

## Evaluation report

Evaluated point	Grade	Comments
Scientific impact of research	Very good	<p>We visited the University of Tartu - Faculty of Medicine on Thursday May 18th 2017. The Faculty has a large and stable staff (850 in total) and is a substantial component of the University. We met with Prof. Andres Metspalu from the Estonian Genome Center (EGC) and visited the Institution. We met Senior Researcher Viljar Jaks, the chair of the Institute for Molecular and Cell Biology (IMCB). We went to the “Biomedicum” building that houses the 6 institutes involved in teaching and training MD students during the bachelor part of their studies. The meeting was organized with the Dean, Prof. Margus Lember. Present was also the heads of Institutes from: Dentistry, Sports, Nursing; Pharmacology and Physiology, Clinical and the Translational Medicine. We did not have a chance to visit any university hospitals to get an impression of research infrastructure. We had limited debate with all the representatives and we had no chance to get information from several areas.</p> <p>The institute had an extraordinary good working atmosphere with no barriers between laboratories and Centres. The genome centre has very modern and optimal facilities. All younger researchers had been in foreign leading labs. The publication record of the Estonian Genome Center is truly impressive: this is a genuine world-leading centre that should serve as an example to others in the University of what can be achieved.</p> <p>The Institute for Molecular and Cell Biology had 130 employees and a budget of 5 Mio EUR of which 1/3 is grants with 14 professors in 9 separate laboratories. The student population consisted of ~150 bachelor students; ~70 MSc students and ~80 PhD students. Scientific output was about 100 publications annually of which many are in high impact journals.</p> <p>We met representatives from all departments and visited two of the laboratories, Pharmacology and Pharmacy, both equipped with the most modern analytical instruments. We saw the animal facility from 2014. This is a truly world-class animal house facility with an impressive manager (Dr Mario Plaas). It has in-built future to cover both the faculty’s need as well as tasks from external requirents (i.e. industries).</p> <p>Given the high investment that has resulted in truly world-class facilities, there is an obvious potential for substantial improvement in the publication record. The picture, however, is uneven, with some outstanding individuals producing high impact research. This is particularly true of the Estonian Genome Centre, The research output from The Institute for Molecular and Cell Biology was lower – about</p>

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		<p>100 papers annually from about 80 academic staff and 70 PhD students.</p> <p>In summary, impact of science at the Faculty of Medicine is difficult to judge across the 6 institutes and 3 attached institutions but it is clear that several groups and researchers publish in the best international journals and receive high citation indexed and thus we conclude that impact is very good.</p>
Sustainability and potential of research	Good	<p>The core business of the Faculty of Medicine is the education of medical doctors. This will continue as there is no other opportunity for medical training in Estonia. The number of places is fixed at 200 per year (with 436 students in total at all curricula) and will not decline. The Estonian Genome Center, as we understand, will soon be fully integrated into the Faculty of Medicine.</p> <p>The Faculty's R&amp;D funding increased steadily over the period 2010-2015, with an impressive growth in income of about 50% over the first two years of this period (derived primarily from EU Structural funds), but with no growth between 2012 and 2015. Total publications over this period declined though the number indicated as being of high level increased slightly. The output per member of staff was not high, being about 1.3 per member of academic staff.</p> <p>An interesting area that we heard virtually nothing from (although being presented as a cornerstone), was clinical research activities and output from the hospitals (the self-evaluation reported 3.5 publication per year per FTE, 300 publication in total in 2016; focused research areas). The research is organized within a clinical institute. We would have liked to see the productivity in science here. We understand that the incentive to become a medical PhD and qualify for positions in hospitals is virtually non-existent. This is partially because there is lack of MDs in Estonia. Some physicians choose to leave especially to work in Finland, so positions are not hard to get. Since PhD study time is 6 years and salary is not competitive this is a huge challenge to be met in order to promote all types of clinical studies.</p> <p>The major question remains: can the present activity level be maintained, and can it even be increased to the level of productivity per member of academic staff that would be expected? All researchers expressed their concerns about future funding. The last two decades of investment in infrastructure and equipment have allowed the scientists to build up a solid research base of steadily increasing quality and international collaboration. The major drawback is that the uncertainty about future funding holds back new risk-taking initiatives, because the researchers want to consolidate</p>

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		<p>their position. This uncertainty also discourages researchers from taking a long-term strategic view of research directions. The two centres of excellence will in a time period of two years be fully incorporated in the university structure. The larger critical mass thereby obtained together with the teaching obligations should thus ensure sustainability.</p> <p>With the threats of insecure funding, lack of MD incentive to become PhD, too few PhD students, delayed and protracted PhD and Master periods and unclear clinical research performance, but with excellent infrastructure and many eager young and highly qualified researchers, we conclude that sustainability is good.</p>
Societal importance of research	Good	<p>Research in the medical and biomedical field has the potential for substantial societal impact. The work of the Estonian Genome Center will undoubtedly lead to advances in our understanding of disease mechanisms which is a precursor to the identification of effective treatments. The Genome Center does frontline research in genome-wide association studies in a wide range of diseases with recent emphasis on psychiatry. The Genome Centre had a budget of 4 mio EUR. It has 5 EU grants and also some grants from industries. Scientific output is 80 papers annually in high to very high impact journals. Education of PhD students is part of the current responsibilities.</p> <p>Translation of basic research into clinical practice takes time but the presence in the Faculty of an Institute whose primary remit is translational medicine augurs well. The exercise sciences are important because of the fundamental research that is carried out but also because of the work on physical activity and other factors that influence health and wellness. It is good that this Institute is now embedded in the Faculty of Medicine where it belongs, and this should allow greater opportunities for collaborative research on the influence of lifestyle and environmental factors on health outcomes. In particular, the work on children and on the elderly is particularly relevant in today's society.</p> <p>The focus on translational science ensures that patients benefit from basic research that is carried out, but it seems that the last step leading to commercial outcome is lacking behind. Also the detailed construction and collaborative initiatives behind the translational centre were not clear to us. There was a lack of comments from the clinical MDs at the meeting and we heard nothing of split positions (clinical/theoretical). We must conclude that at present this is more a possibility than an established platform.</p> <p>In conclusion, the university/ faculty should be proactive and take action e.g. regarding patenting and entrepreneurship and exploit the obvious good translational initiative.</p>

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<p>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.)</p>		<p>We had a lively discussion with 6 PhD students. The PhD students represented diverse scientific areas and at different stages of completion. It was pleasing to see that one student was on track for completion within four years, showing that this can be achieved. They were all satisfied with the working conditions. Working conditions for the PhD students did appear to be excellent with respect to scientific freedom to influence their own projects and get access to needed instrumentations. The relatively short distances to Helsinki and Stockholm make possible collaboration even with a limited budget. Overseas research visits demand special grant funding and can be challenging. We learned that many researchers had returned from foreign labs to the good facilities at Genome centre and Faculty of Medicine. However, they felt that international collaboration was hampered by financial restrictions. They also expressed their concern for their possibilities to pursue an academic career. We heard little about exercise science, physiotherapy, dentistry, pharmacy and some other activities of the Faculty, though the written submission contains evidence of activity in at least some of these other areas. The level and quality of the research conducted by staff secure the quality of conducted supervision and we heard very little about supervision and projects in the clinical sciences.</p> <p>The overall picture was less happy, though, with completion being slow, as highlighted above. It may be unfair to single out the Institute of Molecular and Cell Biology, but this is the data that we have. Completion rates for graduate students are a concern: from 70 MSc students, there are only 30-40 thesis defences annually and from 80 PhD students there are only 6-13 defences annually. While appreciating some of the reasons for this (maternity breaks, part time work, etc.) there is nevertheless a need to address the long MSc and PhD completion times. Completion within the allotted time should be the norm rather than the exception. Students generally thought that they were provided with a supportive environment in terms of mentorship and access to capital equipment, but some concerns were expressed about funding for running costs. Students were also less sanguine about future employment prospects and research opportunities.</p>

## Summary assessment

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<p>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.)</p>		<p>The staff at the faculty represents a mix of profession-educated researchers (M.D.'s, dentists and pharmacists) and scientists coming from natural science and engineering. The dean emphasized that this balance would be maintained. The geographical dispersion of these activities within the faculty must be a concern, but the research infrastructure is, thanks largely to EU funding, as good as that anywhere in Europe. The research platforms we observed therefore present a tremendous environment for research productivity, and the obstacle to further increase research productivity seems not to be the availability of capital equipment. Laboratories are generally much better equipped than those in many other parts of Europe.</p>
<p>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.)</p>		<p>PhD completion times are long and this is a serious concern: the PhD and Post-Doc community should be the engine that drives research output. If it is not running at proper speed, the research community will not prosper. Research output will be low and graduates will not be well placed to find employment because of their poor track record. Too few MD PhD students.</p>
<p>Assessment proposal to the Minister of Education and Research</p>	<p>To grant positive evaluation</p>	<p>See other fields</p>

## Feedback

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<p>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&amp;D which it finds to be currently important, e.g., related to its development plan).)</p>	<ul style="list-style-type: none"> <li>• Be proactive and exploit the translational institute. Establish split MD/research positions. Promote clinical science.</li> <li>• Regarding the proportion of tenured/non-tenured staff it depends on the disciplines and type of work (e.g. if it is theoretical and experimental). In general there should be sufficient tenured staff to secure core business and succession planning. For groups working experimentally the ratio could be in the range of 1/10 to 1/6.</li> <li>• Regarding realization of each researcher's potential for creativity: If this means innovation and entrepreneurship we suggest that the present rules for ownership of patents is re-evaluated i.e. Inventor vs. university and the proportion which the inventor owns.</li> <li>• Further to facilitate the process, so the researcher does not stand alone with all the patenting aspects possibilities for assistance should be present. PhD students should join courses in entrepreneurship so they at least know the rules and possibilities for help.</li> <li>• We suggest it as essential to reconsider the PhD legislation in order to promote MDs to obtain PhDs and thereby promote clinical research in Estonia. Salary should be increased and the "3 paper" rule should be abandoned for a more flexible PhD requirement.</li> </ul>
<p>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).</p>	<p>There was a plenary session with all deans, Rector and Vice-Rector who presented a University Mission and Vision and its strengths and challenges. We learned that the Faculty of Medicine is the 2nd largest in the University, it has the lowest number of students (1906 in 2016 with admission of 200 in medicine and a total of 436 to Faculty of Medicine per academic year), it has the lowest number of PhD graduates with 11 in 2016, and it has the lowest percentage of PhD students with 225 in 2016. We learned that student enrolment has declined by 25% in years 2010-16 mirrored in a 7% decline in employees at TU. Despite this, teaching income is stable. Around 8% of students at TU come from abroad. There was a possibility to pose questions but no debate or discussion. Decline in student numbers is considered a major threat, too long completions times for graduate and PhD students, and too few MD PhD students and a weak to absent clinical research was presented to us.</p>

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	<p><b>STRENGTHS</b></p> <p>The staff at the faculty represents a mix of profession educated researchers (M.D.'s, dentists and pharmacists) and scientist coming from natural science and engineering. The dean emphasized that this balance would be maintained. The geographical dispersion of these activities within the faculty must be a concern, but the research infrastructure is, thanks largely to EU funding, as good as that anywhere in Europe. The research platforms we observed therefore present a tremendous environment for research productivity, and the obstacle to further increase research productivity seems not to be the availability of capital equipment. Laboratories are generally much better equipped than those in many other parts of Europe.</p> <p><b>WEAKNESSES</b></p> <p>PhD completion times are long and this is a serious concern: the PhD and Post-Doc community should be the engine that drives research output. If it is not running at proper speed, the research community will not prosper. Research output will be low and graduates will not be well placed to find employment because of their poor track record.</p>