

IPN-Metodika:

ÚOCHB - IOCB

Ústav organické chemie a biochemie
AVČR, v.v.i.:

A case study

Zkušenosti s hodnocením výzkumu v
dynamickém kompetitivním systému

31. ledna 2015

Zdeněk Hostomský

IOCB History



- Institute of Organic Chemistry and Biochemistry, The Czech Academy of Sciences, Prague
- The building was constructed between 1926 and 1929.
- A group of chemical enthusiasts around professor František Šorm moved in in 1951.
- The Institute established on January 1, 1953. Its name was changed to the Institute of Organic Chemistry of the Czechoslovak Academy of Sciences.



František Šorm
(28.2. 1913 - 18.11. 1980)

Institute Overview

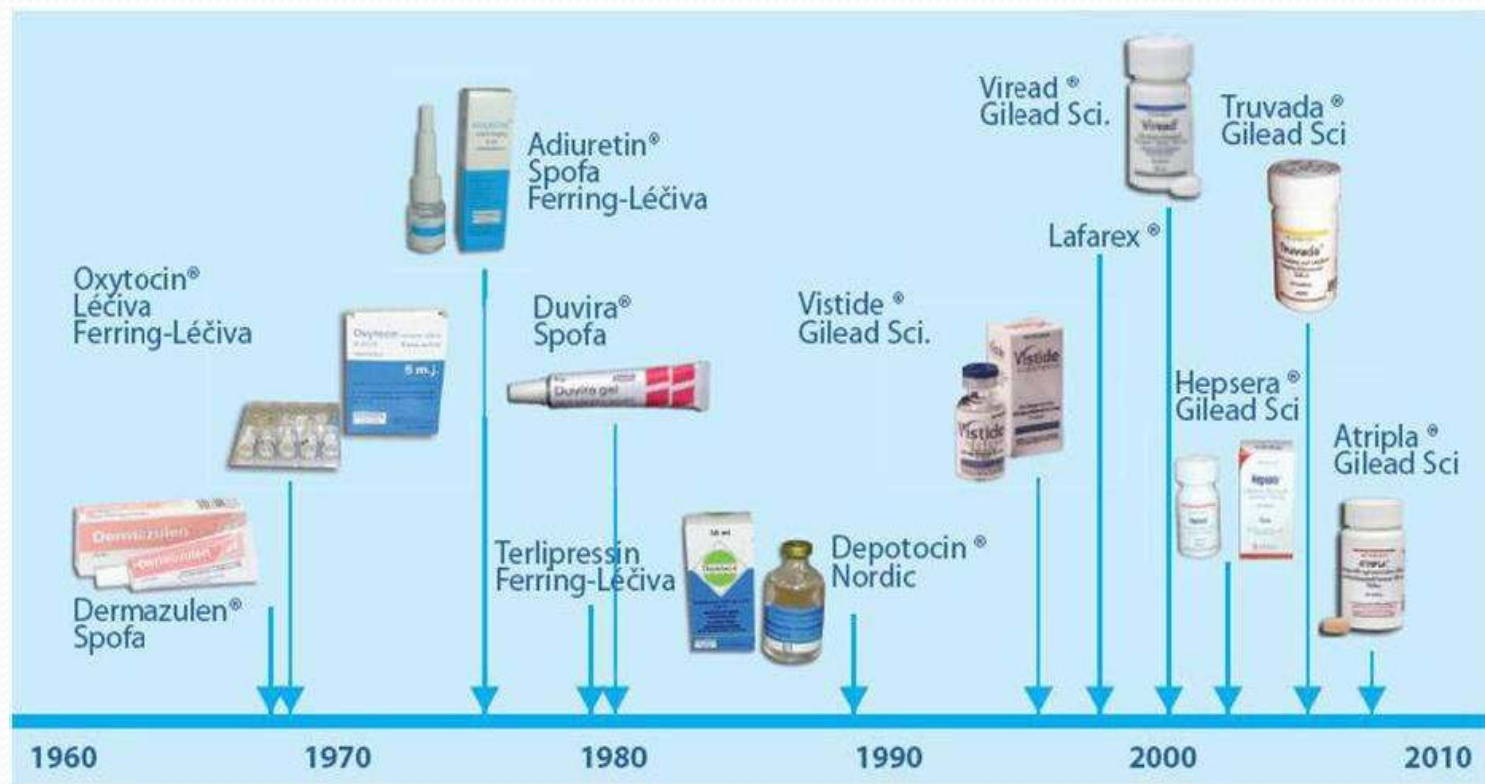


- IOCB is the largest chemical research institute in the Czech Republic (~580 people, ~470 FTE)
- The research has been focused from the beginning on organic chemistry, biochemistry, and biological disciplines and has been oriented toward the **medicinal chemistry, chemistry of natural products, synthetic methodology, and molecular modeling.**

IOCB licences



- This unique combination of different disciplines has enabled to bring scientific results that have ended in outstanding clinical applications
- The licence activity has been aimed at human and veterinary medicine and biotechnology



- The Institutional licences:
- **Desmopressin** (Adiuretin, derivate of vasopressin) - used for treatment of diabetes insipidus, enuresis nocturnal
- **Terlipressin** (Glypressin, derivate of vasopressin) - treatment of post-surgery states (peptic ulcers, liver cirrhosis)
- **Carbetocin** (derivate of oxytocin) - veterinary medicine
- Since 60th - licences for **animetabolites**

Nedávná historie



- ÚOCHB - tradiční hierarchická organizace: ředitel - oddělení - skupiny
- 2006 Vědecká rada a ředitel připravují nový systém - vytvořen International Advisory Board, první evaluace,
- 2007 – vytvoření v.v.i. (veřejná výzkumná instituce)
 - Flat structure: ředitel a skupiny; oddělení zrušena
 - 6 skupin zrušeno, zůstalo 18 seniorských skupin
 - otevřeny 4 nové juniorské skupiny

2012



- Pozměněný a doplněný International Advisory Board
- Nový ředitel
- Evaluace seniorských a juniorských skupin po pětiletém období
- Nové juniorské skupiny

International Advisory Board (IAB)



Dr. Alexander Wlodawer
Macromolecular Crystallography Lab.
National Cancer Institute,
Frederick, MD, USA



Prof. Dr. Karl-Heinz Altmann
ETH Zurich
Institute of Pharmaceutical Sciences
Switzerland



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Max-Planck-Institut für Chemische Ökologie
Jena, Germany



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Salt Lake City, UT, USA



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Universität Regensburg,
Germany



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Virology, University Hospital Heidelberg
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Department of Chemistry,
Atlanta, GA, USA



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Vienna University of Technology
Institute of Applied Synthetic Chemistry,
Austria



Prof. Barry V. L. Potter PhD
University of Bath
Department of Pharmacy and Pharmacology,
United Kingdom



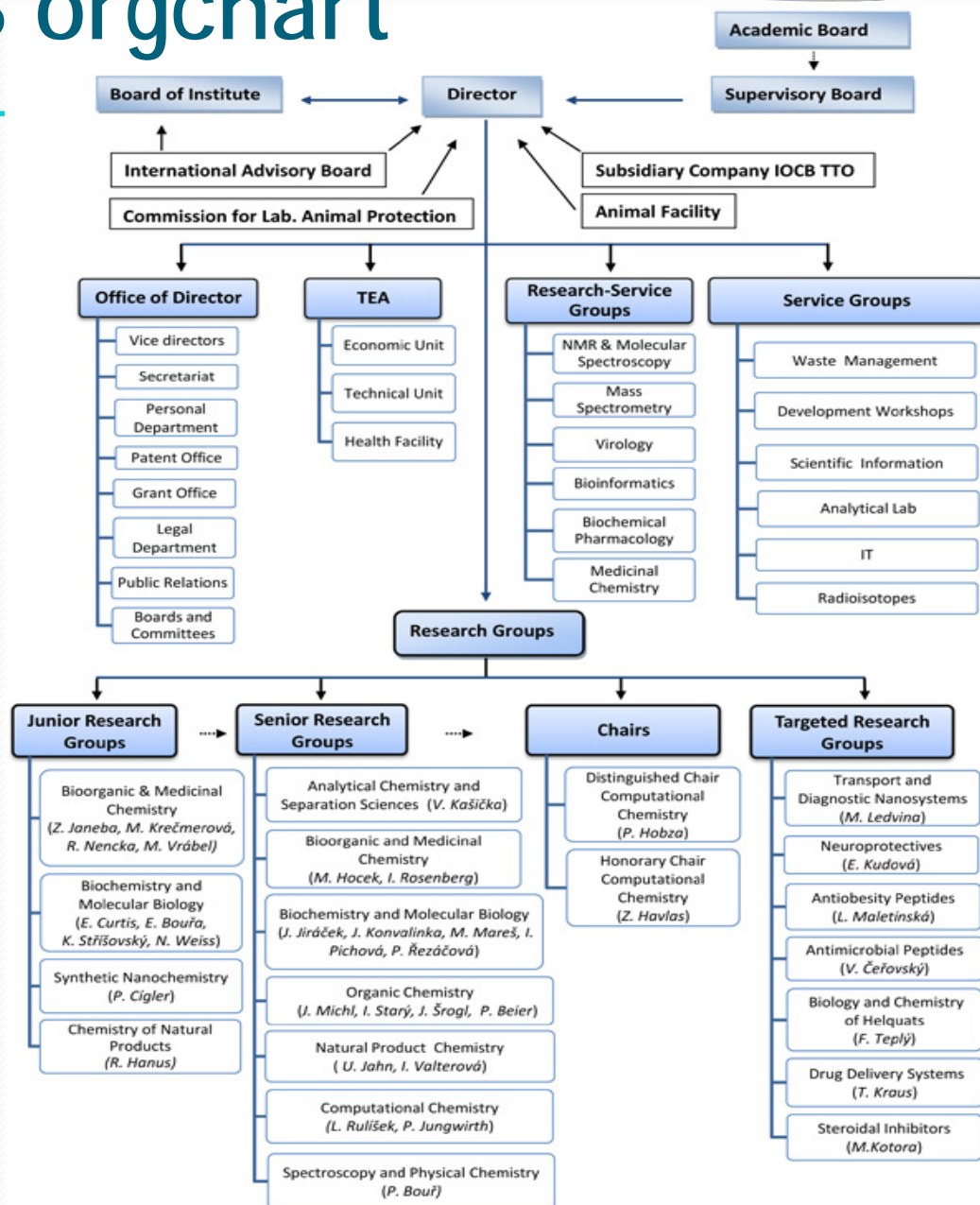
Prof. Dr. Helmut Schwarz
Technische Universität, Berlin
Department of Chemistry,
Germany

Vědecké skupiny



- Vědecká skupina (Research group) je základní organizační jednotkou ústavu
- 2 typy vědeckých skupin:
 - Juniorská (1-5 pracovníků)
 - Seniorská (5-20 pracovníků)
- Vědecká skupina je založena a definována vedoucím skupiny (Group Leader).
Odchodem vedoucího daná skupina končí.
Zodpovědnost za lidi.

IOCB orgchart



Seniorská vědecká skupina



- Hodnocení každých 5 let
(řešené projekty, seznam publikací, granty, prezentace, Q&A)
- Hodnotící stupnice:
 - 1 - Vynikající
 - 2 - Dobrý
 - 3 - Přijatelný
 - 4 - Nepřijatelný (a-opravitelný, b-neopravitelný)
- Zkušenost: *Je velmi obtížné získat 4b*

Juniorská vědecká skupina



- Program na 5 let (tenure track)
 - První hodnocení po 3 letech - možné varování, course correction
 - Závěrečné hodnocení po 5 letech
- Hodnotící stupnice:
 - 1 - Povýšit na seniorskou skupinu
 - 2 - Nepovýšit (skupina končí)
- Zkušenost: *IAB rovnoměrně uděluje obě doporučení. Juniorské skupiny jsou nejdynamičtější složkou systému.*

Hodnocení 2012



- Výsledky hodnocení IAB:
 - Jedna seniorská skupina ukončena
 - Dvě juniorské skupiny povýšeny do seniorského stavu
 - Další dvě nepovýšeny a přestaly existovat
- Skupiny cíleného výzkumu (internal spin-offs)

Junior Research Groups 2012



- **Kvido Strášovský** (MRC Lab MolBiol, Cambridge, UK)
Intramembrane proteases: recognition and catalysis in biological lipid membrane
- **Evžen Bouřa** (NIH Bethesda, MD, USA)
PI4 kinases - structure, function, inhibition
- **Petr Cígler** (IOCB; Scripps Research Institute, La Jolla, CA, USA)
Synthetic nanochemistry - nanodiamonds
- **Václav Veverka** (University of Leicester, UK)
NMR structural biology of peptide signaling molecules

Hodnocení vědecké produkce skupin



- Podstupuje se každoročně
- Interní proces
- Souvisí s rozdělováním peněz pro skupiny

Evaluation of scientific output



A component of group financing

- Group efficiency factor (GEF) quantitative aspect

$$\text{GEF} = \frac{\text{J+B+C+D+P+T+S+L}}{\text{IS}} \quad \begin{array}{l} \text{(Numerator)} \\ \text{(Institutional Salaries - Denominator)} \end{array}$$

J - journal articles x IF

B - books

C - book chapters

D - article in proceedings

P - awarded patents

T - verified technology

S - industrial prototype or software

L - income from licenses and IP

Group Efficiency Factor – GEF



Formerly Team efficiency factor TEF, „faktor výkonnosti týmu -FVT“

see Director's orders 3/2008 and 4/2011

GEF:

- Version A (excluding Group Leader's salary and over-limit components) *„ bez mzdy vedoucího a nadlimitních složek“*
- Version B (including Group Leader's salary and over-limit components) *„ včetně mzdy vedoucího a nadlimitních složek“*

Cumulative output for the 2011-2013 period will be normalized to the per year average (to be fair to groups who were here for less than 3 years).

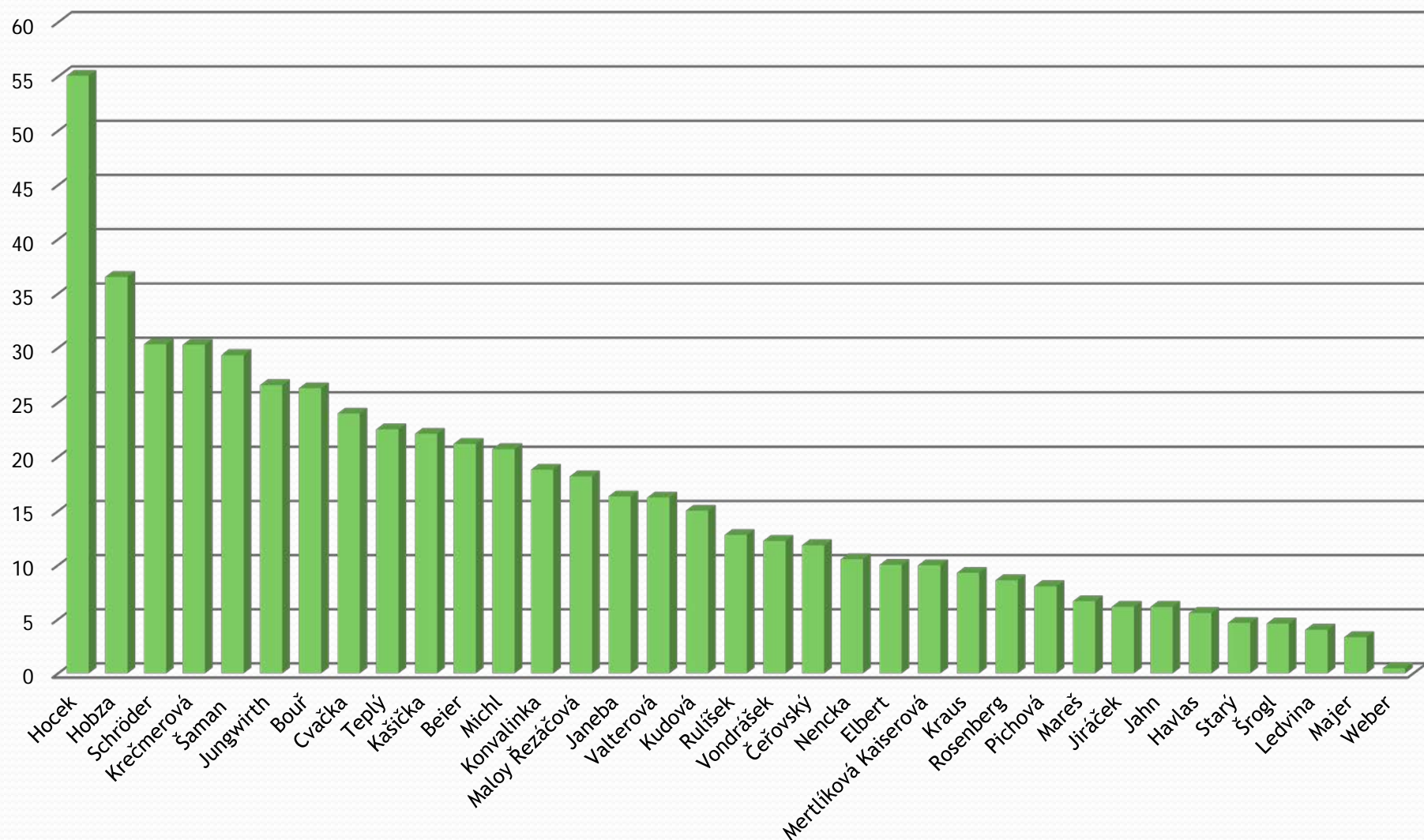
The numerator of the formula rather than GEF will be used as basis for distributing portion of the scientific output award money to the groups.

Group Efficiency Factor - version B

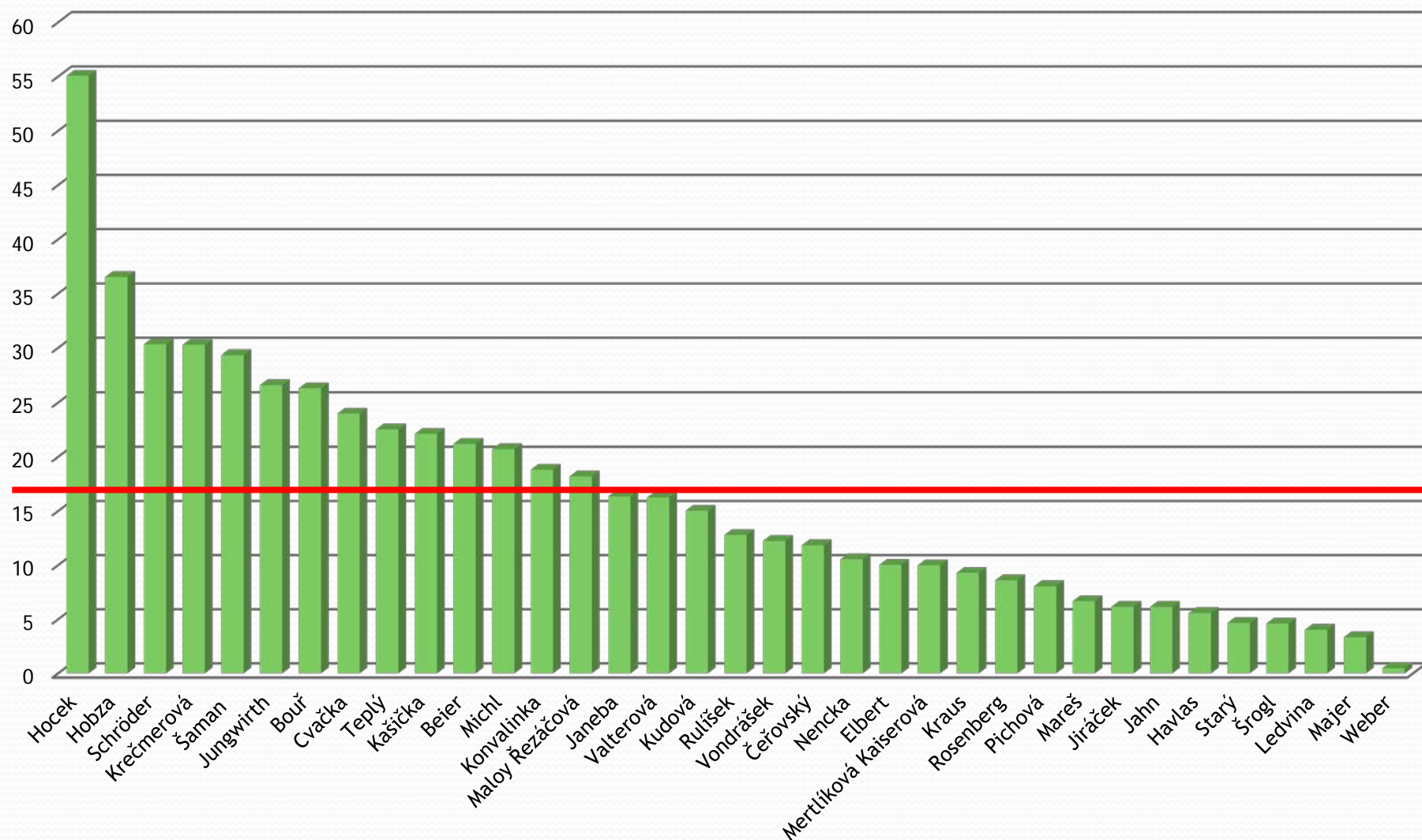
	Group	GEF		Group	GEF
1	Hocek	55,053	19	Vondrášek	12,228
2	Hobza	36,521	20	Čeřovský	11,821
3	Schröder	30,320	21	Nencka	10,524
4	Krečmerová	30,260	22	Elbert	10,009
5	Šaman	29,340	23	Mertlíková Kaiserová	9,980
6	Jungwirth	26,600	24	Kraus	9,265
7	Bouř	26,301	25	Rosenberg	8,591
8	Cvačka	23,976	26	Pichová	8,034
9	Teplý	22,519	27	Mareš	6,654
10	Kašička	22,106	28	Jiráček	6,134
11	Beier	21,183	29	Jahn	6,123
12	Michl	20,692	30	Havlas	5,562
13	Konvalinka	18,806	31	Starý	4,647
14	Maloy Řezáčová	18,177	32	Šrogl	4,581
15	Janeba	16,333	33	Ledvina	4,019
16	Valterová	16,224	34	Majer	3,322
17	Kudová	15,018	35	Weber	0,467
18	Rulíšek	12,770			



Group efficiency factor (GEF) - version B



Group efficiency factor (GEF) - version B



Group
Efficiency
Factor -

Numerator
only

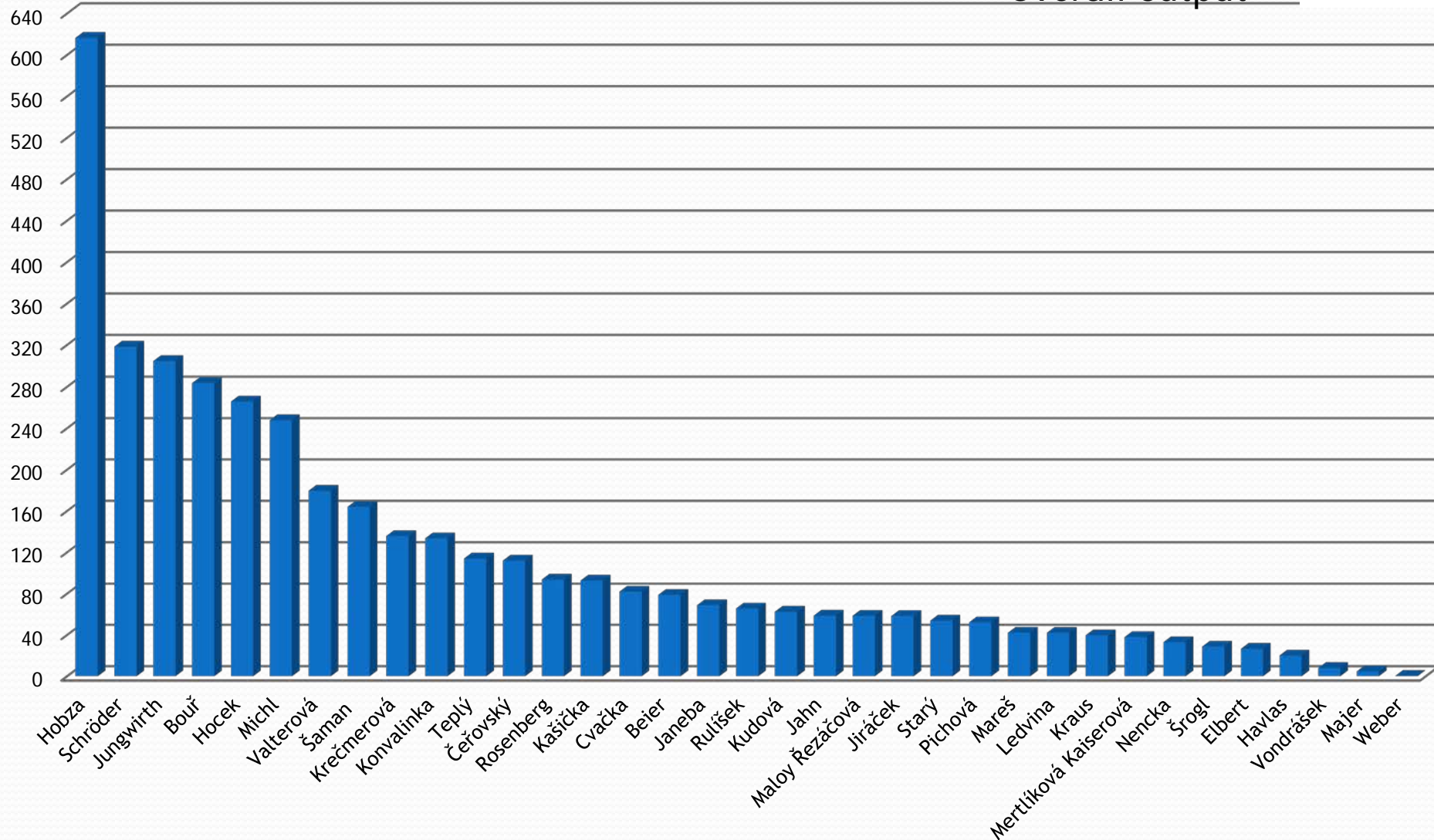
	Group	Numerator		Group	Numerator
1	Hobza	616,439	19	Kudová	62,416
2	Schröder	318,271	20	Jahn	58,600
3	Jungwirth	304,729	21	Maloy Řezáčová	58,439
4	Bouř	283,498	22	Jiráček	58,323
5	Hocek	265,633	23	Starý	53,767
6	Michl	247,719	24	Pichová	52,162
7	Valterová	179,497	25	Mareš	42,133
8	Šaman	163,862	26	Ledvina	42,004
9	Krečmerová	135,686	27	Kraus	39,646
10	Konvalinka	133,429	28	Mertlíková Kaiserová	37,854
11	Teplý	113,901	29	Nencka	32,939
12	Čeřovský	111,899	30	Šrogl	28,707
13	Rosenberg	93,499	31	Elbert	26,513
14	Kašička	92,581	32	Havlas	20,027
15	Cvačka	81,830	33	Vondrášek	7,875
16	Beier	78,736	34	Majer	4,677
17	Janeba	68,795	35	Weber	0,372
18	Rulíšek	65,499			



Group efficiency factor (GEF) - Numerator



Overall output



Evaluation of scientific output



A component of group financing

- Group efficiency factor (GEF) quantitative aspect

$$\text{GEF} = \frac{J+B+C+D+P+T+S+L}{\text{IS (Institutional Salaries)}}$$

Evaluation of scientific output



A component of group financing

- Group efficiency factor (GEF) quantitative aspect

$$\text{GEF} = \frac{J+B+C+D+P+T+S+L}{\text{IS (Institutional Salaries)}}$$

- Most significant publications qualitative aspect

Most significant publications



- Physical and Theoretical Chemistry
- Medicinal and Organic Chemistry
- Biochemistry and Molecular Biology
- Interdisciplinary (within IOCB)

Each team may submit 1 most significant paper published in 2012 for each category. The papers were judged by an external panel (IAB members, *ad hoc* reviewers), as well as by an internal IOCB panel (team leaders and management). Top 1/3 of the submitted papers in each category (listed in the following slides alphabetically by first author) will be awarded a prize in the form of operational team money.

Most significant publications



- Physical and Theoretical Chemistry

6 submissions → 2 awards

- Medicinal and Organic Chemistry

15 submissions → 5 awards

- Biochemistry and Molecular Biology

5 submissions → 2 awards

- Interdisciplinary (within IOCB)

12 submissions → ~~4~~ 5 awards

Physical and Theoretical Chemistry



- Prokop A, Vacek J, and Michl* J,

Friction in Carborane/Based Molecular Rotors Driven by Gas Flow or Electric Field: Classical Molecular Dynamics

ACS Nano 2012, 6 1901-1914

- Uhlig F, Marsalek O, and Jungwirth* P,

Unraveling the Complex Nature of the Hydrated Electron

J Phys Chem Lett 2012, 3, 3071-3075

Medicinal and Organic Chemistry part 1



- Hocková* D, Keough DT, Janeba Z, Wang T-H, de Jersey J, and Guddat LW,
Synthesis of Novel N-Branched Acyclic Nucleoside Phosphonates as Potent and Selective Inhibitors of Human, *Plasmodium falciparum* and *Plasmodium vivax* 6-Oxopurine Phosphoribosyltransferases

J Med Chem 2012, 55, 6209-6223

- Mládková J, Vaněk V, Buděšínský M, Elbert T, Demianová Z, Garrow TA, and Jiráček* J,
Double-Headed Sulfur-Linked Amino Acids as First Inhibitors for Betaine-Homocysteine S-Methyltransferase 2

J Med Chem 2012, 55, 6822-6831

Medicinal and Organic Chemistry part 2



- Raindlová V, Pohl R, and Hocek* M,

Synthesis of Aldehyde-Linked Nucleotides and DNA and Their Bioconjugations with Lysine and Peptides through Reductive Amination
Chem Eur J 2012, 18, 4080-4087

- Rejman* D, Panova N, Klener* P, Maswabi B, Pohl R, and Rosenberg* I,

N-Phosphonocarbonylpyrrolidine Derivatives of Guanine: A New Class of Bi-Substrate Inhibitors of Human Purine Nucleoside Phosphorylase
J Med Chem 2012, 55, 6822-6831

- Žádný J, Jančařík A, Andronova A, Šámal M, Vacek Chocholoušová* J, Vacek J, Pohl R, Šaman D, Císařová I, Stará* IG, and Starý* I,

A General Approach to Optically Pure [5]-, [6]-, and [7] Heterohelicenes
Angew Chem Int Ed 2012, 51, 5857-5861

Biochemistry and Molecular Biology



- Křížová I, Hadravová R, Štokrová J, Gunterová J, Doležal M, Ruml T, Rumlová M, and Pichová* I,

The G-Patch Domain of Mason-Pfizer Monkey Virus is a Part of Reverse Transcriptase

J Virol 2012, 86, 1988-1998

- Maletínská* L, Pýchová M, Holubová M, Blechová M, Demianová Z, Elbert T, and Železná B,

Characterization of New Stable Ghrelin Analogs with Prolonged Orexigenic Potency

J Pharmacol Exp Ther 2012, 340, 781-786

Interdisciplinary (within IOCB) part 1



- Grishina A, Stanchev S, Kumprecht L, Buděšínský M, Pojarová M, Dušek M, Rumlová M, Křížová I, Rulíšek L, and Kraus* T,

β-Cyclodextrin Duplexes That are Connected through Two Disulfide Bonds: Potent Hosts for the Complexation of Organic Molecules

Chem Eur J 2012, 18, 12292-12304

- Khobragade D, Mahamulkar SG, Pospíšil L, Císařová I, Rulíšek L, and Jahn* U,

Acceptor-Substituted Ferrocenium Salts as Strong, Single-Electron Oxidants: Synthesis, Electrochemistry, Theoretical Investigations, and Initial Synthetic Application

Chem Eur J 2012, 18, 12267-12277

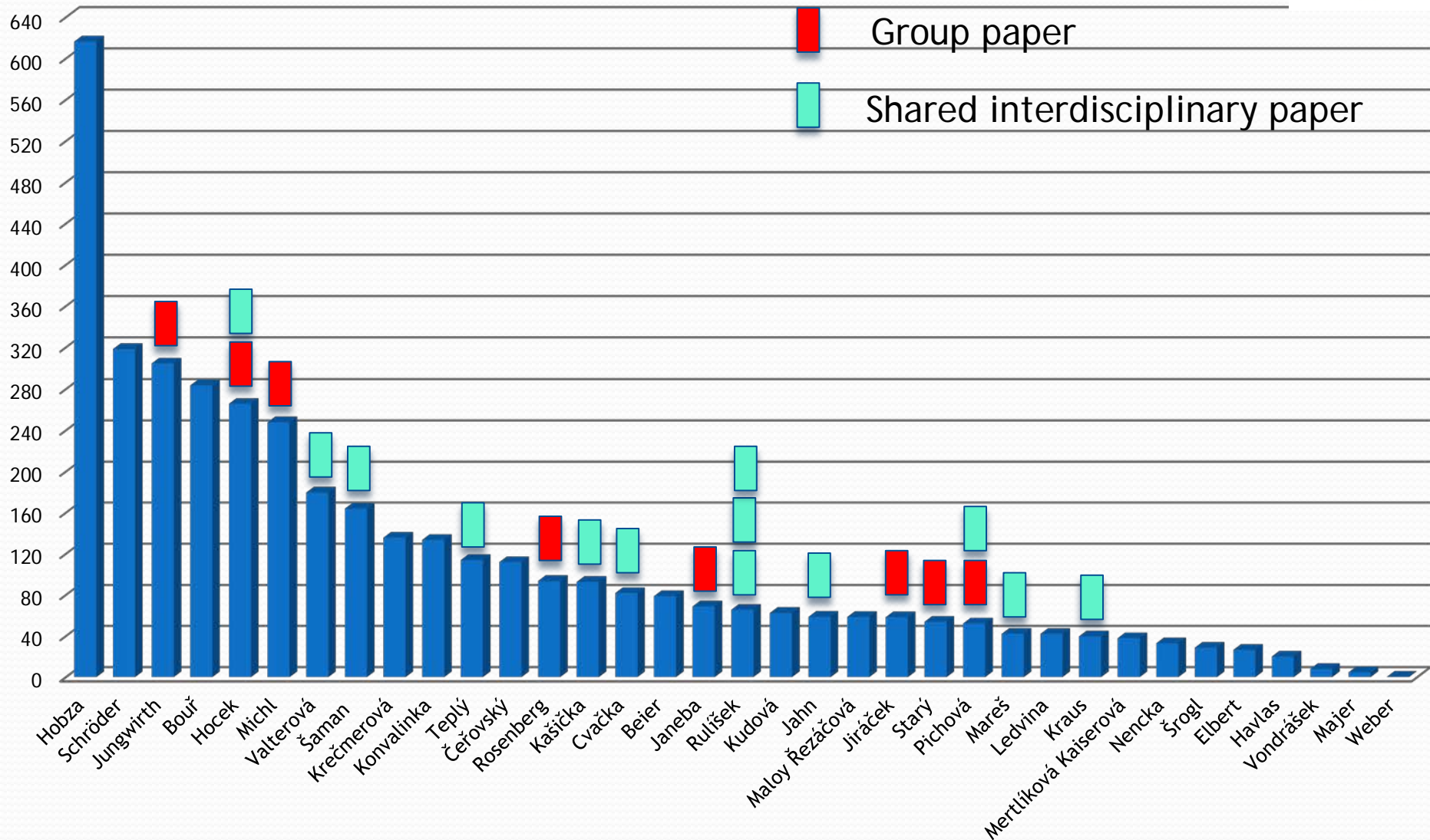
Interdisciplinary (within IOCB)

part 2



- Riedl J, Pohl R, Rulíšek L, and Hocek* M,
Synthesis and Photophysical Properties of Biaryl-Substituted Nucleos(t)ides. Polymerase Synthesis of DNA Probes Bearing Solvatochromic and pH-Sensitive Dual Fluorescent and ^{19}F NMR Labels
J Org Chem 2012, 77, 1026-1044
- Severa L, Ončák M, Koval D, Pohl R, Šaman D, Císařová I, Reyes-Gutiérrez PE, Sázelová P, Kašička V, Teplý* F, and Slavíček* P,
A Chiral Dicationic [8]Circulenoid: Photochemical Origin and Facile Thermal Conversion into a Helicene Congener
Angew Chem Int Ed 2012, 51, 11972-11976
- Šobotník J, Bourguignon T, Hanus* R, Demianová Z, Pytelková J, Mareš M, Foltynová P, Preisler P, Cvačka J, Krasulová J, and Roisin Y,
Explosive Backpacks in Old Termite Workers
Science 2012, 337, 436

Group efficiency factor (GEF) - Numerator vs. Most significant papers in 2012



Group Evaluation

Group	Award (CZK)	Numerator per Year	GEF (A)	GEF (B)	Group	Award (CZK)	Numerator per Year	GEF (A)	GEF (B)
Hobza	403 886	171,96	41,034	31,809	Pichová	49 041	20,88	13,882	8,575
Hocek	254 625	108,41	106,733	60,125	Jiráček	48 525	20,66	11,678	6,879
Jungwirth	254 037	108,16	52,537	30,421	Jahn	47 867	20,38	14,023	8,287
Bouř	220 075	93,7	43,489	29,261	Rosenberg	44 226	18,83	8,821	5,471
Michl	217 186	92,47	41,784	27,902	Majer	38 895	16,56	17,814	9,275
Šaman	131 646	56,05	42,337	29,811	Krečmerová	34 667	14,76	22,563	10,341
Valterová	122 627	52,21	19,16	13,604	Mareš	25 977	11,06	9,556	5,37
Rulíšek	82 323	35,05	52,497	20,501	Mertlíková Kaiserová	24 474	10,42	11,3	9,185
Janeba	78 518	33,43	89,554	26,548	Nencka	22 853	9,73	23,071	9,55
Konvalinka	67 455	28,72	17,211	11,169	Vondrášek	21 702	9,24	38,517	14,2
Kašička	62 030	26,41	35,452	19,593	Šrogl	12 331	5,25	6,168	3,084
Maloy Řezáčová	60 174	25,62	34,33	22,714	Weber	10 053	4,28	9,921	4,234
Beier	54 655	23,27	33,408	17,296	Havlas	7 164	3,05	3,508	2,186
Cvačka	53 081	22,6	26,733	18,191	Total	2 500 000			
Starý	49 910	21,25	7,424	5,162					

Kvantita vs. Kvalita



- Původně kvantita byla rozhodující
- Nyní, oba aspekty jsou odměněny stejně:
 - 2.5 M CZE rozděleno podle celkové produkce
 - 2.5 M CZE rozděleno za významné publikace
- Budoucnost - Sílící důraz na kvalitu

IOCB Strategic Objectives



- Basic Research with practical applications
- International character of IOCB
- Education

IOCB Strategic Objectives

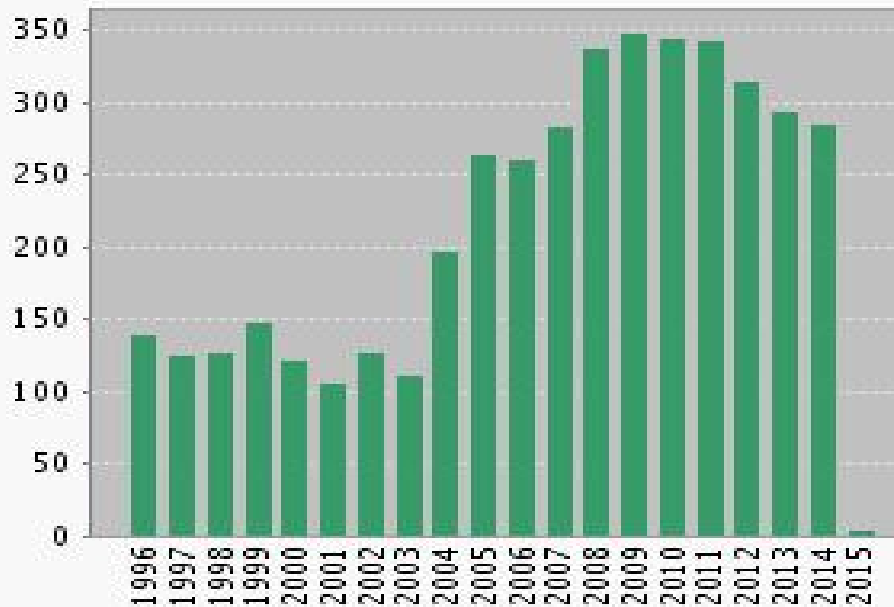


Objective 1:

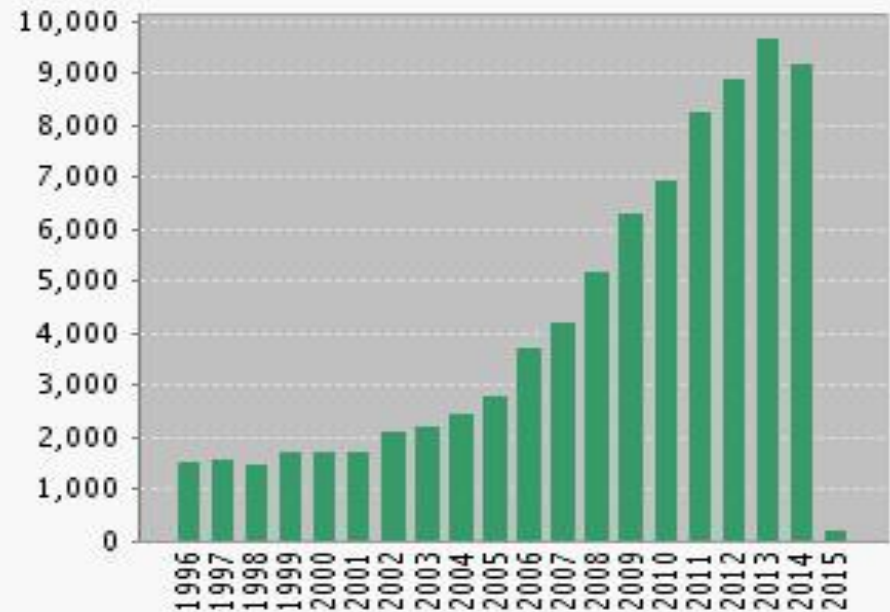
- Support high quality basic research combined with systematic exploration of opportunities for practical applications
 - IOCB TTO
 - Targeted Research groups
 - *Ad hoc* SWAT teams within Research groups
 - 9 projects so far

IOCB Publication Activity

Web of Science -papers



Web of Science – IOCB citations



Targeted Research Groups (TRGs)



Internal Spin-offs

Non-public money

- Transport and Diagnostic Nanosystems
- Neuroprotectives
- Antiobesity Peptides
- Antimicrobial Peptides
- Biology and Chemistry of Helquats
- Drug Delivery Systems
- Steroid inhibitors

Evaluation of TRGs



- Reflects differences in evaluation of **Basic Research** (publications, peer review) and **Applied Research** (hard deliverables)
- Evaluated every year by Director, head of TTO, invited *ad hoc* expert
- Maximum lifespan – 3 years
- Criterion of success – identification of a third party willing to pay for the outcome (IP, trade secret, compounds)

Jr. Group Leaders Recruitment



- Expanded search
 - Organic, Bioorganic, Medicinal Chemistry, Biochemistry and Molecular Biology
 - Interface
 - Collaborative potential
- Focus on scientific personality rather than a specialized discipline
- Received 43 applications



Institute of Organic Chemistry and Biochemistry
Academy of Sciences of the Czech Republic, Prague

IOCB AS CR



Interested in starting your own research group?

The Institute of Organic Chemistry and Biochemistry in Prague invites applications for the positions of **Junior Team Leaders** in the field of **modern Organic, Bioorganic, or Medicinal Chemistry, Biochemistry and Molecular Biology**. We are interested in strong creative scientific personalities who would thrive at the interface of these disciplines.

This tenure-track position is comparable to an Assistant Professor at a US university, or to a new investigator position at the Max Planck Institutes. IOCB aims to enhance its character as an international research center and applications from non-Czech scientists are encouraged.

THE INSTITUTE:

- Has history of 60 years of successful basic research in the organic chemistry, biochemistry, chemistry of natural products and theoretical chemistry, often translated into successful commercial assets
- Is located in an attractive historic city of Prague, capital of the Czech Republic
- Has multicultural environment, with English as the language used in most laboratories
- Enjoys unprecedented financial position which allows for freedom to choose and defend your own project and scientific direction

THE INSTITUTE OFFERS:

- The possibility to build a team (with a maximum of 5 co-workers) and begin one's own scientific career
- Help in submission of grant applications which, if successful, may enhance further the size and scope of the research group
- Fully equipped laboratory
- Generous startup financial package
- Competitive salaries of the leader and co-workers
- Support of the institutional services

THE INSTITUTE REQUIRES:

- Completed education on the Ph.D. level
- A minimum of 2 years of postdoctoral experience
- Ability to lead a research team
- A research program complementing the scientific focus of the institute (<http://www.uochb.cz>)
- An age usually below 35 years

Send your application in English along with CV, your proposal of a research program for 5 years (a maximum of 5 pages), and a full list of your publications including the number of citations according to WOS in an electronic form (pdf) to uochb@uochb.cas.cz by May 19, 2013. In the heading of the document, put **"Junior Team Leader"**. Two letters of recommendation from respected scientists should be sent directly to Dr. Iva Pichová at: pichova@uochb.cas.cz, who can also provide further information.



TIMING:

- Applications are to be submitted by May 19, 2013
- Interviews on June 17 – 18, 2013
- Expected start from January 1, 2014

Junior Group Leader Ad

- Ad posted on NatureJobs on Friday April 19, 2013
- PDF file sent to members of IAB for distribution
- IOCB Group Leaders asked to spread the news
- Deadline: May 19, 2013
- Interviews: June 17-19



New Junior Group Leaders 2014



Starting in 2014:

- **Robert Hanus** (IOCB, Prague)
Chemistry of Insect societies
- **Edward Curtis** (Harvard University)
Functional capabilities of artificial and naturally occurring RNA molecules (aptamers, ribozymes, etc.)
- **Norbert Weiss** (Hotchkiss Brain Inst - University of Calgary)
Physiopathology of T-type calcium channel in diabetic neuropathy

New Junior Group Leaders 2014



Cont:

- **Dmytro Yushchenko** (EMBL, Heidelberg)
Development of chemical tools for visualization and manipulation of biomolecular interactions in living cells
- **Josef Lazar** (Inst Nanobiol & Struct Biol. AS CR, Nove Hradý)
Development of advanced methods of optical microscopy for studies of protein structure and function in living organisms
- **Milan Vrábel** (Ludwig-Maximilians University, Munich)
New click chemistry for synthesis of modified bioconjugates



Age limit

- In the Concept of IOCB the age limit for group leaders is 65 years of age, after which the leader retires and the group is dissolved.
- I agree that this could be the default position, but there should be an opportunity for a reasonable exception.

Overcoming age limit



- Initiative and motivation from the group leader
- Evaluation of trend in scientific productivity of the group in the preceding 5 years.
- Need to impress and convince IAB (presentation and evaluation)

Options for IAB



- **A.** The leader and his group do excellent first-class science and closing them down at this stage would be a great loss to the world science and IOCB. We recommend continuation for additional 3-5 years.
- **B.** Although this group does a decent science, weighing the 2 scenarios:
 - a) keeping this group in existence even after reaching the age limit, versus
 - b) an opportunity to open one or two new junior groups and bringing new areas of science in its place,we believe the option b) is in the long-term interest of IOCB

Organizační vize ÚOCHB



- Dynamický kompetitivní systém
- Kontinuální příležitosti pro otevírání nových skupin
- Možnost důstojně ukončit činnost méně úspěšných skupin – meritokracie a transparentní pravidla