Evaluation report

Evaluated point	Grade	Comments
Scientific impact of research	Good	Site visit was on Wednesday May 17th 2017. The impression was based on the presentations, discussions with staff, a visit to the laboratories and the submitted self-report material. The reviewers have focused on the 2 biomedical groups: Laboratory of Bioenergetics and Laboratory of Environmental Toxicology. We had an opportunity to meet with senior and junior staff as well as with one PhD student. We also spent time individually with Dr Kaambre (Department Bioenergetics) and Dr Kahru (Laboratory of Environmental Toxicology) and had an opportunity to see their laboratories. Dr Kahru and Kaambre have educational backgrounds in biology. Dr Kaambre performs metabolism research specifically related to mitochondrial function and Dr. Kahru is active in ecotoxicology testing impact of chemicals and nanocompounds on living cells. Both researchers exhibit activity through publications in international journals; they supervise PhD students and post docs and they are being cited by the international community. Both groups publish in top-ranked international field journals. Dr Kahru's publication record is particularly impressive. The Kahru group consisists of 10 "researchers" with PhD degrees and 10 PhD students. We did not have a chance to meet younger researchers in the Karhu group but spoke to one PhD student in the Kaambre group. The Karhu group focuses on applied methods to estimate toxicology of newly invented materials using cell-and organism based test systems. There has been a stable rise in publication activity in Kahru group since 2005 with published volume in international journals of 5-10 papers every year in recent years: Dr Kahru has an H-index of 36 and is an increasingly active and cited researcher. Dr. Kaambre showed an extensive international collaboration particularly with Grenoble France, and Rochester Minnesota USA. Dr Kaambre has best papers cited 150 times and publishes yearly. Kahru's group has focus on testing in simple pro- and eukaryotic model systems the safety of modern nanocompounds. At one hand there is a societal and legal need/requirement for such testing, but on the other hand we did not identify any mechanistic hypothesis-driven research. Prof Kaambre appears to collaborate extensively with University of Tartu, with Tallinn Technical University, with Hospitals in Estonia and with a small start-up

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		company; all collaboration with institutions other than NICBP where only resonance spectroscopy was mentioned as a mutual beneficial technique. Both group leaders are of high scientific standard. The activity and the topics of their activities are of significance seen from the high number of citations of their work. With a staff of 5-6 PhD students the educational aspects are fulfilled. With the little interaction within the institute and the somewhat poor physical infrastructure and limited grant income, the two groups are doing quite well with the available tools and thus research impact is evaluated as good.
Sustainability and potential of research	Satisfactory	The biophysical/life science arm of the institute is small relatively and absolutely (low critical mass). The group size of all employed in the biomedical groups has expanded to 34 (self-report) with a young median age and predominance of women, thus quite a substantial volume to two research groups. The biomedical groups have only very limited collaboration with the physical arm of the institute. Dr Kaambre reports a single collaborative arm of purely technical nature. Both Dr Kaambre and Dr Kahru lead research teams that have strengths in different areas. Both appear to be working in isolation as a peripheral part of an Institute of Chemical Physics and Biophysics. The two lifescience groups appear not to benefit from each other in research area, scientific questions and in technical equipment applied. Research teams obtain external grants with Dr Kahru participating in European framework programs, COST projects and inter-regional projects and Dr Kaambre participated in a COST network. Most support is from national programs and from Estonian Science Foundation. Physical surroundings are partly in poor shape, this is also reported by the group leaders in their self-report. Association with other groups was not evident, there were long distances to walk and the research areas and office spaces were all behind closed doors with poor visibility and little possibility for spontaneous interaction. Thus surroundings did not promote free and open exchange of ideas. We visited the department around 6 pm where there were very few people. Some equipment appeared older and outdated. Rooms were renovated 10 years ago but several rooms appeared not to be in use. Furniture was partially old and worn out. 3 rooms for research were being renovated in the basement

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		(self-evaluation). We got the impression that the funding situation was unclear beyond the next years. Neither research group in their field of science relies on the resource-intensive facilities that are required for physics research and thus appear misplaced. Both are working in partially outdated laboratories, yet are producing high-impact publications. Dr Kahru's publications seem to arise from work completed within the Institute by her and her research team, while Dr Kaambre's work relies more on international collaborations. Dr Kahru is the only expert in this field in Estonia, which raises concerns about the sustainability of this work. Forward planning is required to ensure that this expertise is not lost. We must conclude that while potential of research is considered good with active and productive research group leaders the sustainability of research is poor in this environment under the present conditions with no synergies or mutual fields and poor technical supply. The sustainability of research is judged closed to not satisfactory: that is not in itself necessarily a criticism of the work being done, but there is a need for a clear strategic plan to shape future directions.
Societal importance of research	Very good	Environmental pollution is an area of increasing concern for many and the ability to identify and quantify the presence of toxins in the environment is ever more important in today's industrial and post-industrial landscape. There is a societal need for high quality toxicology/environmental-life science research beyond just materials, including e.g. industrial herbicides/insecticides in farming/drinking water, industrial chemicals in food industry, etc. Therefore, findings and observations have potentially immediate impact on legislation and consumer behaviour. The current legislation has not defined the screening systems that should be applied to analyse toxic effects of nanoparticles/compounds and therefore what at first glance perhaps appears as outdated techniques are highly relevant as first approaches in order to elucidate a set of valid marker systems. This kind of research is performed only (allegedly) by prof Kahru. Since Estonia needs toxicological expertise and a site for education within this field, there should be an obvious interest in supporting high level research within the area. The Kahru work is highly cited and clearly has global reach. The ability to monitor the presence and impact of these agents is crucial. Dr Kaambre's research is fitted best into basic

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		research within cell metabolism with special emphasis on malignant cells. Societal impact of research is very good.
Scientific basis in the field is sufficient to conduct doctoral studies. (This question should be answered only if: a) institution being evaluated is conducting doctoral studies and; b) The field being evaluated is proposed to grant positive evaluation. If these conditions are met then: a) If the level of scientific basis is sufficient for conducting doctoral studies in every structural unit being evaluated, then the answer should be „yes“; b) If the scientific basis is not sufficient in some structural units, then those units should be listed.)		The Kaambre laboratory fostered 3 defended PhD degrees in the reported period. We met a PhD student in his 5th year. Reviewers note this prolonged PhD study period (that was not unique to NICPB) way beyond the period foreseen by legislation and way beyond comparable countries. It appears not to help PhD students move on with their academic career and it also does not appear to promote the quality of PhD-derived publications. This remark relates not only to this particular group but is a general remark. We had limited opportunities to meet with doctoral students but both research teams include junior staff and doctoral students. Students are exposed to productive environments where publication of high-impact papers is valued, but the working conditions are far from ideal. From our limited interaction with the PhD student community it seems that completion time is slow and there was little obvious sense of urgency. It should be noted that the NICPB is not allowed to issue doctoral degrees and PhD projects require a co-supervisor from the University and as such the Institute acts as an independent entity. The biomedical groups at NICPB appear to have the critical mass and scientific quality to guarantee independent doctoral studies and issuing. Such endeavours would clearly benefit from integration into more biological/environmental/cell biology environments.

Summary assessment

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Areas of special note as appropriate (Where necessary indicate sub-fields, assessment criteria, and/or structural units which, in the committee's opinion, were of a notably high level.)		The high level research within the area of ecotoxicology is an asset for Estonia and should be supported. The Kahru work is highly cited and clearly has global reach.
Areas in need of improvement as appropriate (Where necessary indicate sub-fields of the field being evaluated, assessment criteria, and/or structural units which, in the committee's opinion, revealed significant shortcomings.)		The groups would benefit from integration into more biological/environmental/cell biology environments Both might benefit from the improved synergies and opportunities for collaboration that would occur naturally in a biological sciences environment or a public health environment (Kahru group). In light of the expressed concern for the long term viability of the Institute, these two groups would greatly benefit from being embedded in a more biological research environment.
Assessment proposal to the Minister of Education and Research	To grant positive evaluation	The committee emphasizes that although the sustainability of research is judged close to not satisfactory, this is not in itself necessarily a criticism of the work being done, but there is a need for a clear strategic plan to shape future directions.

Feedback

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Feedback for institution (This question should be answered only if the institution asked for feedback from the evaluation committee in the self-report (about up to three specific areas of R&D which it finds to be currently important, e.g., related to its development plan).)	Our comments to the Institute's question about its research is solely based on grant funding is the following: In the absence of massive competitive funds in Estonia, a research economy solely based on ad hoc grant funding will sooner or later result in collapse of the research groups due to lack of resources, for which reason it is better to find new homes for these.
Suggestions for unit, institution, state etc. (As appropriate, committee can give additional feedback for the structural unit, the institution, or the State (please specify whom feedback is directed to) according to the directive assessment criteria for regular evaluation (article 7).	We repeat the statement from above: The groups would benefit from integration into more biological/environmental/cell biology environments Both might benefit from the improved synergies and opportunities for collaboration that would occur naturally in a biological sciences environment or a public health environment (Kahru group). In light of the expressed concern for the long term viability of the Institute, these two groups would greatly benefit from being embedded in a more biological research environment.