



Habilitation Thesis Reviewer's Report

Masaryk University	Faculty of Science
Faculty	Ecotoxicology
Procedure field	RNDr. Pavel Babica, Ph.D.
Applicant	Faculty of Science, centre RECETOX
Applicant's home unit, institution	Gap junctional intercellular communication: <i>in vitro</i> assessment of hazardous and beneficial effects of chemicals
Habilitation thesis	Prof. Mathieu Vincken, Ph.D., Pharm.D., E.R.T.
Reviewer	President of the European Society of Toxicology <i>In Vitro</i>
Reviewer's home unit, institution	Department of <i>In Vitro</i> Toxicology Vrije Universiteit Brussel Belgium

1. Text of the review

1.1. *Research project*

The submitted dissertation and associated research project is situated in the field of ecotoxicology. Specifically, focus is put on intercellular communication mediated by gap junctions as a marker for the detection of toxicity *in vitro*. This is a timely and very relevant topic. Indeed, in the last decade, the field of (eco)toxicology has witnessed a shift from traditional toxicology, based on measurement of apical endpoints in animals, to mechanistic toxicology, thereby increasingly addressing *in vitro* testing. The research of the candidate greatly fits in this paradigm shift. The thesis is well written, nicely presented and reads smoothly. The dissertation starts with a comprehensive theoretical introduction highlighting all concepts underpinning the research project. This part is outstanding and shows great knowledge of the current state-of-the-art of the areas concerned as well as in-depth insight into the current scientific literature. This equally holds true for the technical aspects of the thesis, in particular the assays to assess gap junctional intercellular communication. The candidate presents some prominent results of his research performed over the past few years, most of which has been embedded in research papers provided as attachments to the thesis.

Throughout his studies, the candidate has used appropriate methodologies and techniques, and has set up his experiments in such a way to unambiguously answer the central research question(s), including sound statistical design. All conclusions are fully supported by the results.

1.2. Candidate

The candidate has a background in ecotoxicology and has built up ample experience in this field over the past decade, thus perfectly matching the scope of the applied position. Importantly, he showed a high degree of international mobility, as evidenced by his visiting researcher fellowship in 2006-2010 at Michigan State University-USA. He attended several courses related to (eco)toxicology and has been in charge of a plethora of projects. He gave a number of lectures, some invited, during (inter)national conferences, among which some very prestigious ones (*e.g.* SOT-USA). This clearly shows international recognition. Moreover, he received several awards for his work. In addition to teaching activities, the candidate also has been, and still is, supervising a multitude of bachelor, master and doctoral dissertations. The scientific output of the candidate is very good, with 41 papers indexed on Web of Science, 3 book chapters, 5 papers in national journals, 3 vulgarizing papers, 1 guest edited special edition in an international journal and 1 utility patent. In summary, the candidate has an excellent track record that proves of all skills to successfully fulfil the applied position.

2. Reviewer's questions for the habilitation thesis defence

- The candidate used gap junctional intercellular communication as a read-out for toxicity, but what about the other connexin-based channels (hemichannels) and pannexin channels? Are the latter 2 channel types also eligible as *in vitro* biomarkers of toxicity?
- The candidate mainly focused on the testing of ecotoxicologically relevant substances *in vitro*. What about testing other types of chemicals, in particular cosmetic ingredients for which *in vitro* testing strategies are urgently needed given the current European legislation? Could gap junctional intercellular communication also serve as a marker of toxicity for this kind of chemical compounds?
- The candidate mentions the integration of *in vitro* assessment of gap junctional intercellular communication in the adverse outcome pathway framework. How exactly would the candidate tackle this?

- Is the candidate planning to apply for large European grants, either collaborative (social challenges program) or individual (European Research Council)? The reviewer strongly encourages such applications, especially given the excellent *Curriculum Vitae* of the candidate and the overall relevance of this research project.
- What is the research vision of the candidate and what are the research priorities that he will set in the upcoming years?

3. Conclusion

The habilitation thesis entitled “*Gap junctional intercellular communication: in vitro assessment of hazardous and beneficial effects of chemicals*” by Pavel Babica fulfils the requirements expected of a habilitation thesis in the field of ecotoxicology. The reviewer fully supports this application and strongly recommends granting the applied position to the candidate.

Brussels,

15 January 2018

Mathieu Vinken

