



# **Scientific Concept of IOCB ASCR and Mechanisms of its Function, 2011- 2020**

# **Scientific concept and proposed development of IOCB in 2011-2020**

## **1. Analysis of the Current State of IOCB**

The Institute of Organic Chemistry and Biochemistry (IOCB) of the Academy of Sciences of the Czech Republic (ASCR), v.v.i., faces a unique historical opportunity. Considerable income from licensing fees for materials developed by the team of Prof. Antonín Holý gives IOCB an exceptional opportunity to win a significant position in the field of world science in the next few years. This chance cannot be wasted.

In the past few years, an unprecedented personnel and organisational restructuring of IOCB has taken place. IOCB is now organised in a “flat structure,” the base of which is composed of scientific, scientific-service, and service teams. The individual heads of these teams report directly to the director of IOCB. Similarly, there is no intermediary between the employees and their team heads.

The scientific teams are further divided into so-called Distinguished Chair teams, senior research teams, and junior research teams. The latter two groups undergo regular evaluation in five-year cycles (or 3+2 in the case of junior teams). The Distinguished Chair title is granted in exceptional cases to excellent scientists, and their teams no longer undergo regular evaluations. Individual groups are very autonomous, and team heads have full responsibility for running them. As of June 2011, three groups of the category Distinguished Chair, 17 senior groups, and four junior groups were active at IOCB (see [www.uochb.cz](http://www.uochb.cz)).

The International Advisory Board (IAB), from which the Evaluation (or Selection) Committee is recruited, has a fundamental influence on the assessment of scientific groups and filling of vacant positions. IAB functions as an independent advisory body of the director. There are programmes at the institute for foreign post-doctoral employees ('IOCB Postdoctoral') and for long-term residences of important foreign scientists at the institute ('IOCB Sabbatical').

Currently, a construction project intended to expand and update the institute's working areas is underway. Thanks to this initiative, IOCB should have modern laboratory areas and offices available for the work of as many as 500 employees, including Ph.D. students, by 2015.

In recent years, the international visibility of the institute has increased. Since 2004, a distinctive rise in most scientometric indicators, as the main indicators of the productivity of

IOCB, can be observed (it is an approximately two-fold growth). In part, this rise reflects the current (and constant) rise in the number of employees (which has grown approximately 1.5-fold in the period mentioned). It should be noted, however, that the quantitative growth of the number of publications and citations produced by IOCB employees has reached a certain plateau in the last two years. Besides the growing number of publications in high-impact journals, the success of the institute is also illustrated by the acquisition of prestigious European grants.

## **2. The Concept of IOCB for 2011–2020: basic mission**

***Mission:** To reach and maintain excellence in basic research in chemical biology, medicinal chemistry, and related scientific disciplines. To create and maintain an internationally visible institution comparable to other renowned European scientific workplaces. To become a sought-after training workplace for students of bachelor's, master's, and doctoral programmes at Czech and foreign universities. To create an inspiring, multicultural, friendly, and at the same time competitive environment for the professional growth of scientific employees and to cultivate the highest ethical and professional standards of work. To be an institute that cooperates, is open, and widely communicates with the public, media, and schools. To heed the practical implementation and commercialisation of the results of basic research and engage in mutually beneficial relations with the commercial sphere while maintaining absolute respect for academic freedom and emphasis on basic scholarly research.*

The main mission of IOCB is basic, scholarly research of chemical and biological processes on the molecular level. The main directions of this research are medicinal chemistry and chemical biology. Research is focused on the identification and characterisation of potential targets for therapeutic intervention in significant human and veterinary diseases. IOCB also focuses on the proposal, preparation, and testing of new ligands and inhibitors, the study of their metabolism, the mechanism of their effect, and the relationship between their structure and activity. Another main research interest of the institute is biologically orientated chemistry, including the study of the chemical character of natural materials and use of modified small molecules or biomacromolecules for the study or influence of biological processes, including the syntheses of artificial 'bioanalogue' model systems. Such research would be unthinkable without basic research

in the areas of organic synthesis and catalysis and without the development and cultivation of physical chemical and analytical methods of modern chemistry, structural biology, and computational and theoretical chemistry.

At the same time, the institute creates conditions for the academic freedom of research, because it is aware of the moveable nature of science and the impossibility of planning scientific discoveries. Individual team heads choose the topics for their work within chemistry, biology, and related fields according to their own judgement and intuition, and the management of the institute will not in any way intervene in this process. Institute leaders will select suitable scientific personalities through regular competitions and evaluations in cooperation with the International Advisory Board (see below). In the case of exceptional scientific figures, the institute will respect even scientific projects that do not conform to the scientific conception formulated above.

The institute endeavours for scientific excellence. Excellence is a complex notion that can indirectly be evaluated by regular publication in prestigious professional journals, high citation response, and visibility in the scientific community (invited lectures at important workplaces and conferences, significant awards). The institute will therefore perform annual assessments of the scientific results of individual teams using the scientometric method. Limited consequences will result from this assessments (e.g. increasing wages and resources for the most successful groups). Significant consequences, including terminating a group's existence, can be derived exclusively after a complex evaluation, which must include peer review and also consider the field specifics, trends, and importance of the group for the application or educational activity of the institute. Such an evaluation will be conducted every three (junior groups) or five years. Application of the scientific work (patents, licences, licensing incomes) and the training of students will also be components of the assessments. IOCB supports general cooperation with universities, including the founding of joint laboratories.

IOCB aims to maintain its international, multicultural, multidisciplinary environment, which it considers valuable. In the future, IOCB will maintain and develop international ties on all levels, with an emphasis on specific, generally beneficial scientific cooperation between teams. It will continue to support short-term and long-term stays by outstanding foreign scientists at the institute with an emphasis on long-term stays of post-doctoral students and 'visiting scientists' (IOCB postdoctoral, IOCB sabbatical). At the same time, it will attempt to remain a national hatchery of talents and actively invite promising young Czech scientists who have proved their abilities at foreign workplaces.

IOCB is completing its transformation into a compact and effective unit. The target size of the institute after completing the transformation should not exceed 500 full time employees, of which the majority should be in scientific and scientific-service teams. A key problem facing the scientific concept of IOCB is preserving the dynamics of development (the possibility of regularly providing opportunities for high-achieving young employees, e.g. those returning from exceptionally successful foreign residences, recipients of prestigious international grants, etc.) with the simultaneous maintenance of continuity (key methodologies, competence, and know-how), while preventing the overall size of the institute from growing beyond a financially and managerially controllable limit. The paths to the resolution of this dilemma lie in the preparation and observation of clear rules in the organisation of regular evaluations and competitions.

# **Mechanisms of the creation, dissolution, and functioning of scientific, scientific-service, and service groups at IOCB**

To achieve the goals mentioned above, it is necessary to define the mechanisms of the creation, evaluation, dissolution, and functioning of the individual teams: scientific, scientific-service, and service. These mechanisms have the aim of maintaining the balance between the stable functioning of the institute and the dynamic development of scientific topics. We propose that these mechanisms should be based on the following fundamentals:

## **Scientific teams**

IOCB oversees three categories of scientific teams: junior, senior, and Distinguished Chair teams.

There should be four to six *junior (starting) groups* at the institute, and their size should be around five employees (scientific employees + postdoctoral fellows + PhD students + technicians). The head of a junior group must be a young scientific employee (normally within ten years of completing the Ph.D.) with at least one year of postdoctoral experience at a foreign workplace, several very good scientific publications, and an excellent, innovative project. The junior teams obtain adequate space for this fixed number of employees and financial means for the purchase of investments and beginning the work of the group (start-up money). These teams will be evaluated three years after their creation with the possibility of an extension of financing for another two years. Then, they will be evaluated again and either shifted to the category of senior teams or cancelled. In the assessment of junior teams, it is necessary to expect a success rate that will allow the institute to maintain a financially and managerially controllable size. The target personnel limit of the institute should proceed from the future space possibilities after the completion of the current construction project (multiplied by a factor of e.g. 0.9), allowing the operative acceptance of new groups in exceptional cases (see below).

There should be 15 to 20 *senior teams*. Senior teams are created from successful junior teams (see above) or directly through competition. Only in exceptional cases (today, for instance, EMBO gold medal winners, recipients of ERC grants, or other scientific personalities who would significantly contribute to IOCB) can such a team be established by appointment of the director without a competition after the approval of the Council of Workplaces. Such a group then undergoes evaluation at the normal time. The size of the senior groups is usually 10 to 15 employees (scientific employees + postdoctoral fellows + PhD students + technicians). Scientific

personalities with excellent projects and outstanding scientific results, who either are or have the potential to become internationally recognised experts, must be their heads. These groups will be evaluated every five years (see below). In the case of a successful evaluation, their position is prolonged for another five years. In exceptional cases, highly successful senior teams could be raised to the category of ‘Distinguished Chair,’ meaning tenure without further evaluation.

The establishment of a ‘*Distinguished Chair*’ should be approached only in exceptional cases; there should normally be three of these teams at IOCB. These teams are established by the director of the institute at the proposal of the International Advisory Board or Evaluation Committee and after consultation with the Council of Workplaces. The heads are exceptionally important scientific personalities, who not only regularly publish in prestigious journals but set the trends in their fields and are highly recognised by the international scientific community. The size of such a team can be as much as roughly 20 employees.

In the individual categories, the same institutional resources are allocated at the creation of a team, and the head freely disposes of them according to his/her discretion, including setting employee wages. The team leader determines the salaries of the members of his/her team within the predetermined financial limit set by the institute and the legal measures and financial rules regulating the activity of institutes of Academy of Sciences. The financial limits are set in advance at the creation of the group and will be adjusted for inflation and according to the institute’s financial possibilities. These limits must be respected. Their increase in isolated cases must be approved by the Board of the Institute (Rada pracoviště) and must be publically reported. Other employees, financed by extra-budgetary means (special-purpose means, gifts, cooperation with industry etc.), could be accepted if the team has enough space to accommodate these additional employees.

***The creation and dissolution of teams and evaluation.*** The evaluation and competition system is the basic instrument of personnel changes and intra-institute dynamics. The management of the institute cooperates with the International Advisory Board (IAB) to select an evaluation commission and mediate the peer-review process with the evaluated groups. Large evaluations occur at five-year intervals, while junior teams are evaluated three years after their creation, at which point their position can be prolonged for another two years.

Immediately after the evaluation concludes, competitions are announced for the vacant team leader positions (usually junior team leader positions). Suitable candidates may be sought out and

addressed in advance. In every competition, the directions or fields in which new team leaders will work should be defined in advance by the Council of Workplaces after discussion with IAB. These directions or fields should support the scientific concept of the institute. Approximately half of the competitive team leader positions should be filled purposefully (according to previously selected issues or directions) and half without constraints (but still within the above defined focus of the research at the IOCB). The competition is open and international; it is governed by an international evaluation commission assembled by the management of the institute in cooperation with the International Advisory Board, and it includes visits to the institute by selected candidates.

Teams are dissolved when the leader leaves the institute or reaches the age limit for a team leader or at the recommendation of the evaluating commission during a regular evaluation. The age limit for the leader of a senior team is set at 65 years for men and women.\* When the leader reaches this age, the entire team is automatically dissolved. The dissolution of a group is understood as a reorganisation according to the Labour Code. The employees of the group receive a one-year interim period during which they can be offered employment in another group, transfer to another workplace, etc, depending on the possibilities available at the institute. Significant scientific personalities from these teams (not necessarily only team leaders) can be reassigned to the status of emeritus employee of the institute. Emeritus employees of the institute are offered conditions for theoretical work including relevant space and equipment for its performance (an office). An evaluation of a senior group scheduled to occur three or fewer years before the leader reaches the age limit may be cancelled. Following a successful evaluation up to eight years prior to the leader's reaching the age limit, the team's position may be prolonged until the leader reaches the age limit.

The age limit for the leader of a Distinguished Chair group is also 65 years of age.\* After reaching this age, the leader is reassigned to the category of 'Distinguished Emeritus' with the right to lead a team under roughly the same conditions (i.e. finance and size of space allotted) that apply for junior teams.

## Scientific-service and service teams

A **service team** is a professional working group that provides chemical or physical analyses and the preparation of compounds and whose operation is indispensable for the normal functioning of

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\* This age limit can change depending on the legal age of retirement.

at least three scientific teams of the institute. The operation of service teams is financed by the institute. A system of internal accounting will be created to regulate the performances of the service teams. Service teams will be regularly evaluated by the leaders of the scientific teams at IOCB and the Council of Workplaces.

A ***scientific-service team*** is a working group that conducts routine service duties (see above) but also has a scientific component, including its own scientific projects or professional cooperation in the scientific projects of other teams. Its scientific part is supported by the institute on the level of a junior group. The scientific part of a scientific-service team will be evaluated according to similar criteria as scientific teams; the service part will be evaluated by the Council of Workplaces and the leaders of scientific groups (as users) to ensure that the team is fulfilling its service function for the institute. In the case of failure in the evaluation (unlike the scientific teams), the scientific-service and service teams are not dissolved, but a competition is announced for a new leader.

The total number of current scientific-service and service teams will be critically evaluated regularly by the Board of the Institute and the scientific team leaders. The number of service teams does not have to be limited, but the total number of ‘service’ positions (more precisely the resources allotted for them) in scientific-service and service teams should be limited (i.e. after a careful analysis of the current state, a ‘*numerus clausus*’ will be set). This limit to the number of scientific-service teams and service teams leads to natural competition and discussion regarding the size and sense of the individual scientific-service and service teams.