



Public Lecture Evaluation

Masaryk University

Faculty

Procedure field

Applicant

Lecture date

Lecture topic

Persons present

(number)

Designated evaluators

(board members)

Faculty of Science

Ecotoxicology

RNDr. Pavel Babica, Ph.D.

20.2.2018, 14:00 Lecture room RCX1 - University Campus
Bohunice, A29/252

Gap junctions – an evolutionary ancient cell phone being
rung by modern toxicology and pharmacology

51 (see attached list of attendees)

Prof. RNDr. Jana Klánová, Ph.D.

Prof. RNDr. Marie Stiborová, DrSc.

Prof. RNDr. Zdeněk Dvořák, Ph.D.

Public lecture by Pavel Babica presented broader scientific field and discussed in detail specifically topics of his independent research. The presentation included both key aspects in the field of ecotoxicology, i.e. assessment of hazards and its relationship to chemical exposures. The presentation also included future directions of the applicant research and short overview of his pedagogical experiences. The lecture has been recorded and broadcasted via YouTube channel (<https://www.youtube.com/watch?v=S6S7Pji2Sv8>) to allow for participation and detailed assessment by all members of the habilitation board.

In the first introductory part, Dr. Babica presented biological background and importance of cell-cell communication as an integral process assuring homeostasis in multicellular organisms. The importance of understanding mechanisms of chemical effects, i.e. toxicity vs eventual benefits (pharmacology) has been highlighted. The lecture presented in a logical way both evolutionary and ontogenetic aspects as well as molecular (patho)physiological consequences of cell-to-cell disruption. After providing broader framework, the main focus of the lecture was on gap junctional intercellular communication (GJIC), where the most current knowledge on its structure and functioning has been presented. Within the first part, specific examples of known adverse outcomes and diseases related to chemical disruption of GJIC have been presented.



Through the overview of available methodological approaches allowing to investigate ecotoxicological effects of chemicals on GJIC, Dr. Babica logically provided a bridge to the second part of the lecture, where the results of his own research have been presented.

The research part was structured into six sections that presented the importance of GJIC and recent advances in the use of relevant methods for the assessment of toxic and beneficial effects of chemicals. The sections included (i) characterizations of new chemical hazards by discussing biological effects of various congeners of PAHs, phthalates, PCBs, perfluorinated compounds, (ii) investigations of molecular and biochemical mechanisms beyond the observed biological GJIC responses, (iii) tissue-specific and species-specific GJIC responses discovered in various cellular in vitro models (rodents, humans), (iv) validation cases and examples of own in vivo research results, (v) implementation of GJIC assays in the assessment of chemopreventive and anticancer properties of pharmacologically interesting compounds, and (vi) own results of GJIC assays implementation into higher-throughput automated format.

The concluding part of the lecture provided consistent take-home-message, and outlined future directions in the development of methods (HTS implementation, moving towards 3D models), future ecotoxicological research (linking GJIC with other phenotypic endpoints like endocrine disruption, immunotoxicology) and pharmacology (projects investigating potencies of compounds isolated from various autotrophic as well as invertebrate organisms). The candidate also presented his track record and plans related to educational activities, i.e. mentoring of students, lecturing, working with undergraduate and secondary school students.

Within relevant sections of his presentation, Dr. Babica also addressed several specific points and questions raised in the written reports received from the reviewers of his habilitation thesis – prof. Mathieu Vinken, doc. Karel Šmejkal (attended the lecture in person) and prof. Jan Vondráček.

During the discussion, Dr. Babica responded in full to all raised questions from the participants. The specific questions (total 5 questions from 4 persons) addressed strong structure-specific effects of GJIC-active compounds, question on limitations and drawbacks of the used in vitro methods and the need of their in vivo validation, mechanistic explanations for differential effects of methylated PAHs on GJIC, detailed plans and available methods for the assessment of GJIC in 3D cultures, and issue of doses in toxicology and pharmacology - beneficial vs negative effects of investigated phytochemicals.

The content, form of presentation as well as duration of the habilitation lecture were appropriate to the broader expert audience. Lecture slides in PowerPoint were prepared with great care, were graphically consistent and sufficiently readable and presented the topic in an attractive form with sufficient level of detail.

Conclusion

The lecture by **Dr. Pavel Babica**, entitled “Gap junctions – an evolutionary ancient cell phone being rung by modern toxicology and pharmacology” delivered as a part of the habilitation appointment procedure, **demonstrated sufficient scholarly qualifications and pedagogical capabilities** expected of applicants participating in a habilitation procedure in the field of Ecotoxicology.

In Brno on 28.2.2018

Prof. RNDr. Jana Klánová, Ph.D.

Prof. RNDr. Marie Stiborová, DrSc.

Prof. RNDr. Zdeněk Dvořák, Ph.D.

