

The Institute of Biophysics of the CAS, v. v. i.

Company ID: 68081707

Registered Office: Královopolská 2590/135, 61265

Annual Activity and Management Report for 2017

Discussed by the Supervisory Board on: May 29, 2018

Approved by the Institute Board on: June 1, 2018

In Brno on April 27, 2018

I. Information on the composition of the bodies of the public research institution and on activities or changes thereof

a) Initial composition of the bodies of the institute

Entrusted with management from: **March 25, 2017**

Institute director: **doc. RNDr. Eva Bártová, Ph.D.**

Appointed with effect from: **May 1, 2017**

The Institute board was elected on December 20, 2016 as follows:

Chairman: RNDr. Aleš Kovařík, CSc. (IBP of the CAS ,v.v.i., Brno)

Deputy chairman: doc. RNDr. Miroslav Fojta, CSc. (IBP of the CAS ,v.v.i., Brno)

Members:

doc. RNDr. Eduard Kejnovský, CSc. (IBP of the CAS, v.v.i., Brno)

doc. RNDr. Stanislav Kozubek, DrSc. (IBP of the CAS, v.v.i., Brno)

prof. RNDr. Jiří Šponer, DrSc. (IBP of the CAS, v.v.i., Brno)

prof. RNDr. Jan Vondráček, Ph.D. (IBP of the CAS, v.v.i., Brno)

prof. Ing. Jaroslav Doležel, DrSc. (IEB of the CAS, v.v.i., Olomouc)

prof. RNDr. Jan Šmarda, CSc. (FS MU, Brno)

doc. RNDr. Lumír Krejčí, Ph.D. (FM MU, Brno)

The Supervisory Board was appointed on March 22, 2017 as follows:

Chairman: prof. RNDr. Jan Zima, DrSc. (Institute of Vertebrate Biology of the CAS, v.v.i)

Deputy chairman: RNDr. Martin Falk, Ph.D. (IBP of the CAS, v.v.i.)

Members:

prof. RNDr. Jiří Doškař, CSc. (FS MU)

Ing. Eliška Kudělková (S-invest s.r.o.)

Ing. Ilona Müllerová, DrSc. (ISI of the CAS, v.v.i.)

prof. RNDr. Renata Veselská, Ph.D., M.Sc. (FS MU)

b) Changes in the composition of the bodies:

Because of the end of the term of office, the new Board of the Institute of Biophysics was elected in December 2016. The new Board began its function on January 3, 2017. The composition of the original Board of the Institute was as follows: [doc.

RNDr. Antonín Lojek, CSc. (IBP of the CAS, v.v.i., Brno); doc. RNDr. Miroslav Fojta, CSc. (IBP of the CAS, v.v.i., Brno); RNDr. Aleš Kovařík, CSc. (IBP of the CAS, v.v.i., Brno); doc. RNDr. Stanislav Kozubek, DrSc.(IBP of the CAS, v.v.i., Brno); RNDr. Jiří Šponer, DrSc.(IBP of the CAS, v.v.i., Brno); prof. RNDr. Jan Vondráček, Ph.D. (IBP of the CAS, v.v.i., Brno); prof. Ing. Jaroslav Doležel, DrSc. (IEB of the CAS, v.v.i., Olomouc); prof. RNDr. Jiří Doškař, CSc. (FS MU, Brno); doc. RNDr. Lumír Krejčí, Ph.D. (FM MU, Brno)]. The composition of the current Board of the IBP is as follows: doc. RNDr. Aleš Kovařík, CSc.; RNDr. Miroslav Fojta, CSc.; doc. RNDr. Stanislav Kozubek, DrSc.; prof. RNDr. Jiří Šponer, DrSc.; prof. RNDr. Jan Vondráček, doc. RNDr. Eduard Kejnovský (IBP of the CAS, v.v.i., Brno), CSc.; prof. Ing. Jaroslav Doležel, DrSc.; prof. RNDr. Jan Šmarda, CSc. (FS MU, Brno); doc. RNDr. Lumír Krejčí, Ph.D.

In February 2017, a tender was also held for the position of Director of the IBP; again due to the end of the term of office of the Director, doc. RNDr. Stanislav Kozubek, DrSc. The Board of the Institute recommended doc. RNDr. Eva Bártová, Ph.D. as the new Director of Institute of Biophysics of the CAS, v.v.i.

Further, there has been a change in the composition of the IBP Supervisory Board. The original composition in 2016 was as follows: prof. RNDr. Jan Zima, DrSc. (IVB of the CAS, v.v.i., Brno); prof. RNDr. Alois Kozubík, CSc. (IBP of the CAS, v.v.i., Brno; Ing. Ludmila Moravcová (a private tax advisor); Ing. Eliška Kudělková (S-invest,s.r.o); prof. RNDr. Jan Šmarda, CSc. (FS MU, Brno); doc. PhDr. Radomír Vlček, CSc. (Institute of History of the CAS, v.v.i.). Academic Council of the Czech Academy of Sciences, pursuant to Section 19 (4) of Act No. 341/2005 Coll., On Public Research Institutions, as amended, and in accordance with Article 17 of the Statutes of the Czech Academy of Sciences, appointed with effect from May 1, 2017 for a five-year term of office, i.e. to April 30, 2022 new members of the Supervisory Board of the Institute of Biophysics of the CAS, v.v.i.: prof RNDr. Jan Zima, DrSc. (IVB of the CAS, Brno); RNDr. Martin Falk, Ph.D. (IBP of the CAS, v.v.i., Brno); prof. RNDr. Jiří Doškař, CSc. (FS MU, Brno); Ing. Ilona Müllerová, DrSc. (ISI of the CAS, v.v.i., Brno); prof. RNDr. Renata Veselská, Ph.D., M.Sc. (FS MU, Brno).

c) Information on the activities of the bodies

The Director:

An important activity of the Institute management was to resolve all administrative matters concerning taking over the position of director and creating a good background for the management of the Institute. The utmost emphasis was placed on maintaining good quality IBP staff resources, especially young scientists.

The acquisition, retention and upbringing a young generation of scientists belong to priorities of the Director and the whole IBP management. Young researchers were offered support for research through the establishment of the Internal Research Support Fund. This financial support for 2018 concerned not only young scientists but also group leaders who needed to bridge the period when their research was not supported by other grant means, and also took transient socio-economic situation of the scientific team into account. In this respect, a new IBP Directive has been created, which lays down rules for granting IBP internal support. For the purpose of examining applications for Internal Research Support and for the

purpose of discussion of organizational and scientific issues of the Institute, a Collegium of the Director was established, which is an advisory body of the Institute management. In principle, it is a meeting of heads of departments and their representatives with the management of the Institute.

In 2017, the Institute management also devoted itself to investment projects, such as reconstruction of some parts of the building, namely the laboratory on the 3rd floor of the main building (about CZK 1.2 million) and offices (about CZK 400 thousand). We also implemented installation of security system for the entire IBP complex (about CZK 6.2 mil.) and reconstruction of the accommodation facility for IBP guests (about CZK 500,000). A major effort was devoted to the acquisition of project documentation for the reconstruction of rooms. In addition, the management of the institute has begun to work on preparing an application to build a new building for 2 other departments and several smaller laboratories which we intend to offer to young scientists returning from abroad or directly to foreign scientists. To support these scientists, Internal research support should be used as well, into which the management intends to deposit a part of the subsidy means of the CAS. Through these steps, the IBP management intends to maximize the internationalization of the Institute.

In 2017, several devices were purchased from the investment funds, for example Autolab potentiostat (about CZK 1,054 thousand), Up-grade AFM + fast scan module (about CZK 1.7 million), cages installed in the equipment for laboratory animals (about CZK 1.4 million), Monolith NT.115 Pico (about CZK 4.0 million), xCelligence device, which is a device for measurement of the cell impedance (about CZK 1.5 million).

Research at the Institute of Biophysics has a long tradition and great results. As apparent from the evaluation by the Academic Evaluation Commission and independently from the evaluation according to the RVVI methodology, IBP belongs to the best institutes of the CAS and to the major research institutions in the Czech Republic. After discussion with department managers, the Director came to conclusion that it would be useful to update the IBP internal evaluation approach so that the evaluation is even more motivating. After several discussions with department managers within the Collegium of the Director, the existing algorithm for the evaluation of the scientific teams and the subsequent allocation of institutional funds was re-evaluated. The evaluation algorithms were carefully analyzed by the management of the Institute (the Deputy Director contributed a great deal to the setting of new algorithms). In addition, by the end of 2017, the International Advisory Committee (IAC) was established, which shall provide recommendations for improvement of scientific work of the individual departments and the whole institute. The International Advisory Committee consists of the following members: prof. Roland Foisner (Medical University of Vienna); prof. Ben Luisi, (University of Cambridge), Assoc. prof. Elena Ferapontova (Aarhus University of Copenhagen); Mary Anne O'Connell (CEITEC MU, Brno); prof. Jiří Forejt (UMG of the CAS, Prague). The establishment of this advisory committee required considerable organizational efforts from the management of the Institute. Based on the recommendations of the International Advisory Committee and with regard to bibliometric parameters, institutional funds will be allocated. In 2018, these funds have been distributed identically for all departments, but a different approach is planned for 2019, which should make provision for the 3 best IBP science teams (departments). As a supporting parameter for the assessment of scientific

performance, bibliometric parameters have and will be used, for example the AIS factor, number of articles cited in the last five years, articles in the first quartile (Q1), the IF factor value and others. The number of international projects, the number of works belonging to the 10% of the most cited articles in the Czech Republic, teaching activity and, in particular, the performance of the department converted to an institutional subsidy or the number of scientists, will also be taken into account (according to the IAC assessment). Using IAC, the IBP internal evaluation approaches the methods of the all-academic peer review. The procedures and results of the evaluation have and will be discussed by the Institute Director at the IBP Supervisory Board Council.

An essential part of long-term quality research activity is also pedagogical activity, which ensures the gradual transfer of knowledge acquired through high-quality research. From the results of the 2017 evaluation it is clear that each IBP department is involved to a certain extent in educational activities, such as the education of diplomats, doctoral and post-doctoral students. Best Ph.D. students are annually, and thus also in 2017, awarded the IBP Director Award. Another motivational tool of the Institute management is publication rewards. In 2017, a total of CZK 1.4 million (plus social charges) was paid in the form of publication rewards (calculated according to IF and the so-called half-life magazine according to the WoS database). IBP scientists published 117 scientific papers in impact journals in 2017 in total.

We have also been engaged in popularizing activities. Popularization of science has been done, for example, in the form of open days (November 8, 2017) and Science and Technology Week, and in the form of popular articles provided by the Institute through the PR manager or individuals. IBP Facebook page was launched for the first time in 2017 (June 13, 2017) and 2-3 press releases are published there every week, such as the biggest discoveries of the department, news from the IBP and CAS, as well as the greatest discoveries of world science, extracurricular IBP activities, presentations of our scientists in media, student awards, conferences or historical photographs of the IBP. In addition, new IBP website has been set up and is currently in the optimization phase. We installed a light sign on the front of the institute with the title "The Institute of Biophysics of the Czech Academy of Sciences". We have also taken panoramic photos of the outdoor parts of the Institute and the panorama of some selected laboratories for Facebook presentation and website. For PR purposes, we produced promotional material and screened accompanying films about the IBP and genetics (documentary "Nezkreslená věda" (Undistorted science) – presentation of the CAS, available on YouTube) during Open Days. Furthermore, we have published articles in popularizing journals such as the magazine Vesmír, Scientific American and Živa. In addition, an interview was published on Radio Leonardo (December 21, 2016) where Judit and Jiří Šponer discussed their theories with the title: "Dva scénáře vzniku života na Zemi: Kyanovodík nebo formamid. Který vyberete?" (Two scenarios of the emergence of life on Earth: cyanide or formamide? Which one do you choose?). The Šponers were also ambassadors of Terence Malik's film "Cesta času" (Voyage of Time, about the origin of life), and further the Czech Television (CT1) aired a film about prof. Emil Paleček, entitled "Vzpomínky na léto 1963: cesta do Ameriky (Memories of Summer 1963: The Journey to America)".

In 2017, the Institute management also focused on socially up-to-date research topics within the AV21 Strategy. IBP scientists work in programs "Qualitas" (quality

life in health and disease) and “Potraviny pro budoucnost” (Food for the Future). As part of the AV21 Strategy, we organized joint workshops that were in a wider context taken as seminars for the whole Institute, where scientists from several departments of the IBP presented their results of their research. In the future, we intend to build an Epigenetics Centre within the framework of the Strategy of the CAS, which would inform general public and other scientists in the Czech Republic about this biomedical promising field.

Management of the institute has also dealt with updates of a number of directives and internal regulations of the IBP. For example, organizational rules, liability rules (specimen signatures), public procurement directives, internal salary regulations, radiation protection documents (according to the new Atomic Act), rules on the management of the institute funds, conditions of employment, career system, rules on provision of personal protective equipment and work clothes, appointment of advisory commissions, introduction of "home office" and "sick days" status, inventory plan, preparation of the GDPR data protection directive and others.

Management of the institute has further focused on the support of families with young children (promotion of "home office" for such employees, effort to promote pre-school facilities by the CAS) and on the organization of social and sports events such as Christmas parties, volleyball tournaments and table tennis tournaments. A common room was set up at the IBP and outdoor sports facilities were maintained for the sports activities. The aim of all these activities is a creation of positive work environment and open communication among IBP employees. The IBP management aims to achieve teamwork not only of all members of the new management but also of all academic and non-academic staff. The IBP management task is to maintain a friendly and motivating work environment for all employees and students of the Institute.

Institute Board:

The Board of the Institute met five times in 2015. In addition to these physical sessions, several meetings were held electronically (per rollam). In both cases, meeting records were prepared and archived at the IBP secretariat. At physical meetings, records from previous meetings were reviewed and approved.

Constituent Session on January 3, 2018 (only the most important points of the session are mentioned):

(1) At the end of 2016, elections to the Board took place at the Institute. Dr. Jana Krejčí, on behalf of the Election Commission, introduced members to the results of the IBP Board elections, which took place with high attendance. Subsequently, in accordance with the electoral code, the management of the session was taken over by doc. S. Kozubek, who introduced the attendees to the directives for the election of the Chairman. After the discussion about the election of the Chairman of the Board, about the Deputy chairman of the Board and about the appointment of the Secretary of the Board, Aleš Kovařík was elected the Chairman of the Board in secret ballot (vote ratio: 5 for, 4 against). Doc. M Fojta was then unanimously elected Deputy chairman of the Board.

Session on February 1, 2018 (only the most important points of the session are mentioned):

1) The Board has decided that the selection committee for the tender for the function of Director of IBP of the CAS, v.v.i. (IBP) will be established from eight members. Subsequently, 6 members of the selection committee were elected. Non-academic members: doc. Mgr. Martin Lysák, Ph.D.; prof. RNDr. Jan Šmarda, CSc.; prof. MUDr. Zdeněk Kolář, CSc. Internal members of the IBP Board: doc. RNDr. Stanislav Kozubek, DrSc.; RNDr. Aleš Kovařík, CSc. and doc. RNDr. Miroslav Fojta, CSc. RNDr. Aleš Kovařík, CSc was elected the Chairman of the Selection committee. The remaining two members of the selection committee were nominated by the Deputy Chairman of the CAS for relevant scientific field from the members of the Academic Council of the CAS. They were prof. Mgr. Tomáš Kruml, CSc. and prof. RNDr. Jan Zima, DrSc.

2) Members of the selection committee from internal IBP Council members were appointed to the commission for opening envelopes with applications to tender for the post of the IBP Director (doc. RNDr. Stanislav Kozubek, DrSc.; RNDr. Aleš Kovařík, CSc. and doc. RNDr. Miroslav Fojta, CSc.). Secretary of the IBP Board Hana Křivánková informed the Board that only one application was submitted to the tender for the post of IBP Director – by doc. RNDr. Eva Bártová, Ph.D. - within the deadline for submission of applications, i.e. by 12:00 on January 31, 2017.

Session on February 23, 2018 (only the most important points of the session are mentioned):

1) A. Kovařík acquainted the members of the Board with the course and results of the selection committee meeting for the position of the director of IBP of the CAS, v.v.i. held on February 20, 2017. The conclusion of the tender committee was unanimous recommendation of Mrs. doc. RNDr. Eva Bártová, PhD. as the Director of the Institute of Biophysics of the CAS, v.v.i. A copy of the records of the tender committee proceedings and the candidate application were sent to all Board members well in advance. A short discussion followed in which the members expressed their consent to the application and found that the candidate met the conditions laid down in the Rules for the Appointment of Institution Directors of the Czech Academy of Sciences (§ 1 para. 3 and 4 and § 2 para. 2). Subsequently the Board proceeded with a secret ballot (9 valid votes) on the recommendation of a candidate for the position of Director of the Institute of Biophysics of the CAS, v.v.i. with 9 votes in favor, 0 votes against and 0 abstentions.

Session on May 12, 2018 (only the most important points of the session are mentioned):

- 1) The budget of the Institute for 2018 was approved
- 2) The Board discussed and unanimously approved the Mid-term IBP financing outlook for years 2018-2019.
- 3) The Board discussed applications for 2018 investment funds allocation and recommended 3 applications.
- 4) The Director of the Institute Dr. E. Bártová acquainted the Board with her proposed amendments to the Organizational Code (OC) of the Institute of Biophysics of the CAS, v.v.i. The IBP Technical and Economic Administration was split into IBP Technical Administration and IBP Economic Administration, both of which will have an individual manager appointed by the Institute Director.

Session on September 21, 2018 (only the most important points of the session are

mentioned):

- 1) The Annual Report of the Institute of Biophysics of the CAS, v.v.i. for 2016 was approved.
- 2) Two proposals for grant from the Program for Promoting Perspective Human Resources (PPLZ) (program supported by the CAS) were discussed and supported.
- 3) The Board discussed amendments to the IBP Conditions of Employment: a) Home Office and b) Sick Days.
- 4) The Board discussed and, after the commentary, approved the new IBP Internal Research Support Program proposed by Dr. E. Bártová.

Session on November 22, 2018 (only the most important points of the session are mentioned):

- 1) Dr. E. Bártová acquainted the Board with department budgets for 2018 and described in detail and justified the allocation of funds for the remuneration of managers and employees of the department from the director fund in 2017.
- 2) Dr. A. Kovařík acquainted the Board with the result of IBP applications for the allocation of investment funds for instrumental equipment for 2018. The IBP obtained funds for the purchase of Spectral Flow Cytometer Sony SP6800, Spectral Analyzer 405/488/638 for 2018 (price CZK 10,961,765.10 including VAT). The device will be part of the so-called "core facility" (Cell Biophysics Laboratory) and will be located in the IBP main building. The department of prof. J. Vondráček will be responsible for the operation of this device. Investment funds for the purchase of a disk array (request of the IT manager, Dr. Jursa) and a computer server (request of doc. Brázda) were not allocated because of the decision of the Investment Committee of the CAS not to allocate subsidies for devices up to CZK 5 million if the department has already received an investment fund of more than CZK 5 million, which is also the case of IBP. Both applications for these investments will be submitted in the framework of applications for subsidies from the budget of the CAS for the year 2019.
- 3) IBP received extra funds from the budget of the CAS for the acquisition of xCELLigence RTCA DP Instrument, Flexible Real-Time Cell Monitoring (total price including VAT: CZK 1 478 075,50) for the department of M. Falk.
- 4) Results of two young scientists, candidates for the Award of the Director of the Institute of Biophysics, were presented in the public part of the Board meeting. Due to the balanced and high publishing performance of the applicants and the level of their presentations, the Board recommended the IBP Award for both applicants. Awards were awarded at the Researcher Assembly on December 15, 2017.

Records from the individual Board meetings are regularly published on a bulletin board in the main building of the Institute and on <https://www.ibp.cz/intranet/rada-bfu-vvi>)

Supervisory Board:

The composition of the IBP Supervisory Board was changed in 2017. The original composition of the SB was as follows: Prof. Jan Zima, DrSc., Prof. RNDr Alois Kozubík, CSc., Ludmila Moravcová, Ing. Eliška Kudělková, prof. RNDr Jan Šmarda, CSc., doc PhDr Radomír Vlček, CSc., Academic Council of the Czech Academy of Sciences pursuant to Section 19 (4) of Act No. 341/2005 Coll., On Public Research

Institutions, as amended, and Article 17 of the Annex to the Articles of Association of the Czech Academy of Sciences appointed new members of the Supervisory Board of the Institute of Biophysics of the CAS with effect from May 1, 2017 for a five-year mandate, i.e. until April 30, 2022: Martin Falk, Ph.D. (IBP of the CAS, v.v.i.); prof. RNDr. Jiří Doškař, CSc. (FS MU); Ing. Ilona Müllerová, DrSc. (ISI of the CAS, v.v.i.); prof. RNDr. Renata Veselská, Ph.D., M.Sc. (FS MU). The secretary was Hana Křivánková, DiS.

The SB met three times in 2017, at its 20th, 21st and 22nd sessions, held on March 13, 2017 (in its original composition), June 1 and December 11, 2017 (in the new composition). The guests from the IBP (Doc. RNDr Stanislav Kozubek, DrSc., Doc., doc. RNDr. Eva Bártová, Ph.D., Ing. Dalibor Krejčí, and Ing. Robert Ulrich) were also invited to these meetings. The meetings have always begun by reviewing and approving the records from the previous session (and the per rollam meetings).

At its 20th meeting

1) The SB was informed in detail by Ing. Krejčí about the economic results for the year 2016, and further acquainted with the budget for 2017 and other related documents:

a) Transfer of financial funds from profit of the accounting period for the year 2016 to the Reserve Fund of the Institute of Biophysics of the CAS, v.v.i.

b) Table of projected revenue and expenditure budget for 2017

c) Breakdown of estimated institutional material costs of the IBP in 2017

d) Budget of the Social Fund of the Institute of Biophysics of the CAS, v.v.i. for 2017

Budget of the Institute of Biophysics of the CAS, v.v.i. for 2017 was discussed and the SB concluded that it was prepared conscientiously and realistically

2) The SB subsequently discussed the "Report on the Activities of the Supervisory Board of the Institute of Biophysics of the CAS, v.v.i. for 2016" and approved it unanimously.

3) S. Kozubek informed the members of the Supervisory Board on IBP activities since the last session of the SB, mainly on the election of a new director of IBP of the CAS, v.v.i. Ms. doc. RNDr. Eva Bártová, Ph.D. and the use of a large investment of the microscope with FLIM - FRET equipment in the previous year.

4) The SB also carried out an evaluation of the managerial skills of the director of IBP of the CAS, v.v.i., doc. RNDr. S. Kozubek, DrSc. and agreed on excellent ranking - 3 based on the result of the assessment and management of the institute.

At its 21st meeting

1) At the beginning of the meeting the Chairman of the Supervisory Board of IBP of the CAS, v.v.i. (hereinafter only as Supervisory Board, SB), prof. Jan Zima, welcomed the attendees. Due to the modification of the SB, members introduced themselves. In accordance with point 7 of Article 1 of the Rules of Procedure of the SB (after discussion with the Director of the Institute), the Chairman of the Supervisory Board appointed Hana Křivánková the Secretary of the Supervisory Board. Furthermore, the Chairman introduced the attendees to the duties of the SB members, their roles and basic documents governing the SB activities. The records of the previous Supervisory Board meeting were reviewed and approved.

2) The Supervisory Board confirmed its position on the decision that was approved by the per rollam method. It voiced the agreement with the proposal to submit an

application for support for the acquisition of Spectral Flow Cytometer Sony SP6800, Spectral Analyzer 405/488/638 (purchase price approx. CZK 10.961.765 including VAT). All SB members agreed with the request.

3) S. Kozubek informed members of the SB about the activities of the Institute since the last session and informed the SB about the contents of the Annual IBP Activity and Management Report for 2016 including the Financial Statements and the Report of the Independent Auditor. The SB subsequently discussed the Annual Report without any substantial comments (minor questions were answered satisfactorily).

4) The director of the Institute presented the Supervisory Board with her concept of institute management and the direction of its work, including future development of the institute. She also introduced the attendees to the newly modified internal regulations (internal salary regulation, organizational rules, rules for management of institute funds).

At its 22nd meeting

1) The Supervisory Board confirmed its position on the decision that was approved by the per rollam method. It voiced the agreement with the proposal to incorporate the Czech Biophysics Committee under the Institute of Biophysics of the Czech Academy of Sciences. IBP hereby undertakes to ensure the functioning of the Committee at national level and in relation to the IUPAB international union in the years to come. All SB members agreed to join.

2) Ing. Ulrich informed the SB in detail about the estimated economic results for the year 2017, a positive balance is expected. Unused institutional funds will be transferred to the Fund of dedicated funds (FDF) and exhausted in 2018 on the basis of the FIFO economic principle. The Social Fund is exhausted in accordance with the approved plan, by the end of 2017 we expect the balance to be approximately CZK 6,000 thousand. The Asset Development Fund (ADF) was not used this year, it was increased by depreciation and currently amounts to approximately CZK 9,000 thousand. The reserve fund remained unchanged (approximately CZK 10,000 thousand).

Due to the ending R&D program for 2012-2017, all funds, coming from institutional subsidies and subsequently transferred to the FDF, had to be fully exhausted this year. Of the total amount of CZK 6,640 thousand, CZK 3,100 thousand were distributed among individual departments, remaining CZK 3,540 million were used for the necessary additional payments for construction and investment projects, reconstruction of rooms, renovation and renewal of accommodation facilities, activities in the area of public relations, light sign at the entrance to the main building, etc.

3) The SB was acquainted with the selected capital investment expenditures, which were partially or fully covered by a purpose subsidy:

- The "Potentiostat Autolab" device, in the price of CZK 1,054 thousand. (subsidy CZK 844 thousand, supplement CZK 210 thousand)
- Upgrade AFM + fast scan module in the price of CZK 1,763 thousand. (subsidy CZK 1,410 thousand, supplement CZK 353 thousand)
- The "IBP Areal Security" construction project, worth CZK 6,236 thousand , CZK (subsidy CZK 3,289 thousand, additional CZK 2,947 thousand)
- Equipment for experimental breeding of small rodents under IVC conditions at the price of CZK 1,403 thousand (subsidy CZK 1,122 thousand, supplement CZK 281

thousand)

- The "Monolith NT.115 Pico" device in the price of CZK 4,002 thousand (subsidy CZK 3,497 thousand, supplement CZK 505 thousand)
- The "Reconstruction of laboratories in 3rd floor, wing A" construction project in the price of CZK 1,648 thousand (subsidy CZK 1,165 thousand, supplement CZK 488 thousand)
- The "RTCA xCELLigence DP" device in the price of CZK 1,478 thousand (subsidy CZK 1,182 thousand, supplement CZK 296 thousand)

In 2017, the allocated investment funds were also used within the framework of the obligatory co-financing of the project SYMBIT (OP VVV) - a total of CZK 1,222 thousand.

A new company car was purchased at the turn of the year. It replaced the car, which was at the end of its service life due to its mileage, which recently manifested itself in the occasional unreliability and need for more frequent repairs.

The Director informed the SB on the result of the evaluation of IBP applications for the allocation of investment funds for 2018. IBP received a subsidy for purchase of Spectral Flow Cytometer Sony SP6800, Spectral Analyzer 405/488/638 at the price of CZK 10,962 thousand (subsidy CZK 8,769 thousand, supplement of CZK 2,193 thousand). The device will be of a "core facility" character and will be located in the main building. In addition, the Institute received a grant from the CAS for the reconstruction of the assembly hall with small-scale construction projects in the total amount of CZK 9,620 thousand (subsidy CZK 7,620 thousand, supplement of CZK 2,000 thousand).

4) The Director informed the SB on the unrecognized costs of the 7F14369 Czech-Norwegian cooperation project that were caused by a mistake of the Norwegian partner - the University of Oslo - when the structure of the eligible project expenses changed without any prior written consent of the provider. The Provider (MEYS) assessed the above procedure as a breach of the terms of budget discipline and identified the item as unrecognized. The Institute will reimburse the amount of CZK 275,576.17 from its own resources (the Reserve Fund) to meet the deadline for final billing (December 15, 2017), thus avoiding additional sanctions, but at the same time will require full reimbursement of costs by the Norwegian party (reimbursement of costs by the Norwegian party took place in January 2018).

The SB considers this procedure to be correct.

5) The director of the Institute reported on the Institute activities since the last session of the SB. She provided detailed information about the research activities of the institute, financing and realization of building reconstructions and the investments made in 2017 and the plan for the following year.

6) Miscellaneous: The Director informed the SB about the new European General Data Protection Regulation (GDPR) which will enter into force in the Czech Republic on May 25, 2018. An external company was hired to assess the current level of security and to propose the necessary scope of action that needs to be implemented to observe the law.

II. Changes to the Deed of Foundation:

In 2017, there were no changes to the IBP Deed of Foundation

III. Evaluation of the main work:

The main scientific work of the department focused on the study of structure, dynamics, function and evolution of nucleic acids, correction mechanisms at the level of DNA and chromatin, electrochemical properties of biomolecules, mechanisms of anticancer activity of pharmaceuticals, structure and function of the genome and epigenome, developmental and evolutionary processes in the cell, carcinogenesis and environmental toxicity mechanisms and processes of immune response development in model organisms. At the same time, the Institute has also fulfilled related functions, such as scientific education, participation in higher education, development of international cooperation, popularization of science, transfer of scientific findings to practical use and others.

Achieved research results

In 2017, many priority results were achieved, which were published in 108 original publications, 9 review articles and 2 book chapters (according to WoS). A large portion of publications (68) has a corresponding author from the IBP. From these publications, we have selected the following important results of the individual departments:

Binding of 53BP1 protein to damaged DNA is affected by TP53 gene mutations

53BP1 protein can be considered a key factor in repairing double-stranded DNA breaks. This protein interacts not only with radiation-induced chromatin but also with proteins involved in the repair of damaged DNA. The most important binding partners of the 53BP1 protein include the p53 protein encoded by the tumour-suppressor gene TP53. We have found that mutations in the TP53 gene affect the binding of 53BP1 to DNA lesions that have been induced by ionizing or UVA radiation. These mutations also affect the overall cell response to DNA damage.

Suchánková J, Legartová S, Ručková E, Vojtěšek B, Kozubek S, Bártová E. Mutations in the TP53 gene affected recruitment of 53BP1 protein to DNA lesions, but level of 53BP1 was stable after γ -irradiation that depleted MDC1 protein in specific TP53 mutants. *Histochem Cell Biol.* 2017. 148(3).

Basic research focused on mechanisms of anti-tumour efficacy and proposals for new metallopharmaceuticals.

The novel organoruthenium complexes with C^N ligands are highly potent cytotoxic agents against several different human tumour cell lines. These complexes show high selectivity for cancer cells. Their high efficacy can be attributed to several factors, such as increased accumulation and their ability to alter the mitochondrial transmembrane potential in cells. The novel ruthenium complexes also inhibit the synthesis of proteins with significantly higher potency than conventional DNA translation inhibitors.

Novohradsky, V., Yellol, J., Stuchlikova, O., Santana, M.D., Kostrhunova, H., Yellol, G., Kasparkova, J., Bautista, D., Ruiz, J. and Brabec, V. (2017) Organoruthenium complexes with C^N ligands are highly potent cytotoxic agents that act by a new mechanism of action. *Chem. Eur. J.*, 23, 15294-15299.

Chromatin structure, function, damage and repair research; biological effects of different types of ionizing radiation.

High linear energy transfer ionizing radiation (LET) kills tumour cells better than those used with low LET radiation. This is thanks to the creation of complex double-stranded DNA breaks. LET is therefore an important indicator of the therapeutic efficacy of radiation. We have found, however, that different radiations with similar (high) LETs have different radiobiological effects as they cause damage to DNA with different microscopic structures. This microstructure cannot be predicted by LET.

Lucie Jezkova, Alla Boreyko, Tatiana Bulanova, Marie Davidkova, Iva Falkova, Stanislav Kozubek, Daniel Depes, Evgeny Krasavin, Elena Kulikova, Elena Smirnova, Olga Valentova, Mariia Zadneprianetc, and Martin Falk*: Particles with similar LET values generate DNA breaks of different complexity and reparability: a high-resolution microscopy analysis of γ H2AX/53BP1 foci. *Nanoscale* (2018).

Resolution of isomeric glycans by voltammetry. Modification of 2,3-sialyl lactose and 2,6-sialyl lactose osmium(VI) complexes.

Sugar components of glycoproteins play an important role in health and disease and glycoprotein biomarker specificity can be greatly enhanced by the analysis of their glycans often containing various isomers. We have shown that two isomeric glycans, 2,3-sialyl lactose and 2,6-sialyl lactose (important in cancer) can be broken down volta-metrically after their modification of osmium(VI) complexes.

Trefulka, Mojmir; Palecek, Emil. Distinguishing glycan isomers by voltammetry. Modification of 2,3-sialyllactose and 2,6-sialyllactose by osmium(VI) complexes, *ELECTROCHEMISTRY COMMUNICATIONS* Volume: 85 Pages: 19-22.

Interpopulation variability in homogenisation of rDNA in allotetraploid oilseed rape (*Brassica napus*).

Brassica napus (AACC, $2n = 38$, oilseed rape) is an economically important plant allotetraploid species that originates from a spontaneous interspecific crossbreeding of diploid species close to *B. rapa* (AA, $2n = 20$) and *B. oleracea* (CC, $2n = 18$). In this work we have been dealing with the influence of intensive breeding on changes in its hybrid genome. Using genome-specific probes, the FISH method showed that *B. napus* cultivars differ in the degree of homogenization of rDNA. We assume that the results could be applicable to breeding programs.

Sochorová J, Coriton O, Kuderová A, Lunerová J, Chèvre AM, Kovařík A (2017) Gene conversion events and variable degree of homogenization of rDNA loci in cultivars of *Brassica napus*. *Annals Botany* 119(1):13-26

Nitro-oleic acid regulates growth factor-induced differentiation of macrophages from bone marrow.

Nitro-fatty acids are endogenous mediators capable of modulating the function of immune cells. It has been newly shown that nitro-oleic acid has the potential to

regulate the macrophage differentiation process induced by selected colony-stimulating growth factors. Thus, nitro-oleic acid is a promising therapeutic tool in the treatment of chronic inflammation associated with increased accumulation and dysregulated activation of various subpopulations of macrophages in inflammatory tissues.

Verescakova H, Ambrozova G, Kubala L, Perecko T, Koudelka A, Vasicek O, Rudolph TK, Klinke A, Woodcock SR, Freeman BA, Pekarova M. Nitro-oleic acid regulates growth factor-induced differentiation of bone marrow-derived macrophages. *Free Radic Biol Med.* 2017 Mar;104:10-19.

Significant progress in the study of protein/RNA complexes.

We investigated the structural hydration of the Fox-1 protein/RNA complex by molecular dynamics (MD). Excellent match with experiments has been achieved, indicating that MD is an effective tool for predicting and interpreting hydration in protein/RNA complexes. Hydration is poorly detectable in experiments but can affect the stability of protein/RNA complexes. We have also shown that MD allows to describe structural changes in the CUG-2 protein that affect its specificity for different RNA sequences.

Krepl, M.; Blatter, M.; Cléry, A.; Damberger, F. F.; Allain, F. H. T.; Sponer, J., Structural Study of the Fox-1 RRM Protein Hydration Reveals a Role for Key Water Molecules in RRM-RNA Recognition. *Nucleic Acids Research.* 2017, 45, 8046-8063.

Konté, N. D. d.; Krepl, M.; Damberger, F. F.; Ripin, N.; Duss, O.; Sponer, J.; Allain, F. H.-T., Aromatic Side-chain Conformational Switch on the Surface of the RNA Recognition Motif Enables RNA Discrimination. *Nature Communications.* 2017, 8, e654.

Butyrate is a significant modulator of metabolism and toxicity of polyaromatic hydrocarbons in cell epithelial models of the colon.

Short chain fatty acids, such as butyrate, are a significant source of energy as well as a regulator of the function of the epithelium of the large intestine. In this work we have shown that in cells derived from the epithelium of the large intestine, butyrate can significantly affect the expression of enzymes such as cytochrome P450 1A1, which is involved in the detoxification and bioactivation of significant dietary carcinogens. By inhibiting histone deacetylases, it can significantly affect the genotoxicity of significant carcinogenic substances, such as benzo[a]pyrene.

Zapletal O., Tylichová Z., Neča J., Kohoutek J., Machala M., Milcová A., Pokorná M., Topinka J., Moyer M. P., Hofmanová J., Kozubík A., Vondráček J. (2017) Butyrate alters expression of cytochrome P450 1A1 and metabolism of benzo[a]pyrene via its histone deacetylase activity in colon epithelial cell models. *Arch. Toxicol.*, 91(5): 2135-2150.

Loss of purine bases greatly alters the structure and stability of human telomere quadruplexes.

We have found that naturally occurring apurine (AP) sites in human telomeric DNA greatly alter the structure and stability of its G-quadruplex. APs replacing adenine in loops stabilize parallel squaring of the quadruplex and vice versa replacing guanines by the PA site stabilizes the antiparallel arrangement and does not allow to form a parallel quadruplex. The simultaneous presence of both types of damage is more

dangerous than individual lesions. Depending on their location in the molecule, cumulated lesions may prevent quadruplex formation, which may lead to shortening of telomeres.

Iva Kejnovská, Klára Bednářová, Daniel Renčiuk, Zuzana Dvořáková, Petra Školáková, Lukáš Trantírek, Radovan Fiala, Michaela Vorlíčková*, Janos Sagi: Clustered abasic lesions profoundly change the structure and stability of human telomeric G-quadruplexes. *Nucleic Acids Research* 45 (2017) 4294-4305.

Analysis of satellite DNA and transposable elements in Seabuckthorn (*Hippophae rhamnoides*), a dioecious species with allosomes.

Seabuckthorn (*Hippophae rhamnoides*) is a former shrub commonly used in the pharmaceutical and cosmetic industries as a source of minerals and vitamins. In this study, we analysed the genome. We performed DNA sequencing and reconstructed the major repetitive DNA sequences. For data analysis, we developed a new bioinformatics approach for advanced satellite DNA analysis, and we found that about 25 % of the genome is satellite DNA, and approximately 24 % are transposable elements dominated by Ty3 / Gypsy retrotransposons and Ty1 / Copia LTR retrotransposons.

Janka Puterova, Olga Razumova, Tomas Martinek, Oleg Alexandrov, Mikhail Divashuk, Zdenek Kubat, Roman Hobza, Gennady Karlov a Eduard Kejnovsky *GENOME BIOLOGY AND EVOLUTION* 9: 197-212, 2017

Number of on-going projects in 2017:

Provider	Project	Others	Total
From the chapters of the state budget in total	56	0	56
Of which:			
Czech Academy of Sciences	3	0	3
Czech Science Foundation	40	0	40
Ministry of Health	6	0	6
Ministry of Education, Youth and Sports	7	0	7
From abroad and others in total	0	14	14
Of which:			
foreign	0	7	7
other main business orders	0	7	7
Totally implemented in the IBP	56	14	70

Scientific cooperation

a) The employees of the Institute cooperated with a number of universities, especially Masaryk University, Palacký University in Olomouc, Mendel University in Brno, Veterinary and Pharmaceutical University, Brno, Brno University of Technology, Charles University in Prague, University of Ostrava and University of South Bohemia in České Budějovice. In addition to teaching, IBP scientists were part of research centers shared with universities, partly working in joint laboratories and joint grant projects. The cooperation was also carried out in the framework of the implementation of study programs. The staffs of the Institute is involved in the implementation of 14 undergraduate (48 subjects) and 8 doctoral (25 subjects) study

fields. Together, IBP staff provides 56 semester cycles, of which 12 cycles are in Bachelor's and 44 in Master's programs. Most of these courses take place at Masaryk University in Brno (46), smaller part at Palacký University in Olomouc, Mendel University in Brno, Veterinary and Pharmaceutical University in Brno, University of Ostrava and Brno University of Technology. Under the leadership of IBP scientists, 70 PhD students (out of which 13 graduated successfully in 2017) and a total of 55 undergraduate students were involved in the scientific work of the Institute in 2017.

b) Cooperation with other institutions and the business community

Cooperation in contractual research continued with Contipro a.s. on "Research on the Possibilities of Using Modified Hyaluronan as a Drug Carrier". Experiments aiming to clarify the possibilities of using chemically modified hyaluronan, which forms polymer micelles, as carrier of drugs insoluble in the aqueous environment continued. The results will find application in the development of new cosmetic and therapeutic products.

c) International scientific collaboration of the institute

Significant projects of international scientific cooperation included mainly two projects of the Czech-Norwegian Scientific Program entitled: 1) "Nuclear Architecture in the regulation of autophagy, DNA repair and gene expression" (Project No. 7F14369), and 2) "Czech-Norwegian Networking on nuclear structure and function" (Project No. 7F16012). Coordinator of both projects was doc. RNDr. Eva Bártová, Ph.D.

The institute has been involved in the solution of five other international programs/projects such as Kontakt II (1 project), COST (2 projects), SUJV Dubna (2 projects). Dozens of foreign scientists visited the institute in 2017.

The staff of the Institute organized or co-organized a total of 6 international events. These were the following meetings:

- 1) Nuclear architecture and function in health and disease, 20.–23. 4. 2017, Český Krumlov
- 2) 3rd International Conference on Systems and Synthetic Biology, July 20-21, 2017, Munich
- 3) Modern Electrochemical Methods XXXVII, 15.5. - 19. 5. 2017, Jetřichovice, Czech Republic
- 4) Annual Meeting of COST Action Mye-EUNITER, 1. – 3. March 2017, Brno, Hotel Continental
- 5) International Conference Analytical Cytometry IX, 14. – 17.10.2017, Prague
- 6th International Meeting on Quadruplex Nucleic Acids, 31. 5. – 3. 6. 2017, Prague

d) Domestic and foreign acknowledgement of employees

In 2017, two major awards were awarded to IBP staff.

- 1) prof. RNDr. Emil Paleček, DrSc. was awarded the Neuron Prize for Merit for World Science.
- 2) Mgr. Soňa Legartová, Ph.D. From the Department of Molecular Cytology and

Cytometry IBP was awarded the Otto Wichterle Prize.

IV. Evaluation of further and other activities

In the Deed of Foundation, the Institute of Biophysics of the CAS, v.v.i. has no registered further or other (economic) activity and does not perform any.

V. Information on the measures to remedy the shortcomings in the management and the report on how the measures to remedy the shortcomings imposed in the previous year were met:

In September 2017, Czech Social Security Administration Brno carried out a check on the fulfilment of obligations in sickness insurance, the fulfilment of obligations in insurance and pension insurance and compliance with other obligations of the payer of the insurance. The check revealed no deficiencies that would lead to the imposition of remedial measures.

VI. Financial information on facts that are relevant relative to the assessment of the economic position of the institution and may affect the development thereof:*)

All financial information is presented in the Independent Auditor Report, which includes the audited financial statements and the annex thereof. Said report is an annex to this Annual Activity and Management Report. After the balance sheet date, there were no facts that would have a significant impact on the current economic position of the institution and a further development thereof. In 2018, no major changes compared to 2017 have been expected.

VII. Expected development of the institute activity:*)

Research of the institute in the next period will focus mainly on the highly topical and socially significant area of research, epigenetics, which has been recently experiencing stormy development. In this respect, we will try to build a Centre of epigenetics in 2018 that will coordinate those interested in this field of science. The field of epigenetics is one of the greatest challenges for research teams and ranks among the most up-to-date research directions. Basic research of structure, function and dynamics of biological systems (biomolecules and cells) will use new modern methods such as flow cytometry, mass spectrometry (cooperation with CEITEC laboratories, Brno), advanced methods of confocal microscopy, bioinformatics analysis and computational chemistry studies.

*) Data Required under Section 21 of Act 563/1991 Coll., On Accounting, as amended.

E. Bártová, A. Kovařík, M. Falko, J. Vondráček and R. Hobza teams are mainly involved in the epigenetic research, but other IBP teams are involved in the issue of epigenetic phenomena as well; at least 7 departments of the Institute deal with the post histone translational modifications, the effects of clinically significant inhibitors of histone-modifying enzymes (department of prof. Brabec), DNA methylation (department of Dr. Kovařík), modifications and function of small non-coding RNAs. Even though IBP management supports the multi-disciplinary research of IBP teams (in the spirit of the CAS concept), the main supportive direction will be the study of epigenetic phenomena at the chemical (regulatory) level, at the level of cell populations (with a focus on epigenetics of tumour cells), epigenetics of allosomes in plants and epigenetic modifications of DNA and RNA (nucleic acid study). This direction of research will be supported within the framework of the AV21, Qualitas, Epigenetics Centre as well as the IBP Internal Support Program. Emphasis will also be put on the use of biophysical methods and technologies (from the Laboratory of Cell Biophysics) to study epigenetic processes.

VIII. Activities in the field of environmental protection: *)

The waste management is governed by the Internal Operating Regulations for Waste Management, which is in accordance with Act No. 185/2001 Coll., The Waste Act and the amendment of some other Acts, as amended.

All waste generated, including waste classified as hazardous, is transferred for ecologic disposal to companies authorized to perform this activity, namely:

- company AVE CZ odpadové hospodářství s. r. o. (municipal waste, glass, paper, plastics, wood and metal waste, disposal of hazardous waste, including used and discarded chemicals),
- company EKOTERMEX, a.s. (disposal of selected hazardous waste),
- company ANBOS Brno, s.r.o. (disposal of selected hazardous waste),
- company SAKO Brno, a.s. (material shredding - paper, plastic)
- companies Rema systém, a.s. and Rosomák a syn, s.r.o. (take-back of discarded unusable electrical equipment and appliances, fluorescent lamps and incandescent lamps);
- ÚJV Řež, a.s., Radioactive Waste Management Centre, Division of Fuel Cycle Chemistry and Waste Management (radioactive waste disposal - solid pressable RAW)

In the field of water management, namely waste water, the Institute follows the rules of the Contract for the supply of water for public use and the drainage of wastewater

to public sewerage, which corresponds to the relevant sewerage system. The frequency of control sampling and laboratory wastewater testing is in accordance with the sewerage regulations as well as compliance to observe limits for wastewater pollution.

The state and the maintenance of the vehicle fleet guarantee eco-friendly operation in compliance with emission limits and minimization of possible leakages of technical liquids (inter alia by gradual renewal of the vehicle fleet).

IX. Activities in the field of labor-law relations: *)

Basic personnel data

A. Staff structure by age and gender - as of December 31, 2017

Age	Male	Female	Total	%
25 years and younger	3	11	14	6.17
26 – 30 years	31	30	61	26.87
31 – 40 years	26	30	56	24.67
41 – 50 years	16	28	44	19.38
51 – 60 years	16	16	32	14.1
61 and older	13	7	20	8.81
Total	105	122	227	100
%	46.26	53.74	100	

B. Staff structure by education and age - as of December 31, 2017

achieved education/age	< 20	21-30	31-40	41-50	51-60	>60	total	%
secondary vocational education with an apprenticeship certificate	0	0	0	4	7	0	11	4.84
complete secondary general education	0	0	1	1	1	0	3	1.32
complete secondary vocational education with apprenticeship and graduation	0	0	0	0	0	1	1	0.44
complete secondary vocational education with GCSE (without apprenticeship)	0	3	0	3	7	4	17	7.49
bachelor education	0	10	2	0	1	0	13	5.73
university education	0	54	17	2	2	2	77	33.9
doctoral education	0	8	36	34	14	13	105	46.2
								2
								6

*) Data Required under Section 21 of Act 563/1991 Coll., On Accounting, as amended.

total	0	75	56	44	32	20	227	100
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C. Overall data for the average salary for 2017

average gross monthly salary: CZK 42.090

X. Provision of information pursuant to Act No. 106/1999 Coll., On free access to information ^{)}**

a) Number of requests for information submitted and number of decision to reject the requests

No request for information was rejected in 2017.

b) Number of appeals against decision

No appeals against decision were filed in 2017.

c) A description of the essential parts of each court verdict to examine the lawfulness of the decision of the liable entity to reject the request for information and an overview of all the expenses incurred by the liable entity in connection with legal proceedings for rights and obligations under that law, including the costs of its own employees; costs of legal representation

In 2017, no judgment was passed on the lawfulness of the decision of the Institute of Biophysics of the CAS, v.v.i. on the refusal of the request for information and the Institute did not incur any expenditure in this respect.

d) List of exclusive licenses granted, including justification for the need for an exclusive license

The Institute of Biophysics of the CAS, v.v.i. did not grant any exclusive license in 2017.

e) Number of complaints submitted pursuant to Section 16a of Act No. 106/1999 Coll., the reasons for their submission and a brief description of the way they were processed

No complaints were made under the above paragraph in 2017.

f) Further information related to the application of Act No. 106/1999 Coll.

No further information related to the application of Act No. 106/1999 Coll. is currently available.

^{**)} Data required under Article 18 (2) of Act No. 106/1999 Coll., On Free Access to Information, as amended.

XI. Observance of the mandatory share of people with disabilities in the total number of employees

The mandatory 4% of people with disabilities amounted to 6.92 people in 2017. The observance of this obligation was performed by 2.68 employees, the remaining share was paid in the form of a substitute performance of CZK 1,002 thousand. CZK without VAT by purchasing products from company SMERO, spol. s.r.o., Company ID 25527886.

stamp

signature of the director of the
CAS institute

Annex to the Annual Activity and Management Report: financial statements and report on the audit thereof