Evaluation report Master's Programme in Biomedicine, Uppsala University, 2021

Date: 8 December 2021

Mission and work process

The assessment panel was appointed on February 4, 2021 and we received information about the evaluation process on May 7. The assessment is based primarily on the programme self-evaluation report (received on June 30) and on interviews (management, teachers, students, and alumni) and a tour of the localities at Uppsala Biomedical Centre (BMC) conducted during a site visit in Uppsala (September 27–29, 2021). Several additional documents were also provided, *i.e.*, programme syllabus, programme information folder, course report working process, course report template, professional training schedule Autumn 2020, courses in English by the language workshop, thesis instructions and evaluation forms, goal attainment matrix, programme survey, alumni questionnaire, employer questionnaire, and application summary sheet.

The assessment panel thanks for being entrusted with the task of carrying out this review and we hereby submit our report.

Members of the assessment panel

Brita Svensson, ordförande, Uppsala universitet
Claudia Wladdimiro Quevedo, studentrepresentant, Uppsala universitet
Daniel Öberg-Arendt, arbetslivsrepresentant, Mercodia
Erik Fries, Uppsala universitet
Kajsa Weslien, studentrepresentant, Uppsala universitet
Maria Jenmalm, Linköpings universitet
Maria Norlin, Uppsala universitet
Michael Lindberg, Linnéuniversitetet, Kalmar
Roger Karlsson, Stockholms universitet

Overall comments

The assessment panel acknowledges that the Master's programme in Biomedicine maintains a high quality level, to a large extent due to a dedicated leadership. A programme committee (common for all programmes at the Medical Faculty) meets once a month, giving plenty of opportunities to share experiences and discuss activities common for all programmes. The programme is very popular with about eight applicants per accepted student, many of whom are from countries outside Sweden. The teaching is student-centred and when finished, the students are prepared for a future career inside or outside academia through different training activities (*e.g.*, writing their own C.V.). The students get support from their programme director/coordinator (we have understood that the person who is appointed programme coordinator *de facto* also acts as programme director) whenever needed. Most students admitted to the programme stay in the programme, hence the high completion rate (about 90%).

Some areas for improvement have been detected. The most urgent refer to the programme organisation itself, specifically concerning that the function as programme director and coordinator is combined, leading to a major workload for this person. Since the time allocated for programme coordination, as well as study counselling, appears insufficient, and there is no plan for replacement if the programme director/coordinator falls ill,

we suggest new appointments to these functions, together with increased administrative support. Additionally, the programme director/coordinator has a low mandate to act if course-related problems occur and, combined with a poor influence on the budget, this makes a closer cooperation with the Department Head necessary. Unfortunately, we never got the opportunity to meet this person, nor the head of the Programme Committee to hear their views in these matters.

We have been informed that there are plans to move the programme to the Department of Medical Cell Biology. This would probably benefit the programme given the recently announced reorganization of the Department of Neuroscience. In this process it may benefit not just the Master's Programme in Biomedicine but also other programmes to initiate a closer cooperation between the departments regarding matters such as Internationalization at Home and Cultural Intelligence, to make use of the large diversity in the student group.

To meet some of the course goals, students need experience of giving and receiving feedback on their presentations (both oral and written). Generally, the teachers have too little time for this. A suggestion is to introduce peer-to-peer review among students. Another issue, common to many programmes at the advanced level is the differences in laboratory experience among the students. A short propaedeutic course (say 3–5 days) before the start of the first course could level the students. This could be organised together with other programmes where laboratory skills also are needed.

Summary of the most important quality-enhancing measures. We recommend that:

- a programme director or coordinator is appointed, as well as study counsellor(s), and that appropriate adminstrative support is provided,
- the roles of the programme director and programme coordinator are clarified,
- more time is allocated for the programme coordinator,
- peer-to-peer feedback is introduced,
- a laboratory propaedeutic course is established, and that
- the Department Head becomes involved in the programme regarding, *e.g.*, support and future strategic planning.

Specific comments related to the eleven aspects

Some comments may recur for several aspects, as it is sometimes difficult to draw clear boundaries between them. We have chosen to structure our comments under the headings **Strengths** and **Development opportunities**.

1. that the study programme achieves the objectives of the Higher Education Act and Higher Education Ordinance (Qualifications Ordinance) and programme-specific objectives, i.e., that actual learning outcomes correspond to expected learning outcomes

Strengths

We commend that, in each course, the expected learning outcomes are examined in various ways, *e.g.*, through written reports, laboratory practicals, seminars, and written exams. Many of the goals in the Higher Education Ordinance are already covered in the early courses, indicating that an effort has been made to give the courses at an advanced level already from the beginning. Work has started to use criterion-based examination throughout the programme, an initiative that we encourage. Teachers are engaged, ensuring that Higher Education Ordinance objectives as well as programme specific learning outcomes of the courses are met.

Development opportunities

We found that there are some mismatches between learning outcomes in the programme syllabus and those in the course syllabi. Therefore, we recommend that the content of the learning outcomes, as stated in the programme syllabus, and its relation to the learning outcomes of the individual courses are reviewed and discussed among the organizers of the programme and the teachers of the courses. If parts of the learning outcomes do not correspond to the content in the courses these parts are to be removed or the courses altered to fit their respective syllabus.

Also, some learning outcomes specific for the programme overlap with the general learning outcomes in the Higher Education Ordinance. To make it clearer to the reader what the specific objectives for the MSc Programme in Biomedicine are, this sentence in the programme syllabus

could be added: *In addition to the general objectives stated in the Higher Education Ordinance, the student shall after completed programme….*

2. that the content and teaching activities are founded on a scientific basis and proven experience

Strengths

We commend the ambition of keeping all programme courses closely related to current research, with the aim to illustrate recent developments in covered areas and to train students in critical thinking, for instance by journal clubs and a predominance of active researchers as lecturers. The students are also faced with several writing assignments, covering subjects related to scientific publications or presenting their own project activities.

We also commend that several courses associated with this programme are based on "wet-lab" experiments, and we also sensed that methods and equipment used are up-to-date and comparable to what is used in areas outside academia.

Development opportunities

Since a single department hardly can cover in depth all the complex subjects that are part of this master's programme, the strong research-focused objective naturally risks limiting the different aspects of each subject taught to those studied locally at the course-responsible departments. Since the teachers are chosen locally, course content, including the literature chosen for the journal club sessions, will likely reflect their own research area. Except In addition to the risk that the students get a biased picture of the subject, their limited general knowledge of the subject may also interfere with their full understanding of presented concepts and phenomena.

We recommend that the students are invited to "in-house" seminars such as journal clubs and weekly PhD seminars at the involved departments, in order to increase their exposure to active research situations without actually increasing the invested teaching time for the lecturers. To broaden the students' insights in the field (*i.e.*, outside the teachers' areas of interest), we also consider it beneficial if the students would regularly attend one or more of the general research seminars at the BMC that are

given weekly by leading scientists. These may not have a focus within the fields of endocrinology or neurobiology, for example, but yet provide important insights and perspectives to the specific course programme. The participation in these seminars will also give a more diversified view of molecular medicine in general. Another strategy to broaden what is taught could be to invite guest lecturers from nearby institutes such as Karolinska Institutet, the Royal Institute of Technology, and Stockholm University to complement with lectures in related areas not covered today. More distant institutes can, of course, be invited too, using video-conferencing.

To further improve and broaden the coverage of the subjects linked with the programme, we suggest that a clear plan is worked out for the selection and updating of scientific papers presented to students for course-specific journal clubs. Importantly, these sessions ought to progressively increase in complexity and as far as possible illustrate and teach critical scrutiny of results and methodology. For this reason, it appears instrumental that course leaders involved in organizing journal clubs meet to discuss the strategy in detail to avoid overlaps and provide a step-by-step training as the students develop their skills.

"Learning-by-doing" ought to be central, while video clips alone to illustrate specific experimental activities should be avoided as far as possible. However, we realise the necessity of using these aids during the pandemic. In this context it is important to stress that at the onset of the programme, students are to be checked for their experiences of "wet-lab" work. We recommend that introductory sessions are offered outside the regular schedule (possibly ahead of the programme start) to those lacking basic laboratory skills. Now and then during the programme such sessions could also be introduced, *e.g.*, during evenings, to further illustrate practical moments that for some reason turn out to be difficult to master.

Finally, we strongly recommend that all course leaders and lecturers meet regularly to inform each other about the programme and their students, as well as discuss possible changes for upcoming semesters.

3. that teaching focuses on the learning of students/doctoral students

Strengths

We commend that the course organizers are highly motivated to aid the students in reaching the learning goals. In general, the students find that the teachers, as well as the programme director/coordinator, are very supportive. The students appreciate the flexibility they have during the part of the programme where they are able to choose between (elective) courses given at Uppsala University and elsewhere.

We also commend that several different forms of teaching are used throughout the programme, such as laboratory sessions, lectures, journal clubs and literature review projects, activating the students and thereby facilitating their learning process. Here the students get feedback from teachers.

Suggested improvements

The laboratory sessions appear to be done strictly according to written instructions, giving little room for a deeper understanding of the methods used and little room for the students to learn from their mistakes. We recommend that some labs are re-organised so that the students are first given a problem to solve, related to the lab session, after which the students suggest the design of experiments and discuss this with the teacher before stepping into the lab.

For some students, especially mobile students, there is much to get acquainted with at the beginning of the programme Introducing a "buddy system" with students from the second year may also be helpful. We also recommend introducing a second meeting with the students later in the first semester to check whether they have become organised properly in their new surroundings.

An "Elective course info day" could be arranged relatively early (before October 15) to give the students an opportunity for students to learn about their elective courses at Uppsala University At this event, teachers could prepare posters for their courses; what they contain and how they are taught, and also be there to answer questions. It could also be a chance for them to learn about courses outside UU, presented by the study advisor.

We recommend introducing peer-to-peer learning, as this trains the students in the important skill to give suggestions regarding texts and presentations by colleagues, and also helps them in improving their own communicating skills.

4. that the achievement of intended learning outcomes is assessed using appropriate methods, and complying to rule of law, and that progression is ensured

Strengths

We commend the thorough work on the development of routines and quality regarding grading of the Masters' thesis projects, both the efforts already being made and the suggested plans for further improvement. Also, a strength of the programme is the variety of examination methods employed, with different methods to examine the learning outcomes in each course.

Development opportunities

We recognize that efforts are being made to maintain contact between course leaders and that the teachers are aware of the importance of communicating. Nevertheless, we see room for some improvement in this area, to avoid overlap between courses when possible and for all course leaders to be aware how their course fits into the programme. Meetings between course leaders with collegial coaching would increase awareness and may also give valuable feedback.

We understand that a continuous progression in theoretical content may be difficult to achieve due to the flexibility in the courses. However, this should not hinder continuous progression of theory-independent skills such as oral and written communication and planning and designing laboratory work. As an example, the mandatory journal clubs, which are clearly appreciated by many students, could be designed to provide progressively more challenging demands over time. The journal clubs also offer opportunities to give feedback on students' efforts. In a situation of limited resources where individual feedback by the teachers is considered too time-consuming, feedback may be given using a peer-to-peer system using a standardized evaluation feedback form or by short oral feedback

after each presentation. It is not necessary to give extensive, detailed individual feedback in every moment, since even a few "pointers" on where someone's weak and strong sides lie can be enough to stimulate development.

It is not clear how much and in what way the students have opportunities for self-reflection regarding their skills and development. This should be of importance since a learning outcome of the programme is stated as having the students reach a *good overview of how their own knowledge and skills … could be used to solve different societal challenges*[1]. Suggested tools for improved self-reflection of students' skills are, for instance, mandatory written self-evaluations, where students must reflect on their development, and learning and discussion seminars on this topic.

5. that staff involved in the study programme possess relevant and up-to-date expertise in the subject matter, that they have pedagogical and/or subject didactic expertise, and that there is sufficient teaching capacity

Strengths

We commend that teaching is done by professors, university lecturers, post-docs and PhD students, who are also active researchers, which to a large extent ensures subject competence and a scientific approach. Most teachers have taken a five-credit pedagogics course. Many also attend the workshops arranged by the Pedagogical Council at the Disciplinary Domain of Medicine and Pharmacy (PRåM).

Development opportunities

The programme is vulnerable as *There is a shortage of qualified teachers*[2]. So far, this has not had any negative effects on the programme. But clearly this is a stressful situation for the teachers which needs to be fixed, otherwise there is a risk that the programme and its students will suffer. There is a possibility to involve more postdocs in teaching which, however, is not a sustainable solution. We recommend a review to explore whether it

[1] Programme syllabus Master's Programme in Biomedicine

[2] Self-evaluation Master's Programme in Biomedicine, 2021-06-30. Dnr MEDFARM 2020/1402

could be possible to recruit additional university lecturers and "biträdande" university lecturers.

We recommend closer cooperation with other programmes, *e.g.*, the Master's Programme in Medical Research, with the aim to ease the workload for the programme director/coordinator and also for teachers.

We also recommend that teachers who have not yet taken the pedagogics course are given time to do so.

6. that internationalisation, international perspectives and sustainability are promoted

Strengths

Internationalisation is an important aspect in this programme and appears to be ingrained in the staff, students and the overall environment. Teachers have worked at universities abroad and gained international experience. We commend the great flexibility of the programme, allowing students to go abroad for internships, *e.g.*, by using UU's exchange programme. This altogether makes those who are part of the Biomedicine programme satisfied with the international opportunities the programme provides. We also commend that the Professional Training Seminar includes a workshop on Cultural Intelligence, however, this aspect could be more integrated into the programme.

Development opportunities

We perceived a lack of international perspectives which could be integrated in the program. This concerns, *e.g.*, addressing diseases that are common outside the Western Hemisphere, as well as including information on clinical trials outside Europe. We recommend first that students to a higher degree are asked to find information from other countries and present this to their peers. Another example (mentioned in the self-evaluation) is drug regulations, which differ between countries. We also recommend integrating the aspect of Cultural Intelligence into the program, since understanding and awareness of different cultures can help students from different backgrounds interact more effectively.

7. that a gender equality perspective is integrated into the study programme

Strengths

We commend that the Professional Training Seminar includes a lecture on equality and master suppression techniques, although this aspect could be more integrated into the programme. We also commend that gender inequality issues in working life are brought up and discussed in some courses, and that the gender distribution among teachers and course leaders is more or less even, despite exceptions in some courses.

Development opportunities

We recommend that gender equality perspectives be more integrated in the programme, rather than being addressed only on certain occasions.

One suggestion is having a seminar on equal opportunities in science, where students themselves get to gather information through research articles *etc*., and design a study with the aim to investigate how gender and cultural background determine the degree of academic success. This could be done in collaboration between other programmes.

We also recommend having journal clubs focusing on these issues, where students get to develop their knowledge and critical thinking by independently reviewing and evaluating scientific reports and articles on the subject.

A third suggestion is having workshops where different gender and equality scenarios are discussed, including how to behave if you are being discriminated against at the workplace. We also recommend that gender issues (and age issues) are brought up to a larger extent when it comes to symptoms and diseases in all courses where it is relevant.

8. that the study programme meets individuals' and society's needs for learning and professional knowledge and prepares students for future careers

Strengths

We commend the seemingly good preparation of the students for their future employment in this attractive programme. This is reflected from

teachers, students and course contents. The students are guided in their choice of courses in order for the programme to suit each student's interests and aims for a future career. The students feel very optimistic about their next steps.

Development opportunities

We recommend the programme to try marketing itself better in order to attract more interest from both the industry and potential students. The field of clinical trials and clinical research is growing and is in great need of people with insight in drug discovery and needs thereof. Marketing can be done in workshops where representatives from relevant industries are invited to present their work and to exchange ideas with students.

We recommend the programme to continue developing the Biomedicine network through different channels, especially on LinkedIn, which presents a way for the programme and associated students to follow alumni through their professional development highlighting career possibilities and potential mentors, *etc*.

We recommend, based on student feedback in course evaluations, to provide the students with even more practical experience.

9. that students/doctoral students have influence on the planning, implementation and follow-up of the study programme

Strengths

We commend that the programme director/coordinator and the majority of the teachers seem to be highly available to the students to discuss opinions and issues. We also commend that, when needed, important changes have been implemented to courses according to the students' opinions.

Development opportunities

We recommend increasing the efforts to receive evaluations from the majority of the students, for example by scheduling time for written evaluations and oral discussions in connection with a lecture or seminar at the end of the course. One may also consider increase the use of formative evaluations. To indicate the importance of the students'

feedback, it may be further clarified to all course leaders that it is mandatory to present which course changes that have been introduced as a result of feedback from previous students.

Furthermore, student representatives should be assigned for all courses to collect feedback for the course leaders and to include this feedback in a section of the course report.

10. that an appropriate study environment is available to all students/doctoral students

Strengths

We commend the programme for providing the students with an inspiring environment with motivated organisers and engaged teachers. The students get good information and excellent support.

We also commend the programme for the flexibility in course selection and helping students not only finding their course locally but also internationally. Overall, the students are content and dedicated. They are happy with being in Uppsala.

Development opportunities

We recommend the programme, potentially jointly with other programmes, to provide opportunities for students with poor practical experience for an introduction to basic laboratory techniques, preferably pre-course. Such an effort would provide great support to otherwise theoretically very strong and motivated students and possibly allow practicals to be run more smoothly. Such events also allow for (early) networking between programmes. This could potentially also alleviate some of the stress such students carry at the first half year at Uppsala.

We recommend the teachers to implement opportunities for feedback on student presentations in the different study modules. This can be achieved easily by letting the students themselves give productive feedback to their peers. After the presentation a few minutes could be dedicated to this exercise. In the committee's experience, this is greatly appreciated by most students.

We recommend a couple of issues to be followed up thoroughly. Firstly, we noticed while reading course evaluations that student meetings were

recorded, surely arranged because of the Covid-19 pandemic, but nonetheless this seems to be an unnecessary measure to make. It seems to be a less effective use of teacher time, checking those videos afterwards, as well as intrusive towards the individual students. Secondly, the students were recommended to keep a diary, which well presented can be a great tool and members of the committee have themselves implemented it to great success. In this case, however, it seemed to be just another burden for the students. We suggest that the programme coordinator/director follows this up, and brings it up for discussion in the programme committee.

11. that continuous follow-up and improvement of the study programme is carried out

Strengths

We commend that all courses in the programme end with an evaluation which is summarized by the course leader, and that files are kept where the performance and course choices of each student is followed. This enables the programme director/coordinator and the administration to keep track of the students and contact them if they fall behind. Since the programme is rather small (approximately 30–35 students starting each year), and the programme director/coordinator and the administration know the students well, the programme director/coordinator and the administration can easily get in touch when advice is needed. This is an excellent initiative. However, as seen below it may require a special strategy to be fully carried through.

Development opportunities

Changes that might be introduced due to recommendations from the course evaluations should be presented to the next course, preferably during the course introduction to illustrate that student evaluations in fact have an impact on the programme and its courses. This is a highly commendable routine which to some extent addresses the problem mentioned in the self-evaluation that students at later stages of the programme are less motivated to participate in the evaluations. To further this objective, we recommend all scheduled evaluations to be divided into

two parts; one where the students anonymously answer pre-addressed questions in writing, and one held as an open discussion with participation of as many of the lecturers as possible. Important during these sessions is to generate a good discussion atmosphere, in order to allow criticism and to respond to views with explanations why certain aspects might be due to situations not possible to change for whatever reason. The changes recently introduced and listed at the end of the self-evaluation document under this aspect appear highly relevant. We recommend that procedures are developed to follow up on the outcome of these.

That files are kept and regularly checked for the performance of each student is excellent. However, it may require a special strategy to be fully carried through since it depends on the programme director/coordinator's motivation and priorities given their available time. Therefore, it may be advisable to pre-determine dates (perhaps 2–3 each semester) when these files are to be checked as outlined, and the findings discussed between the programme director/coordinator and the study advisor.

Finally, it is important that course leaders are available to the students for questions and comments throughout the period when "their" specific course is ongoing.