion: Promoting the Quality and Societal Relevance of Research

Monitoring of Research Quality

Questions for Commission:

- Evaluate the concept and performance of monitoring the quality of research and professional activity. Is internal evaluation performed at the institute and is this evaluation adequately set up? How are the results of this evaluation used? Do they contribute to improvements?

Commission's evaluation:

The institute is a basic science and academic entity; however, it is monitoring research quality and social relevance through a two evaluation models:

1. Internal evaluation- The evaluation is based around the Czech government's M17+ methodology, which provides a comprehensive analysis of research quality and an internal evaluation system that fosters transparency and drives improvement. The evaluation process is designed to assess research performance at both the

institutional and individual levels, utilizing a range of monitoring tools, methodologies, and external feedback mechanisms.

2. External evaluation- The International Advisory Board of the institute has been asked to review the quality of the research and the engagement to society. This includes evaluation of both individual departments, and teams, as well as the institute as a whole.

The outcome of the above is then considered and implemented when possible. Thus, the institute initiated a dynamic feedback loop that informs ongoing improvements to research quality and institutional management.

The above indicates that the institute is considering seriously ways to improve its social relevance.

Support System for Gaining and Managing Projects

Questions for Commission:

- Evaluate the support system for obtaining and managing projects. What is the quality of the support activities performed at the institute for gaining projects and during their realisation? Is the institute successful at gaining important international or national projects?

Commission's evaluation:

The institute has initiated 62 new projects, mostly national and only 5 international projects, in 2020-2024. Overall, these are many projects, considering the size of the institute. The institute is very successful in initiating new projects. However, a more emphasis on the international side would be highly profitable for the institute.

To support and encourage project the IBP initiated a support system that helps acquiring and managing significant international and national research projects. This initiative is designed to assist research teams identifying funding opportunities and proposal development to implementation and sustainability phases.

Support System for Transfer of Knowledge and Technology

Questions for Commission:

- Evaluate the system for transfer of knowledge and technology. Does the institute set system conditions for successful transfer? Evaluate how the institute approaches the protection of intellectual property.

Commission's evaluation:

The institute is encouraging the engagement with industry, and in recent years the IBP acquired ~86,000 Euros from Application partnerships (in 2022-2024). While this is an excellent development, the institute still lacks a strategic partnership that would drive application. This may partly be because the environment, but the management of the institute recognized the importance of strengthening the collaboration between researches from the institute and the industry.

A possible way to develop such an avenue would be the founding of a more application-oriented research group.

Significant Collaborations and Their Impact

Questions for Commission:

- Evaluate the institute's conceptual approach to international (national) collaborations. Does the institute establish significant institutional and team collaborations? Evaluate how the collaborations are implemented in terms of their benefits and whether the collaborations led to unique results. Note: collaboration is understood as an actually realised collaboration, significance is meant in relation to the benefits and results of the collaboration, not in relation to the significance of the collaborating institution (its reputation and prestige).

Commission's evaluation:

Due to the previous evaluation, the institute has promoted new collaborations in recent years. The Institute recognized the importance of these collaborations and actively enhances its domestic and international collaborations. This includes securing a Czech-USA inter-excellence project for 2025, funded by the Ministry of Education, Youth, and Sports. The Institute also engaged in bilateral collaborations, such as the project between Dr. Judit Šponer and Dr. Matthew Pasek at Rensselaer Polytechnic Institute in the USA, as well as other projects with Ludwig Maximilian University in Munich. These are important measures by the institute, and this committee encourages the IBP to further increase its international ties with other countries and institutions for every department.

On the domestic arena the IBP is already involved in many interactions and will continue this way. The committee sees the active collaboration strategy very positively and supports further development of this activity.

Publication Strategy and Practice

Questions for Commission:

- Evaluate the institute's publication strategy and established practice for high-quality and responsible publication. Does the institute have set internal rules for high-quality publishing? Does the institute support Open Access to publications and the Open Access publishing model? How does the institute deal with the predatory practices of journals / publishers? How do you evaluate the quality of journals / publishers in which the institute and its research teams published?

Commission's evaluation:

The IBP is aiming to maximize the impact of its research. As all other institutions its aim towards high profile journals with high impact to the field. The publication strategy is aligned with best practices in scientific integrity, ensuring that all research outputs meet rigorous ethical and methodological standards.

The institute shows a good practice in supporting open access publication and pre-print platforms (such as BioRxiv). On the other hand, the institute maintains strict guidelines to prevent engagement with predatory journals and publishers.

The IBP has shown an excellent research practice involves the adoption of safe working practices and evaluation of the results using advanced scientific algorithms including statistical methods.

Approach to Scientific Information and Research Data Management

Questions for Commission:

- Evaluate the approach to scientific information at the institute. How good is the quality of the research data management concept – the method of collecting data, access to data, data sharing and their security?

Commission's evaluation:

The institute has an excellent data management concept, which is in line with all other scientific institutions. Although the institute share its data it keeps a reasonable security measures. Due to the importance of IT security, it would be good to have an overview of data protection and preservation.

Open Science Policy

Questions for Commission:

- Evaluate how the institute approaches the Open Science principles. Is the implementation of these principles successful in practice?

Commission's evaluation:

The IBP makes a big effort to support Open Access publishing to ensure broad dissemination of scientific knowledge. The institute encourages researchers to publish in reputable OA journals or hybrid journals that offer OA options. This is achieved by:

- Allocates funding to cover Article Processing Charges (APCs) for OA publications, particularly for output from major grant-funded projects.
- Utilizes institutional agreements with publishers that support OA initiatives, including transformative agreements that enable free or discounted OA publishing for IBP researchers.
- Deposits publications in institutional or national repositories, such as the Digital Library of the Czech Academy of Sciences, to comply with funder mandates and enhance accessibility.
- Encourages the use of preprint servers (e.g., bioRxiv, arXiv) to promote early dissemination of research findings while maintaining compliance with publisher policies.

The above are excellent measures that the institute should be recognized for its excellent work.

Ethics

Questions for Commission:

- Evaluate the approach to addressing ethical issues at the institute. Is this concept sufficient? Does it correspond to the standards in scientifically advanced countries and institutions?

Commission's evaluation:

The institute indicated the required ethical procedures in order to deal with scientific issues. Every animal and human material that is used in the institute go through ethical commission in Brno and in the academy of sciences to acquire the permission. This includes treatments of animal as well as patient cells and human material.

The institute recognize ethical principles related to their field of research and rules of work (e.g. working with human embryonic stem cells, GMOs, laboratory animals, or using ionizing radiation). These standards are documented in the Academic Ethical Codex as well as in the Institutional Ethical Codex.

This has been clarified during the discussion with the director of the institute, and the committee agrees that it fulfils the ethic requirements.

PR Activities and Popularisation

Questions for Commission:

- Evaluate how the institute approaches PR activities and popularisation. At what quality standard were the activities realised? Did the activities have a significant impact?

Commission's evaluation:

The institute uses several ways of dissemination of its research. This includes articles in popular science, science day for the public and lectures in schools.

Key events include Open Days, the Spring Concert, and Researchers' Night. IBP has also taken part in significant international and national events, such as the Mendel Festival in Brno and the Science Fair organized by the Czech Academy of Sciences. Additionally, the institute has successfully promoted numerous research findings through various media channels and its website. In recent years, IBP has highlighted studies on topics such as radioactivity-induced cellular damage, nucleic acid structure, advancements in anti-cancer drug research, and evolutionary genetics. Social media plays a crucial role in IBP's outreach efforts. In 2022, the institute published 75 posts on Facebook, a number that increased to over 100 in 2023, and with more than 100 posts in 2024. Also, they published information about their research papers on Twitter (nowadays renamed X) and LinkedIn portals. Scientific lectures on genetics and evolution were also shared on YouTube (Assoc. Prof. Eduard Kejnovský), with 30 lectures published in 2022 and 28 in 2023.

This is an impressive amount of effort to get into large society.

Subcriterion: Instruments, Technologies and Research Infrastructure

Questions for Commission:

- Evaluate the institute's approach to the acquisition, management and renewal of instruments and technology and to ensuring access to research infrastructure needed for teams' activities. Are the instruments, technologies and research infrastructure of good quality, up-to-date and corresponding to the teams' research needs?
- Are the instruments, technologies, research infrastructure and instrumentation and professional competences of the research-service teams effectively shared, both internally within the institute and externally with other institutes and other entities or the public?

Commission's evaluation:

The committee was impressed with the facilities that provide important infrastructure for the researchers and the research. However, to keep this infrastructure in its high end further investment should be made. For example, much of the scientific work in the IBP rely on fluorescence based microscopy therefore it is a necessity to purchase super-resolution modality to the current confocal microscopy. Super-resolution microscopy is a conventional techniques that often been requested by reviewers and will provide the IBP the possibility to have high-end images of chromatin, DNA, proteins and other biological materials.

In general, institute's current instruments and technologies are of high quality, well-maintained, and somehow up-to-date. They support the scientific activity and the research teams, enabling competitive and innovative scientific output. However, continued investment is fundamental.

Subcriterion: Implementation of Recommendations from Evaluation for the Period 2015–2019

Questions for Commission:

- Evaluate how the institute approached and used the feedback from the previous evaluation period 2015–2019. What specific changes were implemented based on the evaluation at the institute and what is your view of what these changes led to?

Commission's evaluation:

Overall, we can see that the IBP took seriously the previous reviews and made major steps towards the implementations of the previous report. Here are some of the measured made by the institute:

1. **Website Enhancement:** In response to feedback, the Institute began upgrading its website to improve accessibility and communication of research activities. While the website upgrade is ongoing, it was recognized by the ISAB as a crucial area for improvement.

2. **Financial Incentives:** To further support high-quality research, the Institute introduced financial bonuses for top-performing research teams. These bonuses were based on the teams' publication records and research outcomes, aiming to incentivize continued excellence.

3. **Strengthening the Scientific Incubator:** The management of the Institute focused on fostering innovation by expanding its scientific incubator. This initiative involved recruiting promising early-career researchers, encouraging a dynamic research environment, and ensuring that fresh perspectives were incorporated into the Institute's projects.

4. **International Collaboration:** The Institute actively pursued international research projects to enhance its global standing. Notable achievements include securing the Czech-USA INTEREXCELLENCE project for 2025, which is funded by the Ministry of Education, Youth, and Sports. The Institute also engaged in bilateral collaborations, such as the project between Dr. Judit Šponer and Dr. Matthew Pasek at Rensselaer Polytechnic Institute in the USA, as well as other projects with Ludwig Maximilian University in Munich. However, some departments are less effective on this point.

5. **Public Relations and Social Media:** Efforts to enhance public relations activities led to improved visibility on the Institute's social media platforms, including Facebook, LinkedIn, and X. These initiatives were designed to increase the Institute's engagement with the wider scientific community and the public.

6. **Support for Women in Science:** The Institute continued to prioritize support for female researchers. This included offering part-time job opportunities, on-site childcare, and parental leave return programs integrated into project applications. Additionally, the Institute applied for projects focused on supporting post-maternity leave returns. In quantitative terms, the impact of these measures on leadership is not yet evident.

It is fair to say that some important recommendation should further be implemented.

Evaluation of the Institute's Management Quality in Comparison with the Level and Standards in Scientifically Advanced Countries and Institutions

Guidelines for Commission:

- Evaluate the institute in terms of management quality in comparison with the level and standards in scientifically advanced countries and institutions.
- Give reasons for your final evaluation – comment on how the institute compares to the level and standards in scientifically advanced countries and institutions in terms of management quality and provide relevant arguments.

Commission's evaluation:

The management of the institute is hierarchical and based on historic establishments. The management run the institute smoothly and in a satisfactory manner. All level of research expressed their content in the place and the working environment. The commission recognized the advantages of the structured institute. However, it seems that the director has only limited power to form major changes in the institute. For example, the committee

recommend the splitting of a large department into two more focused research departments, but the institute director emphasized that it is not within her power to lead such a change. In particular, the committee suggest dividing the very large department of Biophysical Chemistry and Molecular Oncology, in which two sub-groups have already demonstrated their autonomy over the period evaluated.

In a similar way, the recruitment of department leaders is problematic. Most department leaders are internal recruitment and surprisingly exclusively men. This should change if the institute is to be further developed.

Commission's Recommendations for the Institute on Management Quality (NON-PUBLIC PART!)

Guidelines for Commission:

In which of the institute's Management Quality areas specified below do you see room for improvement? It is sufficient to comment only on the areas where you see opportunities for improvement. Formulate actionable recommendations for such areas. You can also state any barriers that prevent improvements and ways to overcome them.

- **organisation of the institute** (organisational structure of the institute, its effectiveness and the adequacy of staff capacities)
- **personnel policy** (concept and implementation of personnel policy in various aspects)
- **promoting the quality and societal relevance of research** (monitoring of quality, internal evaluation, support for obtaining and management of projects, support for knowledge and technology transfer, significant collaborations and their impact, publication strategy and practice, approach to scientific information and research data management, Open Science, ethics, PR and popularisation)
- **instruments, technologies and research infrastructure** (the institute's approach to their acquisition, management and renewal, the quality, adequacy and effective sharing of instruments, technologies, research infrastructure and instrument and professional competences of research-service units)
- **implementation of recommendations from the evaluation for the period 2015–2019** (use of feedback from the last evaluation)

Commission's recommendation:

Suggestions for improvements in management and infrastructure:

1. Transparent recruitment policy with majority to external scientists, an active policy to attract foreign researchers can be implemented (wider publicity, reserved positions, etc.)
2. Transparent in funding distribution for each department and within it for independent groups
3. The establishment of an external committee that will be responsible for the recommendations by the SAB and CAS reviewing committee

4. Further development of the infrastructure facilities, especially the fluorescent microscopy. A super resolution microscope is of a great need.
5. Teaming up with other institute to purchase and establish high end mass-spectrometry facility
6. Implementation from previous review process. Several important steps were taken into consideration; however, additional important comments and suggestion should require major changes in the institute. For example: working on the gender imbalance in the level of the department heads.

Criterion: Vision and Strategy

Subcriterion: Vision and Research Objectives

Questions for Commission:

- In the context of its mission, has the institute succeeded in fulfilling its vision and research objectives for the period 2020-2024?
- How do you evaluate the vision and research objectives for the period 2025–2029? Are they in compliance with the institute's mission?

Commission's evaluation:

The institute is working towards its current visions. The IBP is exploring fundamental biological processes, with a primary focus on nuclear cell and nucleic acids biology and chemistry. The general mission of the institute is to further uses and develops biophysical aspects of cellular systems. The institute continued to growth and increased its state in the worldwide arena. This vision is further developed by the institute leadership and is likely to grow in the fields of biological, biophysical, and biochemical research.

In the coming years the institute will focus on:

1. **Structural Properties of Nucleic Acids**
2. **Chemical and Electrochemical Features of Nucleic Acids**
3. **Epigenetic Regulation of Genetic Information**
4. **Interactions of Nucleic Acids with Environmental Factors**
5. **Chemical Compounds and Their Interactions with Biological Molecules**
6. **Chemical and biological evolution of life on Earth.**

These are excellent scientific topics that span several important disciplines. Covering also potential applications, as well as providing basic knowledge that is important from agriculture to cancer is a very ambitious but remains a realistic vision.

Moreover, the institute laid an important education, biotechnology development, and application of scientific discoveries approaches. More precisely the institute will focus on applications in medical diagnostics, treatment strategies, and sustainable agriculture.

In summary, the institute fulfilled its mission in a very good way.

Subcriterion: Strategic Tools for Development

Questions for Commission:

- Evaluate the concept for promoting (1) research excellence, (2) knowledge and technology transfer and (3) the development of human resources and the environment (including updated strategic tools) to achieve the vision and research objectives for the period 2025–2029. Express your view on these points:
 - To what extent are the conditions for the institute's future development secured?
 - Are the updated concept and strategic development tools aligned with the vision and planned research objectives for the period 2025–2029?

Commission's evaluation:

The Institute has revised its strategic concepts for the period 2025–2029 after the previous evaluation (2015–2019 period). These updates reflect the evolving scientific landscape, new societal challenges, and the need for stronger integration of interdisciplinary approaches. The institute is set the following steps to further develop:

1. To promote research excellent. The institute established a financial rewarding system for top-performing research teams, rewarding high-impact publications and international collaborations.
2. Promote international collaborations the IBP has increased participation in European and global research consortia and support collaborative projects
3. Increasing visibility by promoting the participation in conferences and workshops

The further strategic activity that the institute will conduct are:

1. Setting a Competitive Internal Grants innovative
2. Internal reviewing of grant applications before official submission

These are important steps that may allow further development of the institute.

Steps to improve the technology transfer were also set and are excellent developments.

These includes the established of a dedicated technology transfer office. Overall, the plan of the institute sounds very professional and attractive.

Evaluation of the Institute's Vision and Strategy in Comparison with the Level and Standards in Scientifically Advanced Countries and Institutions

Guidelines for Commission:

- Evaluate the institute in terms of its Vision and Strategy. How does the quality of the institute's concepts and tools for future development compare to the level and standards in scientifically advanced countries and institutions?

- Give reasons for your final evaluation – comment on how the institute compares to the level and standards in scientifically advanced countries and institutions in terms of setup and formulation of the vision and strategy and provide relevant arguments.

Commission's evaluation:

The vision of the institute has not fundamentally changed, and the IBP will continue with 6 main topics:

1. **Structural Properties of Nucleic Acids**
2. **Chemical and Electrochemical Features of Nucleic Acids**
3. **Epigenetic Regulation of Genetic Information**
4. **Interactions of Nucleic Acids with Environmental Factors**
5. **Chemical Compounds and Their Interactions with Biological Molecules**
6. **Chemical and biological evolution of life on Earth.**

When done properly these are excellent topics that would allow the institute to further develop. In this respect the IBP has a good stand and should continue its activity. The topics are covered in other international institutions and the IBP departments have an impact equivalent to the leading teams in these fields. Obviously if a major investment would have been considered the institute would have been able to attract world leaders scientists to join the effort.

Commission's Recommendations for the Institute on Vision and Strategy **(NON-PUBLIC PART!)**

Guidelines for Commission:

In which areas of the institute's Vision and Strategy do you see room for improvement? It is sufficient to comment only on the areas where you see opportunities for improvement. Formulate actionable recommendations for such areas. You can also state any barriers that prevent improvements and ways to overcome them.

- **vision and research objectives** (vision and research objectives for the period 2025–2029)
- **strategic development tools** (concept for (1) promoting research excellence, (2) knowledge and technology transfer, and (3) development of human resources and the environment (including updated strategic tools) for the achievement of the vision and research objectives for the period 2025–2029.

Commission's recommendation:

A substantial improvement of the vision and research objectives would come with (i) restructuring of groups (some groups are already autonomous within department in terms of scientific topics, grant autonomy and leadership, which can also highlight a better gender ratio) and (ii) increase the international quota within the institute (no head of departments and even near no students and few post-doc). These factors would allow increasing dramatically the excellence. This is hard to do if there will not be development in the teams and leaders of departments.

With the current situation and lack of additional substantial investment, the visions and objectives of the institute are very good and realistic.

Similarly, the new setup to grant excellent with additional funding is an excellent development that may encourage the scientists to further develop scientifically.

In terms of human resources and environment. The committee got the impression that the IBP is providing excellent Work-Life Balance and supporting women in science environment. It expands the childcare facilities, flexible working arrangements, and funding programs for women returning from parental leave. It also established Sick Days allowing employees to stay at home for health reasons for up to 3 days a year. The institute is an excellent working environment, and it suggests to further developing its support for the employees

Final Summary for the Institute

Strengths	Weaknesses
• <i>Large body of productivity</i> • <i>The institute is scientifically strong</i> • <i>Excellent working environment</i> • <i>Several departments are doing excellent science</i> • <i>Successful securing of national funds</i> • <i>Three well organized and equipped core facilities, especially high-end novel FACS facility</i> • <i>A junior group leader has been installed to advance the institute</i> • <i>Very enthusiastic director that nominated excellent advisory board</i>	• <i>Restructuring the departments is necessary, but should be done by external committee in collaboration with the director</i> • <i>The scientific future directions are very general and will not produce major changes</i> • <i>Limited internationality</i> • <i>Limited transparency in fund distribution</i> • <i>Gender imbalance in department heads</i>

Threats:

- Some departments rely on a rather basic technological which may reduce their potential exposure and relevance.
- Some departments are extremely diverse and not focused
- Lack of transparency in fund distributions
- Investments in facilities are required in order to keep them competitive

In summary, the IBP is a showcase for functional scientific institute with rather modest funding. Considering all circumstances, it is highly productive and organized well. Students and post-docs like to work in this place. We strongly recommend the CAS to increase the budget from the institute.

**Evaluation of Research and Professional Activities of Research-oriented Institutes of
the Czech Academy of Sciences for the Period 2020–2024**

Final report for Research Teams

Research team number and name:

01 Department of Molecular Biophysics and Pharmacology

Criterion: Research Quality**Subcriterion: Evaluation of selected outputs (Phase I)**

Questions for Commission:

- How do you evaluate the quality of the selected outputs from Phase I?
- What is your statement on the team's contribution to the selected outputs from Phase I?

Commission's evaluation:

The majority of the selected outputs from Phase 1 reached a quality level of excellent or outstanding (6 out of 8 outputs). Of those, 5 were assessed with a high contribution level and 50% were based on international collaboration. Focussing on the outputs with international collaboration, there also was a high level of contribution.

Overall, the outputs (Phase I) are evaluated as excellent to outstanding with a high contribution level involving international collaborations.

Subcriterion: Evaluation of the Team's Research Activity

Questions for Commission:

- How do you evaluate the team's research activity for the evaluation period?
 - Do you regard the research topics the team worked on as up-to-date and significant?
 - What is the quality of the main results achieved, how significant are these results for the scientific community? Do they represent a contribution to existing knowledge? Do the results represent significant progress in terms of the development of the topic? While the main results may have been achieved in collaboration with other teams, it is essential that the results presented were created at the evaluated institute and that the team transparently disclosed any collaborations.
- To what extent has the scientific community recognized the quality of team members' research? (E.g. invitations to lecture at conferences of international significance, prestigious awards for science and research, or other significant awards indicating the research quality and its recognition by the scientific community.)
- How do you evaluate the concept for the development of the team's research and research topics? – What is the team's approach to further advancing the current research topics and to identification of new directions in research topics?

Commission's evaluation:

The team is working on three major topics:

- (1) Developing metal-based compounds for enhanced cancer immunotherapy
- (2) Exploring metallo-supramolecular helicates as DNA condensing agents/ carriers for DNA delivery
- (3) Investigating platinum (IV) multi-action complexes as effective anticancer drugs.

These topics are experimentally and clinically highly significant and follow innovative concepts. The main results have been achieved in a focussed field of research, namely design and development of novel metallodrugs for cancer therapy. The main results advance the current knowledge of anti-cancer drugs and introduce an innovative concept of drug development (metallo-drugs, drug-peptide conjugates) for novel personalized anti-tumor therapy. In particular, the focus on immune-based approaches in combination with metallodrugs in cancer therapy has the potential to contribute significant progress in the field. Most of the main results have been published at a high contribution level indicating that these results were created at the evaluated institute and that the team transparently disclosed any collaborations.

The work was well recognized by the scientific community, e.g. documented by an invitation to international symposia on anticancer metal-drugs. As judged from the available information, the team is constantly seeking for novel scientific approaches and methods to advance their research. Examples are the establishment of patient-derived organoid models to strengthen the translational approach and the decision to move into immunotherapy in cancer.

Evaluation of the Quality of the Team's Research in Comparison with the Level and Standards in Scientifically Advanced Countries and Institutions

Guidelines for Commission:

- Evaluate the overall quality of the team's research in comparison with the level and standards in the relevant research areas in scientifically advanced countries and institutions.
- Provide justification for your final evaluation. Comment on how the team compares to the level and standards in scientifically advanced countries and institutions in terms of research quality and specify the arguments supporting your evaluation.

Commission's evaluation:

The overall quality of the team's research (also in comparison with other international institutions) can be assessed as very good to excellent.

The methodological portfolio of the published outputs is on a competitive level within the field of novel drug synthesis, pharmacodynamics and molecular characterization. The individual outputs combine a variety of methods and cover the range of pharmacological characterization of novel compounds including medicinal chemistry, pharmacodynamics (molecular and cell-based), and in-vivo (rodent models). This overall quality is documented by the team's publication output in best-of-discipline journals such as *Journal of Medicinal Chemistry* and *Angewandte Chemie International Edition*. The scientific concepts of the team have a high degree of novelty e.g. by studying the role of metallodrugs on immunological processes in cancer. Furthermore, the approach of transferring their research into human/patient settings such as patient-derived organoids makes the team internationally competitive and moves the team's work in the field of personalized medicine, an area currently intensely developed in multiple clinical specialities including oncology.

Commission's Recommendations for the Team on Research Quality (NON-PUBLIC PART!)

Questions for Commission:

- What are the opportunities to improve the quality of the team's research and results for the future?
- Is the setup of the team's collaborations optimal and, if not, is there room for the team to play a stronger role in them?
- Is the team's current research portfolio optimal and up-to-date? If not, what research activities should the team consider to enhance its work, and where should its further research be directed?

Commission's recommendation:

The team's research quality has already reached a high level of quality.

Based on the proposed concepts for future developments, and the topic of 'Deeping Fundamental Understanding of Disease Pathways', future work may focus on the identification of novel (metallo) drug targets by using multi-omics screening approaches. It remains unclear whether all these technologies (genomics, transcriptomics, proteomics, metabolomics) are available at IBP. These technologies should be either established at IBP or collaborations should be established. This approach also requires additional expertise in (bio)-informatic and data analysis of large-scale data sets.

In addition, the focus on patient-derived organoids should be further developed and combined with multi-omics approaches. For this, an advanced network of clinical collaborators is required and should be established. To develop future research in the field of personalized medicine and for developing metallodrugs in this field it is not only necessary to have access to human/ clinical samples but also to combine these data with clinical data. Thus, access to clinical data and expertise to interpret these needs to be establish with clinical partners.

For comprehensive pharmacological profiling animal experiments are still required. The group should extend this work to receive a full pharmacodynamic and -kinetic profile, and toxicological data. These data require 'whole-body-systems' and cannot be acquired in organoids.

The head of the department has started in January 2025 and requires additional time to establish his research concepts in the next years.

Criterion: Societal Relevance**Subcriterion: Societal Relevance of Research and Results**

Questions for Commission:

- Is the team's research societally relevant, how is it applicable, and what value does it bring to society?
- How do you evaluate the presented results applied in practice? How were the results used (non-commercially, commercially)? What was the socio-economic benefit of these results within the meaning of the value, benefit or change for society, the economy, culture, public policy, legislation, public services, health, the social area, the environment, the quality of life outside of the academic sector and any other areas?
- How do you evaluate the team's conceptual thinking about the applicability of its research and results – whether and how the team thinks about the future applicability of its research, whether is able to identify and make use of the application potential of its results and make a statement on the team's planned next steps in the transfer of results.

Commission's evaluation:

The societal relevance of research in the cancer field is per se at a high level, because of the high morbidity and mortality rates of tumor diseases in societies worldwide. The team aims to increase this societal impact by focussing on rare and childhood cancers.

The team's also states a high activity level at training of next generation scientists and the public using different educational formats.

The level of societal relevance and applicability could be increased by the future approach of investigating patient-derived organoids and personalized medicine. By establishing close collaborations with clinical centres, a direct societal return of knowledge could be reach by improving clinical care based on the research results.

Additionally, the team has a high potential to further exploit their data in drug development pipelines. Up to now, no patent has been filed on the results with metallodrugs. The team should further develop their lead compounds as drug candidates in a comprehensive pre-clinical and clinical drug development program. Thus, in this research field lies a high potential for entrepreneurship.

Along this line, not only drug candidates but also pharmacological methods newly developed by the team might be commercially exploitable to industry partners. This kind of activity would have mid- to long-term impact on society due to transfer into clinical care.

Subcriterion: Service to the Scientific Community

Questions for Commission:

- Evaluate whether the team (its members) is involved in a significant way in activities that serve the scientific community (this is understood to mean working on editorial boards of significant international scientific journals, membership in prestigious professional societies, organisation of significant conferences, involvement of team members in project evaluation and peer review of scientific publications).

Commission's evaluation:

The activity level of the team members is very high. The members serve as peer reviewers for numerous high-impact international journals. Over the five-year period from 2020 to 2024, expert evaluations were provided for multiple publishers including Elsevier, Wiley, Springer Nature, and the American Chemical Society (ACS). The amount of work regarding reviewing is remarkable: the annual count of submitted reviews: ≥ 60 in 2020, ≥ 50 in 2021, ≥ 50 in 2022, ≥ 40 in 2023, and ≥ 60 in 2024.

There is no information about membership in editorial boards or prestigious professional societies, nor about organisational activities of significant conferences.

Evaluation of the Team's Societal Relevance in Comparison with the Level and Standards in Scientifically Advanced Countries and Institutions

Guidelines for Commission:

- Evaluate the overall societal relevance of the team, including their research, results and service to the scientific community, in comparison with level and standards in scientifically advanced countries and institutions.
- Give reasons for your final evaluation – comment on how the team compares to the level and standards in scientifically advanced countries and institutions in terms of societal relevance and specify the relevant arguments for your evaluation opinion.

Commission's evaluation:

The overall societal relevance of the team can be evaluated as high.

The team addresses a research topic (anti-cancer drug therapy) which has a very high societal relevance because of the prevalence of tumor-associated diseases in societies world-wide. By developing a clinical-translational research approach with patient-derived organoids the team aims to translate their research knowledge in clinical settings and seeks collaborations with clinical partners.

In terms of public reach-out, the team shows a high activity level at training the next generation of scientists, not only university students but also secondary school students using different educational formats.

These activities compare very well to the level and standards in scientifically advanced countries and institutions.

Commission's Recommendations for the Team on Societal Relevance (NON-PUBLIC PART!)

Questions for Commission:

- What are the opportunities to improve the societal relevance of the team's research and results for the future?
- Is the team's approach to knowledge and technology transfer optimal: if not, what improvements would you recommend implementing to increase the team's success and competitiveness in knowledge and technology transfer?

Commission's recommendation:

The team's effort to comprehensive pursue drug development could be improved. New compounds could be patented and further exploited in a drug development pipeline. If necessary, this needs to be negotiated with collaborators doing compound synthesis. This requires e.g. additional animal models, toxicological studies and advice translating pre-clinical results into early clinical development. This could be achieved by collaborations with clinical centres.

Industry cooperations could be initiated, since the team developed novel methods and technologies for drug discovery in the area of metallodrugs.

In addition, the societal relevance could be improved by expanding the work on patient-derived organoids since the clinical-translational impact is high and close to patient-relevant research. For this, also clinical collaborations need to be intensified and a facility for hiPSC is required.

This work could be combined with multi-omics approaches to characterize these organoids in an untargeted fashion to identify novel molecular pathways in cancer in general and for anticancer metallodrugs in particular.

Final Summary for the Team

Strengths	Weaknesses
• Scientific focus on anti-cancer metallodrugs • methodological portfolio for drug discovery and developments (focus on pharmacodynamics) • Innovative approaches e.g. immune-based anti-cancer therapies • Clinically relevant methods e.g. patient-derived organoids	• No drug development including commercial exploitation • Focus more on personalized, targeted therapies in cancer e.g. with a stronger focus on immune-based therapies and patient-derived organoids • Multi-omics expertise/ collaborations including (bio-) informatic expertise should be established • Focus on selected cancer types • Improve on pharmacokinetic profiling • Improve on international students and postdoc, as well as on mobility

**Evaluation of Research and Professional Activities of
Research-oriented Institutes of the Czech Academy of
Sciences for the Period 2020–2024**

Final report for Research Teams

Research team number and name:

02 Department of Cell Biology and Radiobiology

Criterion: Research Quality

Subcriterion: Evaluation of selected outputs (Phase I)

Comparison with Level and Standards in Advanced Countries and Institutions

1. Overall quality in comparison to advanced countries and institutions.

The department is highly active in important areas of research and performs very well, as evidenced by the excellence of their publications, national and international positioning both in collaborations and funding attraction, and their participation in national and international scientific events and awarding track.

2. Justification of final evaluation of comparative quality

The group maintains a clear research focus and pursues this direction with consistency and excellence.

Commission's Recommendations for the Team on Research Quality

(NON-PUBLIC PART!)

3. Opportunities for improvement in the future?

The department could benefit from attracting international members and working on gender balance. The involvement of two laboratories in the line of research about Telemore Biology should be revised and they should diversify their aims. Currently, they could be considered as a single unit due to the largely overlapping topics of research and publications in common. The other two laboratories could also consider expanding their portfolio to the development of reporter systems to monitor the presence of radiation, and their class, since components like radon are highly problematic in living areas. Although IBP is an institute with a long tradition of focusing on basic research, this department has clear potential for patenting and commercialization of developed tools (i.e. software) and products (i.e., drug nanocarriers). It is advised they try to develop in that direction, which will lead to revenues that would facilitate the acquisition of new equipment and personnel.

4. Optimality of collaborations

Collaborations are excellent and the plan for extending them is in place.

5. Research portfolio is optimal and up-to-date or should be improved?

Research portfolio is mainly optimal with room for improvement/expansion with suggestions described above (point 9).

Societal Relevance

Societal Relevance of Research and Results

6. Societal relevance with explanation

Besides the societal impact on the production of wearables and therapies to cope with radiation and cancer, members of the department are involved in training and education activities at the university and high school level.

7. Application in practice (non-commercially, commercially) and the socio-economic benefit (*change for society, economy, culture, public policy, legislation, public services, health, the social area, the environment, the quality of life and any other areas*).

Members of the department have been involved in science dissemination initiatives in news papers and TV. They have also collaborated with the Czech embassy in Japan and have been appointed as science ambassadors of the city of Brno.

8. Team's plans for application and transfer

Although rooted on a tradition of basic research, the department aims to translate into applications the products of their research on cancer therapies, nanocarriers and protective wearables for astronauts and medical practitioners.

Service to the Scientific Community

9. Service to scientific community (*editorial boards of significant international scientific journals, membership in prestigious professional societies, organisation of significant conferences, involvement of team members in project evaluation and peer review of scientific publications*).

Members of the department are involved in a wide range of activities including participation in editorial boards and review of manuscript for general and specialized journals, evaluation of grant proposals for national and international funding agencies as well as their participation in national and international scientific societies. They have proven experience in organizing national and international scientific events.

Societal Relevance compared to Level in Advanced Countries and Institutions

10. Societal relevance cf. with level and standards in advanced countries and institutions.

The contributions to society from the department are comparable to, or even exceed related to its size, those of research departments in advance countries.

11. Final evaluation with justification of evaluation opinion.

The societal relevance of the team's research focus and outputs, including publications and community services, are very good.

Commission's Recommendations for the Team on Societal Relevance

(NON-PUBLIC PART!)

12. Opportunities to improve the societal relevance for the future?

Members of the department could organize outreach activities to increase the perception of the impact of their research in the society. That is specially advisable since most of the topics are directly related to acquiring knowledge in important areas related to health and the development of new technologies and treatments.

13. Possible improvements for increased knowledge and technology transfer?

The laboratories within the department should consider in patenting several outputs of their work, as mentioned above, and cooperating with companies to increase both revenues of the institute/department and social appreciation of their research.

Final Summary for the Team

Strengths	Weaknesses
• novel and important research • high level of internationalization • ability to attract funding • ... •	• Overlapping research topics and joint publications • Gender balance • International members • Interaction with companies

**Evaluation of Research and Professional Activities of
Research-oriented Institutes of the Czech Academy of
Sciences for the Period 2020–2024**

Final report for Research Teams

Research team number and name:

03 Department of Cell Biology and Epigenetics

Criterion: Research Quality

Subcriterion: Evaluation of selected outputs (Phase I)

Questions for Commission:

- How do you evaluate the quality of the selected outputs from Phase I?
- What is your statement on the team's contribution to the selected outputs from Phase I?

Commission's evaluation:

In phase I of the evaluation, the quality of six outputs was evaluated. Of these outputs, four exhibited a high level of contribution from the department to the publication. The outputs covered a broad quality spectrum from "outstanding" all the way to "acceptable." However, it should be noted that three of the outputs were given a rating of "outstanding" or "excellent", this is a good indication for the quality of science. In sum, the external reviewers and the commission recognized the significant contributions of the department and acknowledged its capacity to generate publications of the highest calibre scientific stories.

It is evident that the quality of a publication is enhanced when an external collaboration is involved. This observation underscores the significance of collaborative scientific endeavours in advancing knowledge. However, it is imperative to underscore that the reviewed outputs did not exhibit any international collaborations.

Overall, the presented outputs indicate a spectrum of interest in competitive topics.

Subcriterion: Evaluation of the Team's Research Activity

Questions for Commission:

- How do you evaluate the team's research activity for the evaluation period?
 - Do you regard the research topics the team worked on as up-to-date and significant?
 - What is the quality of the main results achieved, how significant are these results for the scientific community? Do they represent a contribution to existing knowledge? Do the results represent significant progress in terms of the development of the topic? While the main results may have been achieved in collaboration with other teams, it is essential that the results presented were created at the evaluated institute and that the team transparently disclosed any collaborations.
- To what extent has the scientific community recognized the quality of team members' research? (E.g. invitations to lecture at conferences of international significance, prestigious awards for science and research, or other significant awards indicating the research quality and its recognition by the scientific community.)
- How do you evaluate the concept for the development of the team's research and research topics? – What is the team's approach to further advancing the current research topics and to identification of new directions in research topics?

Commission's evaluation:

The Department of Cell Biology and Epigenetics is centered on three research topics that are of significant relevance and competitive standing: The department's research is focused on the "functional organization of the cell nucleus," thereby aligning with a clearly defined scientific focus. The department's primary areas of focus are as follows: 1. The subject of this investigation is the relationship between gene stability, DNA damage, and its repair. 2. The process of DNA replication and the maintenance of genome stability are critical components of cellular biology. 3. A newly established group that studies epigenetics of telomeres. It is evident that the subjects under discussion are interconnected, thereby giving rise to internal collaborations. The department's research is focused on the latest advancements in the field of genetic information.

The head of the department is a well-known scientist (an EMBO member) with international collaborations in the field of chromatin organization and DNA repair mechanisms. The Bartova group made some important contributions over the years. The group of Polášek-Sedláčková using modern DNA editing approaches to study DNA replication. This is rather young group that hold potential to develop into an important figure in the field. The group made several important contributions. Pavel Veverka's group is a recent addition to the research community, and its focus is on a topic of current and significant interest. The subsequent evolution of this group remains to be observed.

The development in this department is very apparent with the new groups that were established. It is likely that in the coming years this group will further grow and mature to be important player in the field.

During the review period (2020–2024), the team published 22 articles in peer-reviewed journals and routinely invited to conference as invited speakers.

Overall these indicated on high level of scientific quality.

Evaluation of the Quality of the Team's Research in Comparison with the Level and Standards in Scientifically Advanced Countries and Institutions

Guidelines for Commission:

- Evaluate the overall quality of the team's research in comparison with the level and standards in the relevant research areas in scientifically advanced countries and institutions.
- Provide justification for your final evaluation. Comment on how the team compares to the level and standards in scientifically advanced countries and institutions in terms of research quality and specify the arguments supporting your evaluation.

Commission's evaluation:

Very good, internationally competitive level. The quality of the work is equal with international standards of excellence scientific groups. The groups in the department are demonstrably productive and evidently conducting elegant experiments. The department's international recognition is evidenced by the nomination of Dr. Bártová as an EMBO member. This outcome signifies the esteem of the European scientific community for the research conducted within this department.

Furthermore, the comprehensive scientific endeavors of the department serve as a testament to its esteemed status within the academic community.

Nonetheless, the department would have considerably benefited from additional technological developments that may complement the fluorescent based microscopy approach which is the major tool in of the department. The rationale behind this necessity is that contemporary, high-profile work necessitates hybrid approaches that align with the scientific capabilities of the department.

Commission's Recommendations for the Team on Research Quality **(NON-PUBLIC PART!)**

Questions for Commission:

- What are the opportunities to improve the quality of the team's research and results for the future?
- Is the setup of the team's collaborations optimal and, if not, is there room for the team to play a stronger role in them?
- Is the team's current research portfolio optimal and up-to-date? If not, what research activities should the team consider to enhance its work, and where should its further research be directed?

Commission's recommendation:

As the two younger PIs continue to develop and mature, it is probable that the scientific quality and excellence of the groups will further grow. This will impact the department output however, further development of the department into complementary approaches, without changing the biological focus of the department, will strengthen the department. The department stands to benefit from additional recruitment into complementary approaches, including mass spectrometry, structural approaches and 3D chromatin organization (e.g., Hi-C).

The collaborative efforts among the teams are evident, and there are numerous longstanding international collaborations that merit further development.

Nonetheless, the department stands to benefit from additional recruitment into complementary approaches, including mass spectrometry and structural approaches.

Criterion: Societal Relevance

Subcriterion: Societal Relevance of Research and Results

Questions for Commission:

- Is the team's research societally relevant, how is it applicable, and what value does it bring to society?
- How do you evaluate the presented results applied in practice? How were the results used (non-commercially, commercially)? What was the socio-economic benefit of these results within the meaning of the value, benefit or change for society, the economy, culture, public policy, legislation, public services, health, the social area, the environment, the quality of life outside of the academic sector and any other areas?
- How do you evaluate the team's conceptual thinking about the applicability of its research and results – whether and how the team thinks about the future applicability of its research, whether is able to identify and make use of the application potential of its results and make a statement on the team's planned next steps in the transfer of results.

Commission's evaluation:

The department central focus on processes that are highly relevant to the society. Gaining basic understanding into the organization of the nucleus, nuclear proteins, regulation of nuclear DNA repair processes and epigenetic, is important to fight cancer and other pathogenic processes. Nevertheless, it is fair to emphasize that the research on cancer related processes is high relevance for the society.

Having said the above, one should mention that the work conducted in the department is mostly basic science, however, basic science is the key for the development of the next generation of drug. Therefore, the committee sees the science in this department very relevant for the society.

The department is also considered to team up with industry in order to further develop their results into products. This among other activities indicates that the department is aware of the pressure to have a more applicable branch of science.

Subcriterion: Service to the Scientific Community

Questions for Commission:

- Evaluate whether the team (its members) is involved in a significant way in activities that serve the scientific community (this is understood to mean working on editorial boards of significant international scientific journals, membership in prestigious professional societies, organisation of significant conferences, involvement of team members in project evaluation and peer review of scientific publications).

Commission's evaluation:

The department is involved in large number of services to the scientific community. This includes active editorial and reviewing of scientific manuscripts, membership and leading professional societies and the organization of conferences.

In particular it is important to mention the contribution to the Czech scientific community for example, Prof. Bártová is the current president of the Czech Biophysical Association. Other members of the departments are involved in specialized courses and workshop for the community. This is clearly an important activity of this department and shows the department dedication to contribute to science beyond their own work.

Evaluation of the Team's Societal Relevance in Comparison with the Level and Standards in Scientifically Advanced Countries and Institutions

Guidelines for Commission:

- Evaluate the overall societal relevance of the team, including their research, results and service to the scientific community, in comparison with level and standards in scientifically advanced countries and institutions.
- Give reasons for your final evaluation – comment on how the team compares to the level and standards in scientifically advanced countries and institutions in terms of societal relevance and specify the relevant arguments for your evaluation opinion.

Commission's evaluation:

The department is focus on topics that are of major interest for the society. Namely, cancer related, UV radiation and its damage, aging etc. However, the department primarily focused on basic scientific studies rather than applications. It is important to mention that basic science is the power house for applications, thus, the department research should be considered as important for the society.

The high level of publications is important aspect of the society relevance of this department. This will also important for the future connections to the industry. It is important to mention that the department is set to interactions with companies and understand the importance of translational research. Therefore, the department plan to increase its intradisciplinary work and to engage with technology transfer agencies.

The department also contribute to the scientific society via tasks that are pursue by the department people. This includes editorial board members, participating in professional society, conference organization, and reviewing of scientific work.

Therefore, this department should be ranked very high in term of relevance for the society, internationally. The combination of topics and of the activities of the departments sum up to excellent social relevance and visibility.

Commission's Recommendations for the Team on Societal Relevance (NON-PUBLIC PART!)

Questions for Commission:

- What are the opportunities to improve the societal relevance of the team's research and results for the future?
- Is the team's approach to knowledge and technology transfer optimal: if not, what improvements would you recommend implementing to increase the team's success and competitiveness in knowledge and technology transfer?

Commission's recommendation:

As mentioned above, the department is actively in improving this part, mainly because primarily the work is in the basic science. Therefore, the committee thinks that the department is doing their best to promote and develop application and technological transfer. A possible direction to support the department in this direction, would include the recruitment of an additional PI that focus on nuclear based translational science. This would expand the activity of the department toward more applicable science.

The topic to the department is very important to the society and therefore continue the high quality of research is very relevant.

Final Summary for the Team

Strengths	Weaknesses
• The department has a clear scientific focus and is known in its field. • The department promotes young scientist and women • It contributes considerably to the promotion of women in the institute • The department work is social relevance • The department internationally recognized and well known	• The internationality with the department could be improved • High dependency on fluorescence-based microscopy

Threats:

The modern science in this field requires a continuing of investment in infra structure. Thus, the limited funding may pay price in the competitiveness of the department in the future. The department largely depends on local manpower (in all levels), however, expanding diversity would make a large impact on thinking and designing novel strategies.

**Evaluation of Research and Professional Activities of
Research-oriented Institutes of the Czech Academy of
Sciences for the Period 2020–2024**

Final report for Research Teams

Research team number and name:

04 Department of Cell Biology and Radiobiology

Criterion: Research Quality

Subcriterion: Evaluation of selected outputs (Phase I)

Questions for Commission:

- How do you evaluate the quality of the selected outputs from Phase I?
- What is your statement on the team's contribution to the selected outputs from Phase I?

Commission's evaluation:

The quality of the productions evaluated in Phase I was rated particularly highly by international experts. Half of the articles were rated as excellent and only one as acceptable. The excellent articles were produced through both international collaboration and internally. Articles rated as standard are often seen as the first step towards greater devaluation in future.

Several of these articles highlight the multidisciplinary nature of the excellent-quality research. The work ranges from fairly theoretical aspects to bioinformatics and the development of high-quality experimental tools.

Examples include advances in understanding the location of G4s in helminth genomes, linking them to somatic genome rearrangement; analysis of inverted repeats in human promoters, revealing their non-random distribution and association with specific biological pathways; and a new electrochemical detection system based on silver amalgam particles electrodeposited on screen-printed silver electrodes.

All of the evaluated articles demonstrate a significant contribution from the department, with some extending to complete control of the research. This shows a very balanced approach. Clearly, the evaluation of these selected outputs demonstrates high-quality research that is at the forefront of the international field.

Subcriterion: Evaluation of the Team's Research Activity

Questions for Commission:

- How do you evaluate the team's research activity for the evaluation period?
 - Do you regard the research topics the team worked on as up-to-date and significant?
 - What is the quality of the main results achieved, how significant are these results for the scientific community? Do they represent a contribution to existing knowledge? Do the results represent significant progress in terms of the development of the topic? While the main results may have been achieved in collaboration with other teams, it is essential that the results presented were created at the evaluated institute and that the team transparently disclosed any collaborations.
- To what extent has the scientific community recognized the quality of team members' research? (E.g. invitations to lecture at conferences of international significance, prestigious awards for science and research, or other significant awards indicating the research quality and its recognition by the scientific community.)
- How do you evaluate the concept for the development of the team's research and research topics? – What is the team's approach to further advancing the current research topics and to identification of new directions in research topics?

Commission's evaluation:

The team's research covers a highly broad spectrum, focusing on elucidating the structure, interactions, chemical modifications and electrocatalytic properties of nucleic acids, proteins, glycoproteins and other biologically relevant molecules in solution and at charged interfaces. The main experimental approach used electrochemical techniques, complemented by advanced biophysical and biochemical methods. In parallel, the team is exploring innovative electrode materials, surface modifications and experimental configurations in order to design next-generation bio(electro)analytical tools. This is a highly demanding and competitive field of research that requires in-depth, interdisciplinary expertise at the intersection of chemistry, biology, and materials science, with significant implications for bioinformatics.

During the review period (2020–2024), the team published 80 articles in peer-reviewed journals. The team's research focuses on two types of macromolecule: (i) nucleic acids with specialties on modified nucleic acids (Electrochemistry of modified nucleic acids, Catalytic hydrogen evolution signals of nucleic acids, Biochemistry, biophysics and bioinformatics of non-canonical DNA structures), and G-quadruplexes (with Guanine quadruplexes and their biological roles, Guanine quadruplexes and proteins p53 transactivation functions, G-quadruplex ligands and behaviour of G-quadruplex forming DNA at electrodes) and (ii) carbohydrates (with the electrochemistry of carbohydrates and glycoproteins, modification of sugar residues with electroactive osmate complexes), without forgetting questions more focused on the electrochemistry of boron cluster compounds, chronopotentiometric stripping and measurements of catalytic hydrogen evolution signals of proteins, supramolecular

structures formed by guanine at graphite electrodes and Novel tools for bioelectrochemical research.

Despite its great diversity, most of this work is at the cutting edge of current technology. Research on guanine quadruplexes (G4) is highly competitive. This team conducts research ranging from pure theory to more applied questions. For instance, in collaboration with Toulouse (France), it has studied the interactions of G4 DNA structures with porphyrin-based ligands, focusing on the uncharacterised H-TMPyPP and its copper complex. Electrochemical and spectroscopic analyses have revealed that certain electroactive porphyrins can be used to study DNA adsorption and desorption on electrodes. Using this approach, the team demonstrated for the first time that human telomeric G4 DNA desorbs more easily from negatively charged mercury surfaces in the presence of potassium ions. This reveals the complex interdependencies between nucleic acid-specific electrochemical processes.

They were also responsible for the initial application of electrochemical methods in synthetic biology, specifically in expanding the genetic alphabet by introducing artificial base pairs. Similarly, they have provided the scientific community with web tools such as G4Hunter, Z-DNA Hunter and CpX Hunter. These tools were designed to help identify and study different types of DNA structure.

They are therefore leaders in this field, as they are in carbohydrate research, where they apply their electrochemical approaches. They have demonstrated that the presence of terminal sialic acids in fetuin glycans stabilises their molecules against the harmful effects of an electric field. They have thus advanced their research into osmate complexes (Os(VI)L) and subsequent voltammetric detection of reaction products.

Much of this cutting-edge work draws on the team's own expertise, often in collaboration with internationally renowned specialists. This commitment to excellence is evident in the team's presentations at renowned conferences in the field.

Thus, the research topics on which the team has worked are highly relevant and of particular significance, enjoying strong international recognition. Much of this work constitutes a significant addition to existing knowledge in the field.

The team's research developments are highly relevant and often innovative, and their imaginative nature should be highlighted. Compared to the previous evaluation, there has been a clear shift towards a deeper focus on high-quality research, thanks to the introduction of new techniques and the establishment of high-quality collaborations.

Evaluation of the Quality of the Team's Research in Comparison with the Level and Standards in Scientifically Advanced Countries and Institutions

Guidelines for Commission:

- Evaluate the overall quality of the team's research in comparison with the level and standards in the relevant research areas in scientifically advanced countries and institutions.
- Provide justification for your final evaluation. Comment on how the team compares to the level and standards in scientifically advanced countries and institutions in terms of research quality and specify the arguments supporting your evaluation.

Commission's evaluation:

The team consists of an average of 15 FTEs per year, with an average of four doctoral students. Its output of an average of 20 articles per year, often in high-quality journals in the field, is therefore quite respectable compared to other internationally recognised groups in the field.

The published papers are among the best in their respective fields, including Nucleic Acids Research, Bioinformatics, Genomics or Electrochimica Acta. It is important to note that, despite covering very broad fields, each topic has produced excellent articles. The outputs are of a high quality and fully in line with the standards in scientifically advanced countries. It should also be noted that a patent entitled 'Measuring Cell' (No. PCT/CZ2021/050120) has been obtained.

The ensemble is therefore of a very high international standard.

Commission's Recommendations for the Team on Research Quality **(NON-PUBLIC PART!)**

Questions for Commission:

- What are the opportunities to improve the quality of the team's research and results for the future?
- Is the setup of the team's collaborations optimal and, if not, is there room for the team to play a stronger role in them?
- Is the team's current research portfolio optimal and up-to-date? If not, what research activities should the team consider to enhance its work, and where should its further research be directed?

Commission's recommendation:

The quality of the research carried out by the team is consistently high. The team is large enough to tackle a number of topics that might initially seem too numerous. The themes addressed by the team are particularly relevant for the institute itself, but also internationally. The team's work on modified nucleic acids, such as G4s, and carbohydrates is perfectly suited to the latest developments in these fields.

The multidisciplinary nature of the department is also a key factor in the quality of the results obtained. The department is therefore performing well and it would be difficult to maintain this momentum. An interesting aspect to highlight is the excellent balance of collaborations established by the various team members. Some work is carried out exclusively within some groups of the department and has been particularly successful, while other work is carried out externally with similar success. The excellent balance of collaborations established by the various team members should also be highlighted. Some work is carried out exclusively within the team and has been particularly successful, while other work is carried out in close collaboration with internationally recognised experts in various fields. Once again, the dynamic is excellent, and it would be wise to maintain it, as the existing balance is entirely appropriate.

The team's current research portfolio appears to be both appropriate and up to date. Two specific points requires further consideration: (i) the link with biomedical applications and (ii) the size of the department. As noted in the team's document, the biological results are still at a very early stage. Given that the term 'oncology' appears in the team's title, it would be appropriate to focus on applications that are genuinely related to cancer or to change to 'pathology', a broader term. The second point is the high heterogeneity of the department, two independent groups, at least, exist, and could become independent in a close future. It could help to provide a better dynamics as to also provide a better visibility for women in the Institute.

Criterion: Societal Relevance

Subcriterion: Societal Relevance of Research and Results

Questions for Commission:

- Is the team's research societally relevant, how is it applicable, and what value does it bring to society?
- How do you evaluate the presented results applied in practice? How were the results used (non-commercially, commercially)? What was the socio-economic benefit of these results within the meaning of the value, benefit or change for society, the economy, culture, public policy, legislation, public services, health, the social area, the environment, the quality of life outside of the academic sector and any other areas?
- How do you evaluate the team's conceptual thinking about the applicability of its research and results – whether and how the team thinks about the future applicability of its research, whether is able to identify and make use of the application potential of its results and make a statement on the team's planned next steps in the transfer of results.

Commission's evaluation:

It can be described by different short questions. In the short term, the team's research relevant to society in terms of improving our understanding of complex phenomena related to nucleic acids and carbohydrates? In the medium term, is it potentially relevant to specific biomedical research? And in the longer term, is it relevant to cancer research? Currently, it is mainly useful to society in basic research. Other teams for their own research can also use methodological developments from this department.

Practical application is evolving towards more application-oriented systems, and several systems of interest have already been studied, for example with glycomimetic inhibitors.

Although currently these are mainly non-commercial aspects, patenting and industrial collaboration show a trend towards industrial issues. Overall, therefore, this has a positive impact on society.

The team effectively presents the potential applications, such as electrochemistry, which suggests promising advances in the future.

Subcriterion: Service to the Scientific Community

Questions for Commission:

- Evaluate whether the team (its members) is involved in a significant way in activities that serve the scientific community (this is understood to mean working on editorial boards of significant international scientific journals, membership in prestigious professional societies, organisation of significant conferences, involvement of team members in project evaluation and peer review of scientific publications).

Commission's evaluation:

The team members have adequate activities at the scientific community level for evaluation activities, but very limited activities at the level of learned societies. Similarly, there is no editorial board activity, which should be more dynamic. Providing web tools to the community is a very positive and essential point these days.

Evaluation of the Team's Societal Relevance in Comparison with the Level and Standards in Scientifically Advanced Countries and Institutions

Guidelines for Commission:

- Evaluate the overall societal relevance of the team, including their research, results and service to the scientific community, in comparison with level and standards in scientifically advanced countries and institutions.
- Give reasons for your final evaluation – comment on how the team compares to the level and standards in scientifically advanced countries and institutions in terms of societal relevance and specify the relevant arguments for your evaluation opinion.

Commission's evaluation:

The teams' topics are sometimes very specialized, such as electrochemistry, but they are most often covered by articles in internationally recognized journals. An important point is the collaborative networks that have been effectively established.

The team's societal relevance lies primarily in understanding fundamental mechanisms and developing protocols that can have a variety of applications. They correspond in terms of quantity and quality to what is expected at the international level. Importantly, providing bioinformatics development to scientific community is a key point.

The connection with medical aspects is still too distant as noted in previous evaluation.

Commission's Recommendations for the Team on Societal Relevance (NON-PUBLIC PART!)

Questions for Commission:

- What are the opportunities to improve the societal relevance of the team's research and results for the future?
- Is the team's approach to knowledge and technology transfer optimal: if not, what improvements would you recommend implementing to increase the team's success and competitiveness in knowledge and technology transfer?

Commission's recommendation:

The developments carried out are of very good quality and should be continued, whether for modified nucleic acids, G4s, or carbohydrates, and collaborations should be continued.

The connection with industry is somewhat weak, and this goes hand in hand with the lack of a connection with oncology (which is in the team's title). It would be good to have a more advanced system for this. Likewise, greater involvement in collective responsibilities at at least the national level would be a plus.

The evolution of this department in different teams can improve it as the research on P53 for instance can be successful in this field, but needs more visibility. Other carbohydrates can also be of highest interest.

Final Summary for the Team

Strengths	Weaknesses
• Innovative developments in modified nucleic acids and G4s – the approaches developed lead to new thinking and open up possibilities for a variety of systems. • Strong expertise in electrochemistry and electrochemical methods, particularly applied to biopolymers – the new developments are innovative and may have medium-term applications in systems of interest. • Interesting tools for carbohydrates – applications in pathologies are the most innovative. • Useful web services for the community – the visibility provided by these tools and their specific features highlight the institute. • A powerful collaboration network – numerous collaborations that lead to significant advances.	• A weak link to industrial valuations – the approaches are too basic research-based, and a single patent and a single industrial contract are too weak in the department's view. • A lack of visibility in oncology – the research is too far removed. • Internationally not yet enough, there is potential for improvements – there has been an improvement compared to the previous assessment, but more work is required • The evolution of the department is difficult to understand in terms of career – as a very large department it would be beneficial to the youngest PIs to gain visibility with their own teams.

**Evaluation of Research and Professional Activities of
Research-oriented Institutes of the Czech Academy of
Sciences for the Period 2020–2024**

Final report for Research Teams

Research team number and name:

05 Department of Molecular Epigenetics

Criterion: Research Quality

Subcriterion: Evaluation of selected outputs (Phase I)

Questions for Commission:

- How do you evaluate the quality of the selected outputs from Phase I?
- What is your statement on the team's contribution to the selected outputs from Phase I?

Commission's evaluation:

During the evaluation period (2020-2024), the Molecular Epigenetics Department has published 36 articles in impacted journals. Considering that the group has a reduced size (7 FTE are declared for this period), the number of publications are appropriate. 6 out of these 36 articles were selected for the evaluation in Phase I. Two articles were scored as outstanding (Nature Plants 2020, Plant J 2022), two as excellent (Front Plant Sci 2021, Plant J 2024), and two as standard (Genes 2020, Mol Bio Evol 2024). Overall, the quality of the outputs is high.

Regarding the contribution of the team members, noticeably in 4 of 6 articles they have a high contribution (Genes 2020, Front Plant Sci 2021, Plant J 2022, Plant J 2024), one article with medium contribution (Nature Plants 2020) and one as low contribution (Mol Bio Evol 2024). It should be noticed that the article with low contribution is a review paper in a high relevant journal.

Altogether, the number of excellent/outstanding articles in which researchers from the department have leading roles is high.

Subcriterion: Evaluation of the Team's Research Activity

Questions for Commission:

- How do you evaluate the team's research activity for the evaluation period?
 - Do you regard the research topics the team worked on as up-to-date and significant?
 - What is the quality of the main results achieved, how significant are these results for the scientific community? Do they represent a contribution to existing knowledge? Do the results represent significant progress in terms of the development of the topic? While the main results may have been achieved in collaboration with other teams, it is essential that the results presented were created at the evaluated institute and that the team transparently disclosed any collaborations.
- To what extent has the scientific community recognized the quality of team members' research? (E.g. invitations to lecture at conferences of international significance, prestigious awards for science and research, or other significant awards indicating the research quality and its recognition by the scientific community.)
- How do you evaluate the concept for the development of the team's research and research topics? – What is the team's approach to further advancing the current research topics and to identification of new directions in research topics?

Commission's evaluation:

During the evaluation period, the Molecular Epigenetics Department has made significant contributions to the field of plant genomics. They have achieved important results in the three main areas of interest defined by the group: (1) evolution of chromosomes in polyploid plants; (2) ribosomal RNA genes biology, and (3) repetitive DNA sequences and their dynamism in the genome. The major achievements and their impact in the scientific society are summarized below.

Nature Plants 2020. The paper has a high degree of innovation as it provides novel information regarding the genome sizes of more than 100 plant species that can impact plant traits. The relevance in the field is high as demonstrated by the number of citations. First author of the article is from the evaluated group. The last author is from United Kingdom, demonstrating a high international collaborative strategy.

Plant J 2021. The article is highly innovative and it provides useful information for the scientific community. It describes a very comprehensive view of telomere variation among plant species and highlights the unique characteristics of gymnosperm chromosomes. The first and last authors are affiliated to the evaluation group. The article includes collaboration with international researchers at United Kingdom, China and Spain.

Plant J 2024. High innovative paper uncovering, for the first time, uniparental silencing of 5S rRNA genes in allopolyploids. It has a high impact in the scientific community in the field of polyploid evolution. Last author (and co-authors) from the evaluated research team. First

author of another Czech Republic institution. It has been performed in collaboration between several national institutes and in Ukraine.

In addition, during the pandemic period the Molecular Epigenetics Department, together with another departments at the institution, have contributed to the identification of mutations at the Sars-Cov-2 virus that can play a significant role in the evolution of the coronavirus. The results were published in a standard paper.

Although the quality of the results and their innovation level, the recognition in the scientific society based on the number of invited talks at congresses or another awards is not satisfactory. In this sense, only two invited talks are contained in the Background materials for evaluation.

Some unsatisfactory achievements were also identified. First, the research focused on epigenetics was only partially achieved by collaboration with the group of Eva Bartová in human models. Second, the research involving animal ribosomal RNA evolution was underdeveloped (due to methodological limitations). Considering this, the future directions of the research lines will be focus mainly on the study of structure and spatial organization of individual chromosomes.

Note: the Background Materials for Phase II of Evaluation about Research Team contains articles/research lines that were not selected as output. It also refers to a high-impact article published in 2025 (Nature), out of the evaluation period, in which the PI of the Department acts as co- corresponding author. The paper was also highlighted during the in person meeting in Brno.

Evaluation of the Quality of the Team's Research in Comparison with the Level and Standards in Scientifically Advanced Countries and Institutions

Guidelines for Commission:

- Evaluate the overall quality of the team's research in comparison with the level and standards in the relevant research areas in scientifically advanced countries and institutions.
- Provide justification for your final evaluation. Comment on how the team compares to the level and standards in scientifically advanced countries and institutions in terms of research quality and specify the arguments supporting your evaluation.

Commission's evaluation:

Overall, the team meets the level of standards established in scientifically advanced countries and Institutions, including quality of the research, relevance of the publications and level of international collaboration. It should be considered that the research team has a small size, so comparisons with another groups is not easy. Given the extensive network of international collaborators, the main weakness can be the reduced number of funded research projects obtained during the evaluation period, specially those referred to non-national applications.

Commission's Recommendations for the Team on Research Quality **(NON-PUBLIC PART!)**

Questions for Commission:

- What are the opportunities to improve the quality of the team's research and results for the future?
- Is the setup of the team's collaborations optimal and, if not, is there room for the team to play a stronger role in them?
- Is the team's current research portfolio optimal and up-to-date? If not, what research activities should the team consider to enhance its work, and where should its further research be directed?

Commission's recommendation:

Overall, the team had a good progress during the evaluation period. However, some specific improvements with respect to research quality are recommended.

1. To reduce the number of research lines. Due to lack of human resources of the group and the lack of animal experimental models, it is recommended to focus the research on the strong areas in plant research.
2. The research lines during the evaluated period are not directly associated with epigenetics. The name of the team is not recapitulating the topics that are addressed by the group. This could have a negative impact on the visibility of the group.
3. The team has a very extensive and well-established network of collaborators from European and non-European countries. It is recommended to explore the applications to European competitive grants for funding.

Criterion: Societal Relevance

Subcriterion: Societal Relevance of Research and Results

Questions for Commission:

- Is the team's research societally relevant, how is it applicable, and what value does it bring to society?
- How do you evaluate the presented results applied in practice? How were the results used (non-commercially, commercially)? What was the socio-economic benefit of these results within the meaning of the value, benefit or change for society, the economy, culture, public policy, legislation, public services, health, the social area, the environment, the quality of life outside of the academic sector and any other areas?
- How do you evaluate the team's conceptual thinking about the applicability of its research and results – whether and how the team thinks about the future applicability of its research, whether is able to identify and make use of the application potential of its results and make a statement on the team's planned next steps in the transfer of results.

Commission's evaluation:

This section is not very detailed in the background materials for evaluation provided by the team neither during the in person meeting. Although the research performed in the team is very fundamental and employs plant models, the knowledge of how genome organization evolves in different species can help to understand evolution. Several implications in agriculture or natural ecosystems can be identified, and are not clearly stated in the report.

However, the report contains the social implication of the unique study of coronavirus evolution performed during the pandemic. Although relevant, this research line is not representative of the team.

The relevance of the plant studies and its impact on society should be reinforced. For instance, they briefly mentioned a future project on how nutrients components impact the plant genome and their adaptive potential under stressful conditions. Could this knowledge be used to mitigate climate change? This and other questions can influence policy-decision makers, but this idea is not clearly developed in the report.

Subcriterion: Service to the Scientific Community

Questions for Commission:

- Evaluate whether the team (its members) is involved in a significant way in activities that serve the scientific community (this is understood to mean working on editorial boards of significant international scientific journals, membership in prestigious professional societies, organisation of significant conferences, involvement of team members in project evaluation and peer review of scientific publications).

Commission's evaluation:

The team has performed interesting services to the scientific community. One major contribution is the deposition of their data in several free databases, including the plant rDNA database, the animal rDNA database, the B-chromosome database and the sex-chromosome database. These achievements have short-term impact on the research in the field, as offers a unique and accessible source of information.

The PI of the team has been member of several national commissions of trusts and advisory boards of international societies. He has participated in the co-organization of one scientific meeting located in Spain. The evaluation tasks are reviewers in international journals is acceptable (more than 20 journals for all team members).

Evaluation of the Team's Societal Relevance in Comparison with the Level and Standards in Scientifically Advanced Countries and Institutions

Guidelines for Commission:

- Evaluate the overall societal relevance of the team, including their research, results and service to the scientific community, in comparison with level and standards in scientifically advanced countries and institutions.
- Give reasons for your final evaluation – comment on how the team compares to the level and standards in scientifically advanced countries and institutions in terms of societal relevance and specify the relevant arguments for your evaluation opinion.

Commission's evaluation:

It is difficult to evaluate this issue with the information provided in the background material for evaluation and after the in-person interview with the PI in Brno. It is clear that the team is doing an interesting basic research, but the potential to translate into society can be reinforced. The social impact on the scientific community is appropriate, however, the team should improved the impact on the general society.

Commission's Recommendations for the Team on Societal Relevance (NON-PUBLIC PART!)

Questions for Commission:

- What are the opportunities to improve the societal relevance of the team's research and results for the future?
- Is the team's approach to knowledge and technology transfer optimal: if not, what improvements would you recommend implementing to increase the team's success and competitiveness in knowledge and technology transfer?

Commission's recommendation:

The team has contributed significantly to enlarge the tools available for the scientific community in the field, specifically, through the design and maintenance of several free databases. However, how the results of the group can be extrapolated to transference is not explored. The topic, specifically, the applications on adaptation of agriculture species to variable environmental conditions such as climate change are interesting and can result in long-term application. At short term, the team can organize educational programs to general public, or biotech companies to make more visible their research and look for non-academic opportunities.

The Participation of the team members as organizers of events should be increased.

Final Summary for the Team

Strengths	Weaknesses
• Research quality of the publications in peer-review journals • Established network of international collaborators • Wide portfolio of molecular and genetic methods	• The team should pay more attention to the transference and innovation possibilities. • The scientific strategic plan for the next years is not clear. Topics should be simplified to avoid dispersion. • Funding strategies are not specified. • The number of PhD students and young researchers is low. This can limit the future viability of the Molecular Epigenetics Department.

Evaluation of Research and Professional Activities of Research-oriented Institutes of the Czech Academy of Sciences for the Period 2020–2024

Final report for Research Teams

Research team number and name:

06 Department of Cytokinetics

Criterion: Research Quality

Subcriterion: Evaluation of selected outputs (Phase I)

Questions for Commission:

- How do you evaluate the quality of the selected outputs from Phase I?
- What is your statement on the team's contribution to the selected outputs from Phase I?

Commission's evaluation:

The quality of the outputs for this department is "Excellent". Indeed, among the 6 evaluated outputs 2 were classified as "Outstanding", 2 "Excellent" and 2 "Standards".

In terms of „Team's contribution“, among these 6 outputs, 4 were evaluated as High contribution, 1 Medium and 1 Low. The team's contribution is thus "High" with 3 of these outputs implying international collaborations, and the 3 others with national collaborations.

Subcriterion: Evaluation of the Team's Research Activity

Questions for Commission:

- How do you evaluate the team's research activity for the evaluation period?
 - Do you regard the research topics the team worked on as up-to-date and significant?
 - What is the quality of the main results achieved, how significant are these results for the scientific community? Do they represent a contribution to existing knowledge? Do the results represent significant progress in terms of the development of the topic? While the main results may have been achieved in collaboration with other teams, it is essential that the results presented were created at the evaluated institute and that the team transparently disclosed any collaborations.
- To what extent has the scientific community recognized the quality of team members' research? (E.g. invitations to lecture at conferences of international significance, prestigious awards for science and research, or other significant awards indicating the research quality and its recognition by the scientific community.)
- How do you evaluate the concept for the development of the team's research and research topics? – What is the team's approach to further advancing the current research topics and to identification of new directions in research topics?

Commission's evaluation:

The team is mainly working on several types of cancer (prostate, breast, melanoma, colon, hepatocellular...) with 2 main axis:

1/ Detection and treatment of tumor cells, including circulating cells. They develop original and outstanding cytometry-based methods and innovative chemical treatments to fight several types of cancers

2/ AhR a transcriptional regulator with therapeutic potential that can also have a role activated by environmental contaminants

The outputs are excellent, and their results are really competitive at the international level.

Their expertise in cancer signalling, resistance, metastasis, tumor circulating cells and impact of pollutants are of major societal importance. They are mainly experts in basic medical research and thus their results are not directly applied to patients, but their expertise is well adapted to exchange with different collaborators to test possible original treatments.

Some of their results have been already used by regulatory agencies and authorities, such as European Food Safety Authority or International Agency for Research on Cancer.

They have an international recognition with international invitations/participation to present in scientific meetings. In particular they are partners in the OBERON H2020 network, and have a lot of national and local collaboration

Evaluation of the Quality of the Team's Research in Comparison with the Level and Standards in Scientifically Advanced Countries and Institutions

Guidelines for Commission:

- Evaluate the overall quality of the team's research in comparison with the level and standards in the relevant research areas in scientifically advanced countries and institutions.
- Provide justification for your final evaluation. Comment on how the team compares to the level and standards in scientifically advanced countries and institutions in terms of research quality and specify the arguments supporting your evaluation.

Commission's evaluation:

Very Good

They produced 75 Journal Articles.

They have developed unique tools to investigate at the cell level the heterogeneity of the tumors, and adapted models of Breast, Prostate, Colon ...

They are experts on the role of AhR in pathologies affecting different barriers (colon, skin), interfaces with xenobiotics contaminants and on different poorly known contaminants of the environment PAHs.

All their expertise and models are shared with local, national and international groups to test different opportunities of treatment, of detection of circulating tumor cells and of testing solutions based on the AhR/pollutants products.

Commission's Recommendations for the Team on Research Quality (NON-PUBLIC PART!)

Questions for Commission:

- What are the opportunities to improve the quality of the team's research and results for the future?
- Is the setup of the team's collaborations optimal and, if not, is there room for the team to play a stronger role in them?
- Is the team's current research portfolio optimal and up-to-date? If not, what research activities should the team consider to enhance its work, and where should its further research be directed?

Commission's recommendation:

The team's research quality is excellent. The main objectives in the future are clearly explained and in continuation with their expertise, results and established models/methods.

They are working at different interfaces: chemistry on one side and medical applications on the other. The 2 PIs are very efficient in both directions and they have long-lasting collaborations with several local, national and international groups.

The portfolio is optimal and up-to date.

A possible risk would come from the multitude of small short-term projects. They are well aware of this situation, and they explained it in the document: *"The current format of research funding in the Czech Republic forces us to rely on relatively large number of diverse projects, in order to secure the funds for our research, as the institutional funding can only be limited. This has important consequences, including the need to rely on short-term projects, which limits any long-term and high-risk research, and also, it provides only limited resources for modern technologies, which are necessary in current cell biology."*

Criterion: Societal Relevance

Subcriterion: Societal Relevance of Research and Results

Questions for Commission:

- Is the team's research societally relevant, how is it applicable, and what value does it bring to society?
- How do you evaluate the presented results applied in practice? How were the results used (non-commercially, commercially)? What was the socio-economic benefit of these results within the meaning of the value, benefit or change for society, the economy, culture, public policy, legislation, public services, health, the social area, the environment, the quality of life outside of the academic sector and any other areas?
- How do you evaluate the team's conceptual thinking about the applicability of its research and results – whether and how the team thinks about the future applicability of its research, whether is able to identify and make use of the application potential of its results and make a statement on the team's planned next steps in the transfer of results.

Commission's evaluation:

Their expertise in cancer signaling, resistance, metastasis, circulating cells and impact of pollutants are of major societal importance. They are mainly experts in basic medical research and thus their results cannot yet be directly applied to patients, but their expertise is well adapted to exchange with different (clinical) collaborators and to test possible original treatments.

Some of their results have been already used by regulatory agencies and authorities, such as European Food Safety Authority or International Agency for Research on Cancer.

Subcriterion: Service to the Scientific Community

Questions for Commission:

- Evaluate whether the team (its members) is involved in a significant way in activities that serve the scientific community (this is understood to mean working on editorial boards of significant international scientific journals, membership in prestigious professional societies, organisation of significant conferences, involvement of team members in project evaluation and peer review of scientific publications).

Commission's evaluation:

J. Vondráček, K. Souček and A. Hyršlová Vaculová, are teaching theoretical and practical courses at the Masaryk University in Brno and Palacký University in Olomouc.

During the period, 4 doctoral, 10 master and 10 bachelor students working in their department have successfully defended their theses,

The 2 PIs are involved in different international committees. Both PI are editorial board members at Current Opinion in Toxicology (Elsevier). K. Souček serves as an associate

editor for American Journal of Pathology and Frontiers of Cancer Cell Biology and he served as a guest associate editor for Frontiers in Molecular Diagnostics and Therapeutics.

J Vondráček serves as editorial board member of Biochimie (an official journal of Société Française de Biochimie et Biologie Moléculaire, Elsevier) and of Journal of Nutritional Biochemistry (Elsevier).

Both PIs and other lab employees are also active members of number of national and international societies.

Indeed, J. Vondráček currently serves as:

- Vice-chair of the Toxicology section of the Czech Society for Experimental and Clinical Pharmacology and Toxicology.
- Representative to the Federation of European Toxicologists and European Societies of Toxicology (EUROTOX). He is currently acting as a chair of the Carcinogenesis Specialty Section of EUROTOX. As a chair, he presided over the activities of the section (including e.g. organization of webinar, organized jointly with our American counterparts) and helped to organize the annual EUROTOX meetings
- Organisation of regular Xenobiochemistry symposia (meeting of xenobiochemistry sections of both Czech and Slovak Societies for Biochemistry and Molecular Biology) and TOXCON (joint yearly meetings of Czech and Slovak toxicology societies with international participation). He was a member of the local organizing committee for The 25th International Symposium on Microsomes and Drug Oxidations (MDO) in Prague (July 7 – 10, 2024).
- Elected member of Academy Council of the Czech Academy of Sciences. panel member of the Czech Science Foundation panel P503 (Food Science, Ecotoxicology and Environmental Chemistry) (2021 – 2024)
- Reviewer Archives of Toxicology, Toxicological Sciences, Toxicology, Environmental Pollution, Environment International, Science of the Total Environment, Chemosphere, Biochemical Pharmacology, Journal of Hazardous Materials

As well, K. Souček currently serves as:

- Chair of the CSAC (Czech Society for Analytical Cytometry)
- Panel member of the Czech Science Foundation panel P304 (Tumor Biology, Experimental Oncology).
- Reviewer Molecular Cancer, PlosONE, Cytometry Part A, Life Sciences, PNAS, Carcinogenesis, American Journal of Pathology, Cell Death & Disease, Theranostics, and others.

Membership in other international societies include International Society for Analytical Cytometry, American Association for Cancer Research, European Association for Cancer Research, Society of Toxicology

Evaluation of the Team's Societal Relevance in Comparison with the Level and Standards in Scientifically Advanced Countries and Institutions

Guidelines for Commission:

- Evaluate the overall societal relevance of the team, including their research, results and service to the scientific community, in comparison with level and standards in scientifically advanced countries and institutions.
- Give reasons for your final evaluation – comment on how the team compares to the level and standards in scientifically advanced countries and institutions in terms of societal relevance and specify the relevant arguments for your evaluation opinion.

Commission's evaluation:

Their projects concern “hot” topics in the cancer biology and toxicology fields:

- research on cancer cell dissemination, tumor cell heterogeneity/plasticity, metabolic reprogramming in cancer cells,
- effects of microbiome/toxic compounds, linked particularly with AhR signaling

The quality level and number of outputs are excellent at the international levels in particular for a department of their “small” size.

Commission's Recommendations for the Team on Societal Relevance (NON-PUBLIC PART!)

Questions for Commission:

- What are the opportunities to improve the societal relevance of the team's research and results for the future?
- Is the team's approach to knowledge and technology transfer optimal: if not, what improvements would you recommend implementing to increase the team's success and competitiveness in knowledge and technology transfer?

Commission's recommendation:

Their expertise is mainly at the preclinical level, and thus their results are not visible yet in clinics, although they have very interesting results, tools and expertise. The translational part, either to the clinics and/or to the industry should be continued:

- Access for clinician to the Single-cell glycosphingolipid profiling (flow cytometry for Glycosylated sphingolipids (GSL) markers, mass cytometry and barcoded high-throughput cytometry platforms). Actually they are already in contact with clinical teams and already working on this part.
- Patent applications on the different innovative products they are (co-)developing. This should be considered and may be as a priority?

Final Summary for the Team

Strengths	Weaknesses
• 2 PIs very strong and active • Very good outputs • European grants • International level • Innovative technologies/facilities • Clinical collaborators • Chemists' collaborators • Interfaces with chemistry and clinics • Societal impact	• Multiple projects on various cancers • Patent • ... • ...

**Evaluation of Research and Professional Activities of
Research-oriented Institutes of the Czech Academy of
Sciences for the Period 2020–2024**

Final report for Research Teams

Research team number and name:

07 Department of Structure and Dynamics of Nucleic Acids

Criterion: Research Quality

Subcriterion: Evaluation of selected outputs (Phase I)

Questions for Commission:

- How do you evaluate the quality of the selected outputs from Phase I?
- What is your statement on the team's contribution to the selected outputs from Phase I?

Commission's evaluation:

Most of the selected outputs from Phase 1 were rated as excellent (4) or even outstanding (1). Only one output was rated acceptable. The same accounts for the contribution of the team to these outputs, one was rated outstanding, four excellent and one acceptable. There is a high level of international collaboration in the outputs. Overall, this is an excellent result for the department.

Subcriterion: Evaluation of the Team's Research Activity

Questions for Commission:

- How do you evaluate the team's research activity for the evaluation period?
 - Do you regard the research topics the team worked on as up-to-date and significant?
 - What is the quality of the main results achieved, how significant are these results for the scientific community? Do they represent a contribution to existing knowledge? Do the results represent significant progress in terms of the development of the topic? While the main results may have been achieved in collaboration with other teams, it is essential that the results presented were created at the evaluated institute and that the team transparently disclosed any collaborations.
- To what extent has the scientific community recognized the quality of team members' research? (E.g. invitations to lecture at conferences of international significance, prestigious awards for science and research, or other significant awards indicating the research quality and its recognition by the scientific community.)
- How do you evaluate the concept for the development of the team's research and research topics? – What is the team's approach to further advancing the current research topics and to identification of new directions in research topics?

Commission's evaluation:

The department worked and still works out the principles of structural dynamics, function and evolution of RNA and DNA. They use classical atomistic molecular dynamics (MD) simulations. The team focuses mainly on the theoretical description of the dynamics of G quadruplexes, Holliday junctions and RNA protein complexes. These topics are important and highly relevant for the understanding of the biological function of nucleic acids. The work of this department is state-of-the-art for the description of DNA and RNA dynamics which is documented by more than 20 collaborations, including many international ones. This shows the high international level and reputation the team has acknowledged in this research field. They have also contributed significantly to the method development for the theoretical calculation methods to push the scientific frontiers further. These molecular modelling methods for DNA and RNA are also very important and highly valuable for the field. The structural description of DNA and RNA dynamics is used in extensive collaborations with experimentalists (mainly structure determination by NMR spectroscopy and X-ray). This clearly shows that the results of the team are significant for the international community.

The development of the molecular modelling studies in the next years will focus on mainly to the following topics, (i) non-canonical base pairs embedded within canonical helices and their role in RNA function, (ii) tandem RNA Recognition Motif (RRM) protein with single-stranded RNAs, (iii) studies of proteins containing the Pumilio domain, and (iv) G quadruplex-protein interactions. These are important topics and will advance the research at the department.

Most recently, the team entered the field of prebiotic chemistry and focus on the template-free RNA oligomerization. Here, the theoretical work is directly linked to experimental work in the same lab, which makes the result very convincing. This work becomes also significant on an international level. There is also new work on amino acid oligomerization, an also important aspect of prebiotic chemistry which will also broaden the knowledge and expertise of the team beyond nucleic acids.

Evaluation of the Quality of the Team's Research in Comparison with the Level and Standards in Scientifically Advanced Countries and Institutions

Guidelines for Commission:

- Evaluate the overall quality of the team's research in comparison with the level and standards in the relevant research areas in scientifically advanced countries and institutions.
- Provide justification for your final evaluation. Comment on how the team compares to the level and standards in scientifically advanced countries and institutions in terms of research quality and specify the arguments supporting your evaluation.

Commission's evaluation:

The overall quality of the research of the department, in particular in comparison with other international institutions, is assessed as very good to excellent. The department's expertise and modelling results are applied in experiments with local, national and international groups with whom the department collaborate. They report 82 publications, the majority is with national and international collaborators. Twelve of those papers appeared in journals with an impact factor higher than 10. The department head and group leaders get international recognition by invitation to international conferences. The team has collected significant third-party funding which shows that they are highly recognized competitors in their research field. Overall, this is an excellent level of the quality of the team's research.

Commission's Recommendations for the Team on Research Quality **(NON-PUBLIC PART!)**

Questions for Commission:

- What are the opportunities to improve the quality of the team's research and results for the future?
- Is the setup of the team's collaborations optimal and, if not, is there room for the team to play a stronger role in them?
- Is the team's current research portfolio optimal and up-to-date? If not, what research activities should the team consider to enhance its work, and where should its further research be directed?

Commission's recommendation:

The expertise of the team in the field of molecular modelling is excellent, the expertise in the field of prebiotic chemistry might get onto a similar level, based on the fact that they pursue the unique combination of theoretical and experimental chemistry in the same laboratory. The main goals in the future are well justified and a clear continuation of the department's expertise, results and established modelling methods. The setup of the team's collaboration is optimal and will adjust to the future results, the department is open to new collaborations, and here again the research field of prebiotic chemistry plays an increasingly important role. The report mentions mainly short-term projects for the next few years, but not an overall vision for the team what might be achieved as long-term goal over the next decade or more. This is in particular relevant for the current limitations of the force-field-based molecular modelling that is mentioned in the report. Here it might become problematic or even critical for the department to stay on the excellent level if they do not overcome these limitations.

Criterion: Societal Relevance

Subcriterion: Societal Relevance of Research and Results

Questions for Commission:

- Is the team's research societally relevant, how is it applicable, and what value does it bring to society?
- How do you evaluate the presented results applied in practice? How were the results used (non-commercially, commercially)? What was the socio-economic benefit of these results within the meaning of the value, benefit or change for society, the economy, culture, public policy, legislation, public services, health, the social area, the environment, the quality of life outside of the academic sector and any other areas?
- How do you evaluate the team's conceptual thinking about the applicability of its research and results – whether and how the team thinks about the future applicability of its research, whether is able to identify and make use of the application potential of its results and make a statement on the team's planned next steps in the transfer of results.

Commission's evaluation:

The department's research focuses mainly on two topics of basic research: (i) Atomistic molecular dynamics (MD) simulations of diverse nucleic acids, and (ii) prebiotic chemistry focusing mainly on possible pathways leading to the formation of RNA oligomers monomers as precursors. The first topic is of course relevant not only to basic research but also for the development of potential drugs in medicinal and pharmaceutical chemistry; nucleic acid therapeutics and vaccines are a topic of emerging importance since the Corona pandemic. The department should also go into this research direction in the future to keep their excellent reputation in this field. The second topic, prebiotic chemistry is more interesting to the public, since it strives a very basic question, the origin of life. Here the department reports that they are engaged in public outreach activities, such as public lectures and contributions to media. This should be intensified to get more visible in this particular research field. The department already teamed up with the Collaborative Research Centre on this topic, headed by Dieter Braun, funded by the Deutsche Forschungsgemeinschaft, at the LMU Munich. Regular lab exchanges of doctoral researchers already started and should be continued. The CRC is also very experienced in public outreach activities and could provide the experience for the department at the IBP in Brno. The department is also active in the training and education of the next generation scientists. This should be continued or even intensified.

Subcriterion: Service to the Scientific Community

Questions for Commission:

- Evaluate whether the team (its members) is involved in a significant way in activities that serve the scientific community (this is understood to mean working on editorial boards of significant international scientific journals, membership in prestigious professional societies, organisation of significant conferences, involvement of team members in project evaluation and peer review of scientific publications).

Commission's evaluation:

The level of the team members with respect to service to the scientific community is sufficiently high. The department head is an elected regular member of the Learned Society of the Czech Republic (equivalent to The Royal Society). The department head and the group leaders serve as peer reviewers for international journals including high-impact journals. Exact numbers are not listed and documented. The department head recently applied to be a member of the evaluation panel of the Czech Science Foundation. There is little or no information about membership in editorial boards or prestigious professional societies, just the coorganization of the EMBO workshop in 2021 is mentioned. Overall, this topic is not well addressed in the report and should be intensified, if not yet achieved.

Evaluation of the Team's Societal Relevance in Comparison with the Level and Standards in Scientifically Advanced Countries and Institutions

Guidelines for Commission:

- Evaluate the overall societal relevance of the team, including their research, results and service to the scientific community, in comparison with level and standards in scientifically advanced countries and institutions.
- Give reasons for your final evaluation – comment on how the team compares to the level and standards in scientifically advanced countries and institutions in terms of societal relevance and specify the relevant arguments for your evaluation opinion.

Commission's evaluation:

According to the report the basic level of societal relevance in comparison with the level and standard in scientifically advanced countries and institutions is achieved. The discussion during the on-site review gave the following situation: (i) The department contributes to the training of young researchers through graduate and postdoctoral mentorship, exact numbers are not reported. (ii) Although the department already collaborates with international groups in research, the internationality of the department is limited. (iii) There is no regular (for instance weekly, biweekly or monthly) series of seminars and guest lectures available at the department. (iv) The mentoring of young scientists is not yet optimal. There are few and rare opportunities to discuss their career development, either in industry or in academia. Overall, here the level is good, but it should be increased by the improvement of the mentoring strategy in the next five years. Here the institute plays an important role to supervise this engagements and align along the whole institute.

Commission's Recommendations for the Team on Societal Relevance (NON-PUBLIC PART!)

Questions for Commission:

- What are the opportunities to improve the societal relevance of the team's research and results for the future?
- Is the team's approach to knowledge and technology transfer optimal: if not, what improvements would you recommend implementing to increase the team's success and competitiveness in knowledge and technology transfer?

Commission's recommendation:

The level of societal relevance is rated as good in comparison with the level and standard in scientifically advanced countries and institutions is achieved. The discussion during the on-site review gave the following recommendations: (i) A higher rate of international doctoral and postdoctoral researchers should be achieved to promote exchange of international research experience and ideas. (ii) The internationality of the department as a research unit should be increased in general. (iii) A regular (for instance weekly, biweekly or monthly) series of seminars and guest lectures should be setup at the department which is a prerequisite for promoting internationality and mentoring of young scientists. (iv) The mentoring of young scientists should include opportunities to discuss their career development, either in industry or in academia. Overall, with these measures the level is increased in the next five years.

Final Summary for the Team

Strengths	Weaknesses
• Excellent research • Many international collaborations • State-of-the-art methods for molecular modelling of nucleic acids • Excellent output by publications • High international visibility • Prebiotic chemistry as new and emerging research topic, both in experiments and theory under one roof	• Force-field based molecular modelling has limitations which might become problematic in the future • Only basic public outreach • Limited mentoring of young scientist with respect to career development in academia or industry • No gender-specific mentoring, mainly female mentoring • Hiring international doctoral and postdoctoral researchers • Enhance the mobility of doctoral and postdoctoral researchers after their stay at the IBP

**Evaluation of Research and Professional Activities of
Research-oriented Institutes of the Czech Academy of
Sciences for the Period 2020–2024**

Final report for Research Teams

Research team number and name:

08 Department of Plant developmental genetics

Criterion: Research Quality

Subcriterion: Evaluation of selected outputs (Phase I)

Questions for Commission:

- How do you evaluate the quality of the selected outputs from Phase I?
- What is your statement on the team's contribution to the selected outputs from Phase I?

Commission's evaluation:

Begin writing your response here (your response is not limited by this page)

The selected outputs from Phase I have been evaluated by external reviewers as excellent for seven out of ten outputs, one was rated outstanding, and two were rated standard. Overall, the quality of the research is excellent. The department's contribution to the selected outputs is significant, with the department serving as lead author on most of them.

Subcriterion: Evaluation of the Team's Research Activity

Questions for Commission:

- How do you evaluate the team's research activity for the evaluation period?
 - Do you regard the research topics the team worked on as up-to-date and significant?
 - What is the quality of the main results achieved, how significant are these results for the scientific community? Do they represent a contribution to existing knowledge? Do the results represent significant progress in terms of the development of the topic? While the main results may have been achieved in collaboration with other teams, it is essential that the results presented were created at the evaluated institute and that the team transparently disclosed any collaborations.
- To what extent has the scientific community recognized the quality of team members' research? (E.g. invitations to lecture at conferences of international significance, prestigious awards for science and research, or other significant awards indicating the research quality and its recognition by the scientific community.)
- How do you evaluate the concept for the development of the team's research and research topics? – What is the team's approach to further advancing the current research topics and to identification of new directions in research topics?

Commission's evaluation:

Begin writing your response here (your response is not limited by this page)

The department's research focus is highly up to date, with its researchers advancing technological and analytical tools in among others, genomics, transposable element biology, and epigenetic regulation. The work is distinctly multidisciplinary, integrating genomics, bioinformatics, cytology, genetics, and epigenetics. The team has successfully developed innovative tools to address key biological questions related to plant chromosome structure.

They are pioneering technologies such as laser microdissection and flow cytometric sorting for the isolation of sex chromosomes, ensuring high chromosome purity. This methodological innovation was recognized as the best methodological contribution from the institute in its year of publication. In addition, the group is actively developing fluorescence *in situ* hybridization techniques for studying transposable elements, as well as creating specialized software, computational pipelines, and image analysis tools.

The department maintains strong international visibility, evidenced by extensive collaborations with partners in countries such as Germany and Japan—approximately half of their outputs involve international co-authorship. They also contribute to the scientific community through the organization of international meetings and frequent invitations for senior members to present seminars at conferences and universities.

Notably, Roman Hobza serves as an expert on the Interministerial Council for Genetics and Genomics and is a member of the advisory body of the Ministry of the Environment Eduard Kejnovský, and Boris Vyskot are members of the Learned Society of the Czech Republic. The leadership team is thus well integrated into national scientific policy-making and maintains high

professional visibility. Younger team members have also received various scholarships and awards across multiple contexts.

Overall, the department demonstrates an excellent level of research activity, innovation, and international recognition.

Evaluation of the Quality of the Team's Research in Comparison with the Level and Standards in Scientifically Advanced Countries and Institutions

Guidelines for Commission:

- Evaluate the overall quality of the team's research in comparison with the level and standards in the relevant research areas in scientifically advanced countries and institutions.
- Provide justification for your final evaluation. Comment on how the team compares to the level and standards in scientifically advanced countries and institutions in terms of research quality and specify the arguments supporting your evaluation.

Commission's evaluation:

Begin writing your response here (your response is not limited by this page)

The team has an excellent overall quality, with regular outputs in top ranked international journals. They are developing on the niche of genomics, epigenic and bioinformatic. They are excellent in their field of research and recognized as such.

Commission's Recommendations for the Team on Research Quality **(NON-PUBLIC PART!)**

Questions for Commission:

- What are the opportunities to improve the quality of the team's research and results for the future?
- Is the setup of the team's collaborations optimal and, if not, is there room for the team to play a stronger role in them?
- Is the team's current research portfolio optimal and up-to-date? If not, what research activities should the team consider to enhance its work, and where should its further research be directed?

Commission's recommendation:

Begin writing your response here (your response is not limited by this page)

The team is encouraged to maintain its current balance between basic and applied research. It will, however, be important to ensure that this equilibrium is preserved so that the team's strong foundation in fundamental research continues to thrive. The development of research tools represents a major strength and should be further advanced. The team's research portfolio is up to date, and collaborations are managed effectively and strategically. Overall, the group excels in conducting high-quality basic science while successfully translating its expertise into practical applications. The diversity of the team is rather limited.

Criterion: Societal Relevance

Subcriterion: Societal Relevance of Research and Results

Questions for Commission:

- Is the team's research societally relevant, how is it applicable, and what value does it bring to society?
- How do you evaluate the presented results applied in practice? How were the results used (non-commercially, commercially)? What was the socio-economic benefit of these results within the meaning of the value, benefit or change for society, the economy, culture, public policy, legislation, public services, health, the social area, the environment, the quality of life outside of the academic sector and any other areas?
- How do you evaluate the team's conceptual thinking about the applicability of its research and results – whether and how the team thinks about the future applicability of its research, whether is able to identify and make use of the application potential of its results and make a statement on the team's planned next steps in the transfer of results.

Commission's evaluation:

Begin writing your response here (your response is not limited by this page)

The team demonstrates strong expertise in basic research while significantly expanding its focus on applied biology through tool development and methodological innovation. They maintain an effective balance between fundamental and applied science, successfully translating their research from theoretical knowledge to practical applications relevant to breeders, farmers, and society.

The group actively develops and implements customized sequencing approaches, genome editing techniques, and cytogenetic tools to investigate complex genomic traits in non-model plant species—an area of considerable interest to breeders and industry partners. To further strengthen their applied activities, they have established the Laboratory of Applied Biotechnology in Agriculture, which is currently in development.

The team also maintains strong engagement with policymakers, contributing advisory expertise at various levels of governance. Their involvement in public communication and education on genetically modified organisms is noteworthy, including appearances in diverse media such as Czech television and online platforms like YouTube. Moreover, the group regularly participates in educational outreach programs for secondary and high schools and is actively involved in university-level teaching.

Subcriterion: Service to the Scientific Community

Questions for Commission:

- Evaluate whether the team (its members) is involved in a significant way in activities that serve the scientific community (this is understood to mean working on editorial boards of significant international scientific journals, membership in prestigious professional societies, organisation of significant conferences, involvement of team members in project evaluation and peer review of scientific publications).

Commission's evaluation:

Begin writing your response here (your response is not limited by this page)

The team is actively engaged in service to the scientific community across multiple dimensions. Several members hold leadership roles, including participation as panel members for the Czech Science Foundation. Roman Hobza serves as an evaluator for the Expert Panel for Key Area I – Bioeconomy and as a project evaluator for the National Agricultural Agency under the Ministry of Agriculture. In addition, both Zuzana Urbánková and Roman Hobza are members of the Czech Commission for the Use of GMOs under the Ministry of the Environment, reflecting the team's strong involvement at the national level.

Furthermore, the majority of team members contribute to the scientific community as reviewers for a range of international journals. The group has also played an active role in community building by organizing several international meetings during the evaluation period.

Evaluation of the Team's Societal Relevance in Comparison with the Level and Standards in Scientifically Advanced Countries and Institutions

Guidelines for Commission:

- Evaluate the overall societal relevance of the team, including their research, results and service to the scientific community, in comparison with level and standards in scientifically advanced countries and institutions.
- Give reasons for your final evaluation – comment on how the team compares to the level and standards in scientifically advanced countries and institutions in terms of societal relevance and specify the relevant arguments for your evaluation opinion.

Commission's evaluation:

Begin writing your response here (your response is not limited by this page)

The team is very well placed on their societal relevance aspects in relation with the levels seen elsewhere. This aspect is strong and in development. The leadership of the team is visible in several public and policymakers' spheres. They intend to develop the aspect of applied science for breeders and farmers even more.

Commission's Recommendations for the Team on Societal Relevance (NON-PUBLIC PART!)

Questions for Commission:

- What are the opportunities to improve the societal relevance of the team's research and results for the future?
- Is the team's approach to knowledge and technology transfer optimal: if not, what improvements would you recommend implementing to increase the team's success and competitiveness in knowledge and technology transfer?

Commission's recommendation:

Begin writing your response here

Not much more should be done as soon as they continue this as they do now. They are proactive and make it happen.

Final Summary for the Team

Strengths	Weaknesses
• the fundamental science level • the applied science level and development • their active implication with policymakers	• Gender balance, the leadership is exclusively composed of men. • ...

**Evaluation of Research and Professional Activities of
Research-oriented Institutes of the Czech Academy of
Sciences for the Period 2020–2024**

Final report for Research Teams

Research team number and name:

09 Department of Biophysics of immune system

Criterion: Research Quality

Subcriterion: Evaluation of selected outputs (Phase I)

Questions for Commission:

- How do you evaluate the quality of the selected outputs from Phase I?
- What is your statement on the team's contribution to the selected outputs from Phase I?

Commission's evaluation:

How do you evaluate the quality of the selected outputs from Phase I?

Five outputs were evaluated: four were rated as *standard* and one as *acceptable*.

What is your statement on the team's contribution to the selected outputs from Phase I?

Out of the five evaluated outputs, four were assessed as *standard* and one as *acceptable*, reflecting a solid overall team contribution.

Subcriterion: Evaluation of the Team's Research Activity

Questions for Commission:

- How do you evaluate the team's research activity for the evaluation period?
 - Do you regard the research topics the team worked on as up-to-date and significant?
 - What is the quality of the main results achieved, how significant are these results for the scientific community? Do they represent a contribution to existing knowledge? Do the results represent significant progress in terms of the development of the topic? While the main results may have been achieved in collaboration with other teams, it is essential that the results presented were created at the evaluated institute and that the team transparently disclosed any collaborations.
- To what extent has the scientific community recognized the quality of team members' research? (E.g. invitations to lecture at conferences of international significance, prestigious awards for science and research, or other significant awards indicating the research quality and its recognition by the scientific community.)
- How do you evaluate the concept for the development of the team's research and research topics? – What is the team's approach to further advancing the current research topics and to identification of new directions in research topics?

Commission's evaluation:

How do you evaluate the team's research activity for the evaluation period?

The team has conducted research activities consistent with the objectives of the evaluation period. The work addresses relevant scientific questions and aligns with current trends in the field.

Do you regard the research topics the team worked on as up-to-date and significant?

Yes. The research topics are current and of relevance within the field.

What is the quality of the main results achieved, and how significant are these results for the scientific community?

The results are of adequate quality. The development of a biological screening platform applicable at different biological levels constitutes a methodological contribution to the field.

Do they represent a contribution to existing knowledge? Do the results represent significant progress in terms of the development of the topic?

Yes. The results provide a contribution to existing knowledge and represent incremental progress in the development of the research topic.

-While the main results may have been achieved in collaboration with other teams, it is essential that the results presented were created at the evaluated institute and that the team transparently disclosed any collaborations.

Most of the work was carried out in collaboration with external partners,. The department's

contribution is mainly in biological screening, and its role in these collaborations is not well explained.

-To what extent has the scientific community recognized the quality of team members' research?

Most lectures delivered by the team were at the national level, with a limited number of invitations to international events. Specifically, three lectures were given at institutes in Bulgaria, two at the Austria–Czech Republic joint meeting, and six at national conferences. Overall, participation in both national and international events is relatively low given the size of the group (five senior scientists, six junior scientists, and four PhD students).

-How do you evaluate the concept for the development of the team's research and research topics?

What is the team's approach to further advancing the current research topics and identifying new directions?

The department plans to continue developing its biological screening platform to maintain up-to-date technology. This platform is applied to address important questions related to immune disorders, such as rheumatoid arthritis and inflammatory bowel disease, in collaboration with institutional laboratories and private companies.

Regarding research topics, the department appears to adopt an opportunistic approach, responding primarily to questions proposed by collaborators rather than systematically defining new independent research directions.

Evaluation of the Quality of the Team's Research in Comparison with the Level and Standards in Scientifically Advanced Countries and Institutions

Guidelines for Commission:

- Evaluate the overall quality of the team's research in comparison with the level and standards in the relevant research areas in scientifically advanced countries and institutions.
 - Provide justification for your final evaluation. Comment on how the team compares to the level and standards in scientifically advanced countries and institutions in terms of research quality and specify the arguments supporting your evaluation.

Commission's evaluation:

Evaluate the overall quality of the team's research in comparison with the level and standards in the relevant research areas in scientifically advanced countries and institutions.

Overall, the team maintains a good publication record in terms of both quantity and quality. Their scientific output is at a standard level when compared with similar institutions in scientifically advanced countries. However, their participation in scientific meetings, both national and international, remains limited.

Provide justification for your final evaluation. Comment on how the team compares to the level and standards in scientifically advanced countries and institutions in terms of research quality and specify the arguments supporting your evaluation.

The team has published 44 articles in peer-reviewed journals, with a substantial proportion of these publications in Q1 or Q2 journals, or in the first decile within their respective fields. In many cases, team members are corresponding authors, which reflects a significant level of scientific leadership. This publication record is consistent with the standards of international institutions of comparable size.

However, as noted above, participation in national and international scientific meetings is limited. In this respect, the team is below the level typically observed in comparable international institutions.

Commission's Recommendations for the Team on Research Quality **(NON-PUBLIC PART!)**

Questions for Commission:

- What are the opportunities to improve the quality of the team's research and results for the future?
- Is the setup of the team's collaborations optimal and, if not, is there room for the team to play a stronger role in them?
- Is the team's current research portfolio optimal and up-to-date? If not, what research activities should the team consider to enhance its work, and where should its further research be directed?
-

Commission's recommendation:

What are the opportunities to improve the quality of the team's research and results in the future?

The team's research activity is largely based on collaborations, functioning in many respects as a technical platform that interacts with multiple academic and private laboratories. The platform is applied to address important questions related to immune disorders, such as rheumatoid arthritis and inflammatory bowel disease. However, the department currently adopts an opportunistic approach, responding primarily to questions raised by collaborators rather than setting its own independent research agenda.

This strategic choice provides flexibility but may limit the visibility and impact of the team's scientific output. To enhance research quality and impact, the team could consider focusing on a smaller number of well-defined projects and establishing clearer research priorities. This would strengthen the team's scientific identity and increase its leadership within collaborative networks.

Is the setup of the team's collaborations optimal and, if not, is there room for the team to play a stronger role in them?

The department could benefit from focusing on a smaller number of collaborative projects to strengthen its strategic positioning and scientific impact. While this may not currently align with the team's strategic choice, it would be appropriate to address and discuss this aspect in order to consider potential adjustments and opportunities for a stronger role within collaborations.

Is the team's current research portfolio optimal and up-to-date?

The portfolio is relevant and supported by an up-to-date biological screening platform. However, it is mainly shaped by external collaborations and lacks a clearly defined internal research agenda. Focusing on fewer strategic areas and setting clearer priorities could strengthen the team's identity and leadership within collaborations.

Criterion: Societal Relevance

Subcriterion: Societal Relevance of Research and Results

Questions for Commission:

- Is the team's research societally relevant, how is it applicable, and what value does it bring to society?
- How do you evaluate the presented results applied in practice? How were the results used (non-commercially, commercially)? What was the socio-economic benefit of these results within the meaning of the value, benefit or change for society, the economy, culture, public policy, legislation, public services, health, the social area, the environment, the quality of life outside of the academic sector and any other areas?
- How do you evaluate the team's conceptual thinking about the applicability of its research and results – whether and how the team thinks about the future applicability of its research, whether is able to identify and make use of the application potential of its results and make a statement on the team's planned next steps in the transfer of results.

Commission's evaluation:

Is the team's research societally relevant, how is it applicable, and what value does it bring to society?

The department's research is highly relevant to society, with potential to contribute to biomedical innovation and, consequently, to improvements in human health—particularly in the field of immune diseases, including those influenced by environmental factors. By applying up-to-date technologies for biological drug screening, the team contributes to translational research and innovation. In addition, the department plays an important role in training students and early-career researchers, thereby supporting both academic and private research sector

How do you evaluate the presented results applied in practice? How were the results used (non-commercially, commercially)? What was the socio-economic benefit of these results within the meaning of the value, benefit or change for society, the economy, culture, public policy, legislation, public services, health, the social area, the environment, the quality of life outside of the academic sector and any other areas?

The department is currently involved in the biological screening of several products, including some developed in collaboration with private companies. At this stage, it appears that no patents have been filed for these products or for the associated processes, and none of the products are expected to reach the market in the short or medium term. However, some of the molecules under evaluation may have future commercial potential.

The lack of patent protection could limit the socio-economic impact of these activities. The team would likely benefit from stronger institutional or national support in intellectual property management and technology transfer to help secure and maximize the potential societal and economic benefits of their research.

How do you evaluate the team's conceptual thinking about the applicability of its research and results – whether and how the team thinks about the future applicability of its research, whether is able to identify and make use of the application potential of its results and make a statement on the team's planned next steps in the transfer of results.

The department does not currently secure intellectual property for its research outputs, such as in drug development. To enhance future applicability, the team should adopt a more strategic approach to patents and technology transfer.

Subcriterion: Service to the Scientific Community

Questions for Commission:

- Evaluate whether the team (its members) is involved in a significant way in activities that serve the scientific community (this is understood to mean working on editorial boards of significant international scientific journals, membership in prestigious professional societies, organisation of significant conferences, involvement of team members in project evaluation and peer review of scientific publications).

Commission's evaluation:

Evaluate whether the team (its members) is involved in a significant way in activities that serve the scientific community (e.g., editorial boards, professional societies, conference organization, project evaluation, peer review).

Overall, the team demonstrates significant involvement in serving the scientific community, particularly through peer review, conference organization, and professional society activities. While the team has no presence on the editorial boards of international journals, they are active in national scientific societies; notably, two members founded the Czech Society for Extracellular Vesicles. The team members are extensively involved in peer review within their specialty, having reviewed more than 200 articles. One team member, the department director, also serves on panels of the Czech Science Foundation.

The team organizes international conferences, co-organizes an international meeting, and co-organizes three national meetings, all within their field of expertise. They also engage in notable outreach activities.

Evaluation of the Team's Societal Relevance in Comparison with the Level and Standards in Scientifically Advanced Countries and Institutions

Guidelines for Commission:

- Evaluate the overall societal relevance of the team, including their research, results and service to the scientific community, in comparison with level and standards in scientifically advanced countries and institutions.
- Give reasons for your final evaluation – comment on how the team compares to the level and standards in scientifically advanced countries and institutions in terms of societal relevance and specify the relevant arguments for your evaluation opinion.

Commission's evaluation:

Evaluation of the overall societal relevance of the team in comparison with scientifically advanced countries and institutions:

The team's research is societally relevant, focusing on biomedical innovation and human health, particularly immune disorders such as rheumatoid arthritis and inflammatory bowel disease. Their biological screening platform is up-to-date and applied to important questions; however, no patents have been filed, and none of the screened products are expected to reach the market in the short or medium term. Compared with institutions in scientifically advanced countries, the research impact and applicability of the team's work are **standard**. Greater focus on key translational projects and a strategic approach to intellectual property could enhance societal and economic impact.

In addition, the team contributes to the scientific community through extensive peer review (over 200 articles), active participation in national scientific societies—including founding the Czech Society for Extracellular Vesicles—and organization of international and national meetings. They also engage in outreach and student training. These activities reflect solid engagement at the national level, though international visibility is limited.

Commission's Recommendations for the Team on Societal Relevance (NON-PUBLIC PART!)

Questions for Commission:

- What are the opportunities to improve the societal relevance of the team's research and results for the future?
- Is the team's approach to knowledge and technology transfer optimal: if not, what improvements would you recommend implementing to increase the team's success and competitiveness in knowledge and technology transfer?

Commission's recommendation:

Opportunities to improve the societal relevance of the team's research and results for the future:

The societal relevance of the team's research could be strengthened by increasing focus on key translational projects with clear potential for application in human health. While the biological screening platform addresses important questions in immune disorders, securing intellectual property protection for discoveries, such as patents for screened molecules or processes, would enhance future societal and economic impact. Prioritizing fewer high-impact projects and establishing clearer research directions could also improve the visibility and influence of the team's work.

Knowledge and technology transfer:

The team's current approach to knowledge and technology transfer is limited, as no patents have been filed and commercialization of products is not yet anticipated. To improve success and competitiveness in this area, it is recommended that the team develop a strategic plan for intellectual property management, including guidance from institutional or national technology transfer offices. Strengthening collaborations with industry partners focused on translational outcomes, and actively pursuing patent protection and licensing opportunities, would increase the societal and economic relevance of their research.

Final Summary for the Team

Final summary Research Quality and Societal Relevance:

The team conducts societally relevant research, particularly in biomedical innovation and human health, focusing on immune disorders such as rheumatoid arthritis and inflammatory bowel disease. Their biological screening platform is up-to-date and applied to important scientific questions. Research quality is **standard** compared to institutions in scientifically advanced countries. While the publication record is solid, participation in international meetings and patenting activities is limited, which reduces visibility and the immediate societal impact of their work. The team demonstrates strong engagement in service to the scientific community through peer review, national scientific societies, conference organization, and outreach.

Strengths	Weaknesses
Up-to-date research platform – The biological screening platform allows the team to address relevant and translational biomedical questions • Solid publication record – Many articles in Q1/Q2 journals with team members as corresponding authors reflect scientific competence. • Service to scientific community – Extensive peer review (over 200 articles), national society leadership, and conference organization indicate strong engagement. • Collaborative approach – Partnerships with both academic and private institutions enhance applicability of research. • Student and researcher training – Contributes to developing future researchers in academia and industry.	Limited international visibility – Few invitations to international conferences and no presence on international editorial boards. • Opportunistic research strategy – Research is primarily guided by collaborators' questions, limiting independent high-impact projects. • Intellectual property management – No patents filed; limited focus on technology transfer reduces potential societal and economic impact. • Breadth of focus – Engagement in many projects may dilute overall research impact; prioritization could strengthen outcome

**Evaluation of Research and Professional Activities of
Research-oriented Institutes of the Czech Academy of
Sciences for the Period 2020–2024**

Final report for Research Teams

Research team number and name:

10 Department of Biophysics of Nucleic Acids

Criterion: Research Quality

Subcriterion: Evaluation of selected outputs (Phase I)

Questions for Commission:

- How do you evaluate the quality of the selected outputs from Phase I?
- What is your statement on the team's contribution to the selected outputs from Phase I?

Commission's evaluation:

The quality of the publications evaluated in Phase I was particularly well received by the international experts involved. Two articles were considered outstanding, three were considered excellent, and three were considered standard. Even the articles evaluated as standard were very well received. For instance, BBA 2020 was recognised as establishing a benchmark for future research in DNA nanotechnology and epigenetics. Overall, the publications were considered to be of the highest calibre.

Most of the articles were produced through national or international collaborations, with the team often making a significant contribution. These collaborations also give the research a multidisciplinary character, improving its quality and that of the journals in which it is published. The work ranges from fairly theoretical aspects, including bioinformatics, to the development of high-quality experimental tools. Of particular note is the work combining advanced computational predictions with biophysical, biochemical and virological assays to explore G-quadruplexes in the TBEV genome. This work sets a benchmark for future RNA virus studies and antiviral development. The establishment of the existence of two-tetrad intramolecular RNA quadruplexes is also a key article.

Clearly, the evaluation of these articles demonstrates the highest quality of research for this team, which is recognised as being at the forefront of international research.

Subcriterion: Evaluation of the Team's Research Activity

Questions for Commission:

- How do you evaluate the team's research activity for the evaluation period?
 - Do you regard the research topics the team worked on as up-to-date and significant?
 - What is the quality of the main results achieved, how significant are these results for the scientific community? Do they represent a contribution to existing knowledge? Do the results represent significant progress in terms of the development of the topic? While the main results may have been achieved in collaboration with other teams, it is essential that the results presented were created at the evaluated institute and that the team transparently disclosed any collaborations.
- To what extent has the scientific community recognized the quality of team members' research? (E.g. invitations to lecture at conferences of international significance, prestigious awards for science and research, or other significant awards indicating the research quality and its recognition by the scientific community.)
- How do you evaluate the concept for the development of the team's research and research topics? – What is the team's approach to further advancing the current research topics and to identification of new directions in research topics?

Commission's evaluation:

The team is small. It studies the formation and behaviour of unusual DNA and RNA structures, such as guanine quadruplexes (G4) and cytosine i-motifs (iM), under different conditions. The team also collaborates with virologists to understand how these structures appear in viral RNA and how they could be exploited to combat infections. Additionally, the team is exploring how these DNA structures interact with proteins inside the cell nucleus to organise the genome.

The first area of research focuses on studying the structural, thermodynamic and kinetic properties of alternative nucleic acid secondary structures, specifically G4 and iM. The researchers point out that, during key nuclear processes such as replication or transcription, it is imperfectly folded and kinetically trapped iM species that participate in regulation rather than perfectly folded iMs, which are highly stable and slow to form. Similarly, the team stabilised otherwise unstable GA pairs by coupling repetitive GA sequences at one end to form an iM, enabling their structural characterisation at the atomic level by NMR and revealing how modifications such as methylation affect their structure. These results have been published in articles in *Nucleic Acids Research*, the leading journal in this field. This area of research also demonstrates a network of highly skilled collaborators, with the team continuing to make an essential contribution.

For the second focus area, the team mainly collaborated with the Veterinary Research Institute to study G4 structures in the RNA genome of tick-borne encephalitis virus (TBEV). It identified and confirmed conserved regions forming G4s in flaviviruses, demonstrating that G4s are essential for efficient viral replication and that both excessive stabilisation and destabilisation disrupt the virus. They also demonstrated that porphyrin compounds can

inhibit TBEV by interacting with its RNA G4 structures, highlighting the potential of these motifs as promising antiviral targets. In addition to articles in reputable journals such as Nucl Aci Re and Antiviral Res, information has been disseminated in newspapers and on popular websites.

In the third area of research, the team investigated how G4 structures contribute to genome organisation, focusing on their relationship with CTCF — a key protein involved in shaping chromatin domains. They found that G4 motifs often occur near CTCF binding sites, and that synthetic sequences from these regions can form stable G4s. Experiments involving both recombinant and cellular CTCF confirmed the presence of robust and specific G4-CTCF interactions, indicating that G4s may play a structural role in chromatin architecture.

The team's research topics can be considered both topical and particularly significant. The G4 and IM fields are highly competitive, and this work is among the most accomplished internationally.

The quality of the main results obtained is excellent, making a significant contribution to the scientific community. This team has made a significant contribution to existing knowledge.

Although the main results were obtained in collaboration with other teams, the team's contribution to most of the work is clearly significant and demonstrates its dynamism. The quality of the team members' research is evident in their publications in peer-reviewed journals. However, there is a lack of international involvement, such as participation in conferences. The team's research development concept and topics are interesting and have produced excellent results. Having analysed the shortcomings in their approaches, the team wants to establish closer links with biology and is even considering integrating AI tools.

The overall result is therefore excellent.

Evaluation of the Quality of the Team's Research in Comparison with the Level and Standards in Scientifically Advanced Countries and Institutions

Guidelines for Commission:

- Evaluate the overall quality of the team's research in comparison with the level and standards in the relevant research areas in scientifically advanced countries and institutions.
- Provide justification for your final evaluation. Comment on how the team compares to the level and standards in scientifically advanced countries and institutions in terms of research quality and specify the arguments supporting your evaluation.

Commission's evaluation:

The team consists of an average of seven to eight full-time equivalents (FTEs) per year, including one PhD student. With an average output of four articles per year in high-quality field-specific journals, the team's performance is comparable to that of other internationally recognised groups in the field.

The high level of female involvement in this group (>70%) is also noteworthy.

The journals in which the articles are published are among the best in the field, such as Nucleic Acids Research.

The highly multidisciplinary nature of the work involves a great deal of internal and international collaboration, enabling the group to achieve results of a very high international standard.

The prominence of these articles demonstrates the group's importance in each of them.

Overall, the work is of a very high international standard.

Commission's Recommendations for the Team on Research Quality **(NON-PUBLIC PART!)**

Questions for Commission:

- What are the opportunities to improve the quality of the team's research and results for the future?
- Is the setup of the team's collaborations optimal and, if not, is there room for the team to play a stronger role in them?
- Is the team's current research portfolio optimal and up-to-date? If not, what research activities should the team consider to enhance its work, and where should its further research be directed?

Commission's recommendation:

Overall, the quality of the research conducted by the team is excellent. The team is reasonably sized and appears to manage these different areas well. The topics addressed by the team are highly relevant both within the institute and internationally.

The work on G4 and iM, with its focus on the specificities of the tTBEV RNA genome, is highly relevant. The team's dynamics are therefore excellent and should be maintained.

The multidisciplinary and collaborative nature of the work is also a key factor in the quality of the results obtained. They are excellent, and it would be beneficial to maintain the existing balance.

The team's current research portfolio seems entirely appropriate and fairly up to date. Interestingly, the team itself has identified areas for improvement, such as promoting young researchers and increasing national and international visibility. A key point is the integration of high-throughput techniques, as well as the use of global clustering and multifactorial analysis methods, in the further processing of data — for example, the integration of AI tools. These last points do not seem obvious in view of the topics covered.

Criterion: Societal Relevance

Subcriterion: Societal Relevance of Research and Results

Questions for Commission:

- Is the team's research societally relevant, how is it applicable, and what value does it bring to society?
- How do you evaluate the presented results applied in practice? How were the results used (non-commercially, commercially)? What was the socio-economic benefit of these results within the meaning of the value, benefit or change for society, the economy, culture, public policy, legislation, public services, health, the social area, the environment, the quality of life outside of the academic sector and any other areas?
- How do you evaluate the team's conceptual thinking about the applicability of its research and results – whether and how the team thinks about the future applicability of its research, whether is able to identify and make use of the application potential of its results and make a statement on the team's planned next steps in the transfer of results.

Commission's evaluation:

The work carried out by the team is clearly fundamental and high-quality research. As the team has explained, there is no effective practical application in the short term. However, recently, nucleic acid-based drugs have been approved by the FDA and European authorities. In the medium term, however, this work could lead to improvements in such molecules. The researchers are aware of this.

The team has a good conceptual understanding of the applicability of its research and results. This will enable them to improve the transfer of their results, for example for vaccines or sensors, should the opportunity arise. However, this applied research must be only a small part of their activities.

Subcriterion: Service to the Scientific Community

Questions for Commission:

- Evaluate whether the team (its members) is involved in a significant way in activities that serve the scientific community (this is understood to mean working on editorial boards of significant international scientific journals, membership in prestigious professional societies, organisation of significant conferences, involvement of team members in project evaluation and peer review of scientific publications).

Commission's evaluation:

The team members have very limited activities in the scientific community, in grant evaluation activities and at the level of scientific societies, we note the academic activities expected for this type of position and more for reviewing. Similarly, there is no editorial board activity. There is a glaring lack of involvement in serving the scientific community.

The department chair is currently the only one who has tried to have a such implication. It is appropriate that all members of the department participate in this effort, which ranges from involvement in conferences, learned societies, international travel to symposiums to scientific evaluations.

Evaluation of the Team's Societal Relevance in Comparison with the Level and Standards in Scientifically Advanced Countries and Institutions

Guidelines for Commission:

- Evaluate the overall societal relevance of the team, including their research, results and service to the scientific community, in comparison with level and standards in scientifically advanced countries and institutions.
- Give reasons for your final evaluation – comment on how the team compares to the level and standards in scientifically advanced countries and institutions in terms of societal relevance and specify the relevant arguments for your evaluation opinion.

Commission's evaluation:

In terms of scientific output, the quality of articles and the journals in which they are published, as well as advances in the field, this team is unquestionably at the top internationally. However, a team of this calibre is expected to have a stronger international and national presence in research, for example through learned societies and conference organisations. Its contribution to the scientific community is limited.

Commission's Recommendations for the Team on Societal Relevance (NON-PUBLIC PART!)

Questions for Commission:

- What are the opportunities to improve the societal relevance of the team's research and results for the future?
- Is the team's approach to knowledge and technology transfer optimal: if not, what improvements would you recommend implementing to increase the team's success and competitiveness in knowledge and technology transfer?

Commission's recommendation:

Based on these criteria, the team is rather weak.

There is a lack of visible participation in the scientific community, and little interaction with industrial applications. While they gained good visibility through their collaboration with the Veterinary Research Institute to study G4 structures in the RNA genome of the tick-borne encephalitis virus, this will not continue.

Therefore, a specific dynamic is needed to contribute more to the national and international scientific community, and to get involved in learned societies, conferences, and editorial boards.

In terms of industrial collaborations, these can be a double-edged sword, often resulting in a lot of time being spent for little result, so they need to be approached in a reasoned manner.

The section they have completed, 'Concept for Development of Research and Research Topics', is particularly good, as they describe how to minimise their weaknesses well. They discuss conferences (point 3) and young PIs (point 2). They really need to move in these directions.

Final Summary for the Team

Strengths	Weaknesses
• Excellent scientific quality and results, with regular publications in leading journals such as Nucleic Acids Research and Antiviral Research, and results of international significance. • High level of interdisciplinarity and collaboration: the team maintains strong national and international partnerships combining biophysics, molecular biology, computational and virological approaches. • Scientific originality and significance: the team contributes to key discoveries in G4 and iM biology, viral RNA structures and chromatin organisation. • Effective internal dynamics and research strategy – Balanced portfolio across three complementary areas, with clear plans to integrate biological validation and artificial intelligence tools. • High proportion of women - the team is noted for its gender in advanced research activities.	• Limited visibility and participation within the scientific community – Few presentations at conferences, minimal roles in learned societies, editorial boards or grant award committees. • Insufficient international presence – Lack of systematic involvement in major international events. • Low student involvement and limited capacity for renewal – Few doctoral students and perhaps limited motivation among young researchers to contribute significantly. • Weak societal and applied dimension – Low involvement in technology transfer or industrial collaborations, despite potential biomedical relevance.

Evaluation of Research and Professional Activities of Research-oriented Institutes of the Czech Academy of Sciences for the Period 2020–2024

Name of the institute:

Institute of Biophysics of the CAS

Final Report was elaborated by the evaluation commission in the following composition:

Commission Chair: Ohad Medalia

Commission Members:

María	Berdasco Menéndez
Jean-Luc	Coll
Alexandre	de Brevern
Ulrich	Kintscher
Pierre	Pontarotti
Stéphanie	Robert
Ignacio	Rubio-Somoza
Hans-Achim	Wagenknecht

Date:

Signature of Commission Chair:

01.11.2025



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