**ORPHEUS Labelling procedure**

**Evaluators’ report of the PhD program at the Faculty of Medicine**

**Lund University, Sweden**

**ORPHEUS visiting committee:**

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Based on satisfactory responses to the self-evaluation report of the PhD program provided by the University of Lund Faculty of Medicine *(Responses to the ORPHEUS questionnaire),* the site visit was held on **January 28th - 29th 2020** (Agenda of the visit added in appendix). The agenda of the visit was prepared through exchanges between the Chair of the committee and the Head of the doctoral program in Lund, Professor Heiko Herwald. Discussions started through a very informative but synthetic presentation of the Lund University and Faculty of Medicine by the Dean Erik Renström, followed by a rather detailed PhD program presentation to the committee by its director, Heiko Herwald.

The essential part of discussion, however, was focused on the responses of the University to the questionnaire, leading to free and extensive exchanges between members of the staff (Heiko Herwald, Emma Roybon, Anette Saltin, Selvi Celik and Jenni Erlandsson) specifically in charge of different aspects of the PhD program and the visiting committee.

Further presentations in the afternoon focused on the very dynamic so called “Career center” (Pernilla Carlsson), including a presentation of the extremely detailed mandatory portfolio developed by the University (Olga Göransson) and on different actions developed in the field of innovation (Johan Flygare). Diana Karpman presented the clinical research school and Gudrun Edgren, Sara Regnér and Tomas Deierborg further detailed the course for supervisors, which is mandatory for supervision of PhD at the Faculty of Medicine.

One of the key points of the visit was the very productive meeting of the committee with 8 PhD candidates’ representative of different topics of research at the University. During this meeting the PhD candidates from the Faculty of Medicine were particularly challenged by the PhD candidate of the ORPHEUS visiting committee. This meeting was followed by another very important one of the visiting delegates with a panel of 10 supervisors of PhD candidates in different fields of research activity.

During the entire meeting samples of thesis recently defended at the University have been proposed for examination by the committee.

The second day was devoted to further discussions with different members of the PhD program staff and finally closed debates between the members of the visiting committee. A restitution of main conclusions of the ORPHEUS visiting committee was held at the end of the process in the presence of university representatives to thank the University and staff for their professionalism, quality of exchanges and precise responses to the numerous questions from the ORPHEUS delegates.

**Main general characteristics of the University and the PhD program in Lund**

* The University of Lund (more than 40.000 students) is one of the world’s top 100 universities regarding academic and research excellence. Doctoral programs are offered in the 9 faculties of the University and related to each faculty. The present visit focused on the doctoral program at Faculty of Medicine (2800 students plus 1100 PhD candidates).
* PhD education through the specific PhD program at the Faculty of Medicine is directly linked to original research. Indeed, in 2018 the Faculty of Medicine has published 1460 scientific articles. As reported from the questionnaire, in 2019 the total number of PhD candidates in the program was about 1100, 70% of them being involved in clinical training. 14 PhD candidates are currently enrolled in an international joint program and 128 candidates enrolled in the program have a basic education in another country (less than 12% of foreign PhD candidates).
* PhD education is under the responsibility of a **Research Study Board** at the Faculty of Medicine including participation of representative of PhD candidates.
* The number of potential supervisors and co-supervisors for the program is in the range of 800 (active researchers). The Faculty of Medicine has explicitly 150 professors and 450 researchers with the permission to supervise PhD candidates, which means that they have followed the mandatory course for supervisor proposed by the University. There is no formal limitation of the number of PhD candidates to be at the same time on the responsibility of one supervisor but the mean is declared to be around 1 to 2 candidates per supervisor with exceptions. A minimum of 100 hours a year supervision per candidate is the time specifically devoted to PhD education.
* In 2018 the number of PhD thesis defended at the Faculty of Medicine was 160 (about 15% of total enrolled).
* Clinical and teaching activities are compatible with the PhD training and in such a case the candidates are considered as contributing half-time to PhD studies.
* The duration of the PhD program is defined at national level. Four years are dedicated to PhD studies in Sweden, thus extending the implementation of the Bologna process based on 3 year full-time doctoral education. Consequently, half-time PhD candidates are allowed to have 8 years to complete their studies. Prolongations can be obtained with justifications.
* Doctoral studentships are used as primary support for doctoral education. In such a case the University of Lund or the University Hospital are the employer of the candidate thus being a member of the staff of the University receiving salary in the former case. Teaching and/or administrative activities for PhD candidates cannot exceed 20% of full-time position. External funding including international supports and scholarships also contribute to support PhD candidates.
* As stated by the national regulation, in order to obtain the PhD degree, the candidates have to collect 240 ECTS, at least 120 credits being related to the doctoral thesis. Complementary credits come from courses, a part of which are mandatory such as basic courses in research ethic, training to animal research experiments, statistics, and different courses based on acquisition of transferable skills (communication, research strategy, career development, translational medicine, innovation technology, etc.). Elective courses are also eligible. Courses are mainly provided through the **Centre for Teaching and Learning** (MedCUL) at the Faculty of Medicine. Part of credits are also associated to constitution of the mandatory portfolio. Data show that as a mean PhD candidate follow 8 to 10 courses, the course being to be followed during the first two years of the PhD training. At the moment of admission into the doctoral program an **Individual Study Plan** for each candidate is established together with supervisor and co-supervisors under the control of the Research Study Board.
* Mid-term review procedure is a mandatory step in doctoral studies at Lund University, that occur essentially at the end of the second year of the training.
* To have the possibility to present research work for thesis in a public defense seminar the candidate has to publish scientific material equivalent to 3 to 4 scientific articles. At least 2 of the articles have to be formally accepted and one article at least has to be signed as a first author in an international peer-reviewed journal. A large introductory part summarizing research methodology and main conclusions of the project is also part of the thesis. The thesis has to be written in English.
* Members of the assessment committee (3 to 5 members) make a preliminary assessment of the thesis and have to recommend to the **PhD Study Office** to proceed to the public defense. The opponent is from another university and the supervisor is not a member of the committee and does not participate in the deliberation.

**PhD program in relation to Basic ORPHEUS recommendations**

1. **Research environment**

The Faculty of Medicine in Lund University has a considerable number of research groups in all the main fields of biomedical research such as cancer, neuroscience, stem cells, metabolism, blood, cardio-vascular research, lung diseases, cell and molecular biology, regenerative medicine, epidemiology, but also nursing, public health and infectious diseases. Translational medicine is thus one of the most active part of research. The research is structured into 6 Departments and related specialized centers promoting inter-institutional collaborations facilitating PhD candidates from one selected Department to interact with groups from other research topics including those of the Faculty of Science or the Faculty of Engineering. The research environment consists of an impressive amount of core facilities, which are all available for PhD training, among them flow cytometry, metabolomics, genetics, proteomics, advanced and quantitative microscopy, biostatistics, animal house, etc. Furthermore, the generation of the most powerful synchrotron radiation source in Europe called MAX IV synchrotron is located in Lund as well as another remarkable international equipment called ESS for *European Spallation Source*, representing in the near future the most powerful source of neutrons, with applications in biology and medicine, which could be source of key scientific advances. It is also relevant mentioning the numerous collaborations of research groups with industrial partners and the considerable connections of research with the international community. Indeed, internationalization is part of doctoral education and PhD candidates can obtain grants from the University to visit research groups abroad during their training.

As above mentioned, at least 600 professors and researchers from the Faculty of Medicine are accredited by the University for PhD supervision and the quality of education and research is illustrated by the presence of the University of Lund in the top 100 universities ranking over the world. It is worth noting the University ensures financial support for most of the PhD candidates who are thus employed by the University/hospital, especially but not only, those working at the hospital.

1. **Outcomes**

Completion of the PhD program includes publication of scientific articles by the PhD candidate (original data equivalent to 3 to 4 international publications; at least one as the first author). The candidate has to follow mandatory and elective courses aimed at developing competences to become qualified and independent researcher according to principles of good practices. Broad knowledge of the research field and demonstration of capability to set up an experimental plan is also a goal to achieve at the end of the training. Research methodology in general and specific methods developed in the project have to be acquired. Altogether scientific knowledge, competences and skills have to be concomitant of development of an intellectual autonomy and application of principles ethics in research.

1. **Admission procedure**

The admission process in Lund is an open procedure. Positions offered to PhD candidates are published on the website of the University/Faculty of Medicine and national and international candidates are invited to apply. Master degree or equivalent is required. According to Swedish law, students with a medical degree are accepted. Prior to admission of the PhD candidate, the PhD project, resources for financing of PhD education for 4/8 years and qualification of the supervisor is reviewed and has to be approved by the Deputy Head of the research Department and by the Vice-Dean in charge of the PhD program. The process of PhD admission is competitive. Based on higher academic education, skills, previous research experience and eligibility, the selection is the responsibility of the supervisor, which has proposed the PhD project. An excellent **Handbook for PhD student**s is available on the web site for information before admission.

1. **PhD training program**

As mentioned above, during the doctoral education beside the doctoral thesis the PhD candidates have to follow courses to collect complementary ECTS to reach 240 ECTS required by the national Swedish regulation. Basic courses at the Faculty of Medicine such as research ethics, training to oral communication or scientific communication as well as special training for using animals in research and applied statistics, for example, are mandatory. These mandatory courses represent 25 to 28 ECTS in general. Elective courses (i.e. Diabetes research, writing and reviewing a draft research paper, MAX IV/ESS-based imaging for medical and biomedical research, etc.) are also available to be selected in accordance with the research project. Once admitted, an **Individual Study Plan** is established by the candidate and his/her supervisor and has to be approved by the **Research Study Board**. Teaching/clinical activities are recommended during PhD training. Courses have to be followed during the first 2 years of the doctoral studies. Each PhD candidate has thus to follow on average 8 to 10 courses during his/her training. Candidates are also asked to attend at least 6 research seminars per year during at least 3 years and to attend at least one international conference. One special mandatory course is devoted to develop comprehensible generic skills leading to production of a mandatory and very detailed **portfolio** (12 ECTS), which collects all the information related to the advancement of the doctoral education. This stimulates self-reflection and contribute to document learning outcomes in relation to their thesis: mandatory and elective courses followed by the candidate, publications and communications, participation to scientific meetings and workshops including international meetings or visit to laboratories abroad, contribution to teaching and/or clinical studies, training through the carrier center, etc.

A **mid-term review** of doctoral education is mandatory. Two researchers from research groups different from that of the candidate review the progress of the PhD training including detailed analysis of the portfolio, which is also examined at the end of the training before thesis defense. During this reflection moment, project main goals and/or direction can be modified to guaranty the success of the PhD candidate at the end of his/her training. Finally, the **Career center** at the Faculty of Medicine is a platform to present and discuss different carrier options following thesis defense. Information is given as seminars on the current labor market situations and position opportunities. Help in writing grant applications and cv is also available and an annual “career day” is aimed at promoting interactions between academic world and market.

1. **Supervision**

The PhD candidates should have one main supervisor and at least one co-supervisor. Frequently the number of co-supervisors is 2 to 3. The main supervisor (Docent in local language) has to be qualified (PhD, permanent position at the Lund University, active person in research) and both main supervisors and co-supervisors need to have followed the mandatory course for supervisor promoted by the University (4 full-days of study). Although no regulation exists at national level in Sweden, the University of Lund has decided that the Research Study Board can reject admission of a new PhD candidate if it is considered that the supervisor already supervises too many candidates. Data show, however, that the vast majority of supervisors only have 1 to 2 PhD candidates at the same time. As previously mentioned, the University also asks the supervisors to devote at least 100 hours/year to doctoral education of their PhD candidates. It is also of his/her responsibility to promote insertion of the candidates in the academic and scientific (local, national and international) communities.

1. **PhD thesis**

General feature of the PhD thesis is a compilation of published/formally accepted articles in international journals (scientific original data equivalent to the content of 3 articles, corresponding to 4 years full-time research). In at least one of the publications the candidate has to be first author. The articles have to be written in English and the introduction has to provide the research context, detailed methodologies, critical assessment of methods, general discussion of data and main conclusions (50 to 100 pages). The presentation of the manuscript is standardized for the University. Samples of thesis examined by the ORPHEUS visiting committee fulfilled those criteria.

1. **Assessment procedure**

The public defense seminar has to be in English. The assessment procedure involves the designation of a committee of 3 to 5 members including at least one from another university (abroad or Sweden) acting as external opponent. The members of the assessment committee have to produce a preliminary assessment report based on thesis manuscript to recommend proceeding to the public defense. The supervisor is not member of the assessment committee but all supervisor/co-supervisors should be present.

1. **Structure of the PhD program**

Doctoral education at Lund University falls under the responsibility of a Vice-Dean. The Research Study Board is the executive committee of the PhD program. Representatives of the PhD candidates are members of the board. At the Department level of the Faculty, **Deputy Head of Department** has the responsibility of research training of the candidates. Finally, a **Study Coordinator** has the role to assist the Vice Dean at operational level with quality assurance of the courses offered within the program. The **Medical Doctoral Student Council** is representing PhD candidates not only in the Research Study Board but also in different other council of the Faculty. A **mentoring structure** is also available for new PhD candidates.

**Conclusions of the visiting committee**

*The PhD program at the Faculty of Medicine of Lund University as described above complies with all the basic ORPHEUS recommendations.* Moreover, some of the quality development recommendations such as the mid-term review of doctoral training, are also set up mandatory in the program. PhD candidates have rights to supervision and other resources and are considered full members of research teams and staff. They have more generally rights and duties as students and also as employees. Monthly salary (2018) before tax of PhD candidates employed at the Faculty of Medicine was 2680 euros. The web site of the PhD program is quite informative and it is worth mentioning the excellent **Handbook for PhD students** containing all practical information about the PhD program in Lund. The only discrepancy to be mentioned from the ORPHEUS recommendations is that in Lund there is no formal contract between candidate, supervisor and University, except for the Individual Study Plan for PhD training.

**Recommendations of the visiting committee to ORPHEUS Executive committee:**

***Members of the visiting committee recommend to ORPHEUS Executive committee to attribute the ORPHEUS Label to the PhD program at the Faculty of Medicine, University of Lund, Sweden.***

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***Additional recommendations/suggestions from the ORPHEUS visiting committee to the Faculty of Medicine, University of Lund, to be communicated to the University***

* The Faculty of medicine is encouraged to further develop a more useful database since information about the number of new PhD candidates entering the doctoral education every year for example as well as mean thesis duration is lacking. In such a way more precise information could be available especially concerning dropout rates.
* The same data base could also be useful to collect precise information on the professional position of alumni.
* Regarding internationalization of the program, the Faculty of Medicine in Lund is encouraged to further develop interactions with the international community through joint programs (only 14 PhD candidates currently supported by joint programs over 1100 PhD candidates in the program).
* In addition, the recruitment of new PhD candidates proposed by the supervisors is presently essentially local. The University is thus encouraged to develop and support international recruitment in relation with the excellent international reputation of the University in the top 100 world universities. The legal limitation to end the contract of a non-performing PhD candidate appears to discourage many supervisors to take on international candidates and instead prefer to recruit “safely” amongst local master students.
* The committee suggests to invest in clarifying the identity and number of the so-called “sleeping students”. Indeed, available data show as a mean 150 to 160 defenses a year and, as a mean, drop-out of 40 per year, but the total number of candidates registered in the program is over 1100. This could indicate that some candidates are no longer active as PhD candidates. This obfuscates the actual drop-out number.
* Finally, the Research Study Board may reconsider in the future the ratio of mandatory courses versus elective courses, regarding for example the initial specific competences of certain candidates and their scientific project. Thus, we suggest to introduce a certain degree of flexibility in the choice of courses, which choice could be better in line with the PhD project in specific cases. The Individual Study Plan will safeguard that all competences are achieved, while facilitating individual preferences to choose e.g. an in-deep course related to the research topic.

***The ORPHEUS visiting committee, February 2020***