

FIMM 5-year Evaluation 2013

Evaluation Report

(Based on the FIMM Evaluation Procedures and EMBL Unit Review Procedure)

Content:

I. Introduction	2
II. Evaluation procedures	3
III. Overview of the institute and recommendations	4
IV. Feedback from PhD students and postdocs	7
V. Signatures	8
Annexes:	
1 Overview of group leaders and specific recommendations	12
2 Programme of the 5-year Evaluation of FIMM, 14—15 May 2013	20

I. Introduction

The 5-year Evaluation of the Institute for Molecular Medicine (FIMM) took place on 14—15 May 2013 in Helsinki, Finland.

The programme of the FIMM 5-year Evaluation is enclosed to this Evaluation Report and it includes information on the participants and venues.

Evaluation Committee

The evaluation was carried out by the Evaluation Committee comprising of experts from members of the Scientific Advisory Board (SAB) of FIMM, EMBL representative nominated by the Director General of EMBL, Professor Iain Mattaj as well as invited external expert (please see below).

Members of the SAB of FIMM:

Professor Kai Simons, Max-Planck-Institute of Molecular Cell Biology and Genetics, Germany (Chair)

Professor Carl-Henrik Heldin, Ludwig Institute for Cancer Research, Uppsala University, Sweden

Professor Cornelia van Duijn, Erasmus University Medical School, the Netherlands

EMBL Representative:

Dr Paul Flicek, EMBL-EBI, Hinxton, UK

Invited External Experts:

Professor Sven Cichon, Division of Medical Genetics, University of Basel, Switzerland

Professor Paolo Gasparini, University of Trieste, Italy

Professor Gregory Gibson, School of Biology, Georgia Institute of Technology, USA

Professor Ari Helenius, ETH Zurich, Switzerland

II. Evaluation procedures

The evaluation was carried out according to the procedures approved by the Board of FIMM, based on the EMBL Unit Review Procedures. The focus of the evaluation was in the research groups. Those group leaders whose five-year term is ending in 2013 – 2014 were evaluated in depth.

The evaluation material comprised of the following documents:

- Introduction and overview of first five years of FIMM by the Director of FIMM, Professor Olli Kallioniemi.
- Dossiers of the 12 FIMM group leaders, based on the EMBL model.
- FIMM Annual Report 2012.
- Letters supporting the evaluation, requested from external experts for those group leaders who were evaluated in depth. The letters were available for the Evaluation Committee's Members during the visit in Helsinki on 14—15 May 2013.

On the first day of the site visit the Evaluation Committee was given an overall presentation of FIMM and FIMM research infrastructure; 12 FIMM group leaders gave a presentation and, in addition, the Committee had an internal meeting with the three FIMM Finland Distinguished Professors Leif Groop, Jonathan Knowles and Juni Palmgren. On the second day the Evaluation Committee members had one-on-one discussions with group leaders; meetings with students and postdoctoral researchers and a tour at FIMM. The research infrastructure was introduced in brief, since the Academy of Finland and Biocenter Finland evaluations take place later in 2013.

III. Overview of the institute and recommendations

FIMM was founded in 2006 with the goal to become a leading research institute in molecular medicine worldwide. Now five years have passed and the task of the Evaluation Committee is to assess the progress of FIMM towards achieving this ambitious aim.

Several features were built into the FIMM structure to facilitate its build up. First, FIMM was associated with the European Molecular Biology Laboratory (EMBL) through the Nordic EMBL Partnership for Molecular Medicine. FIMM became a driving force for this networking initiative that used EMBL as a link to bring together not only the Nordic institute partners but also other European research efforts in the area of Molecular Medicine. The EMBL connection has turned out to be an important advantage for FIMM, for example, by facilitating recruitment internationally. It is also reflected in the active partnerships that FIMM has been able to establish with many EU programmes. Most importantly, the EMBL connection brings in funding and knowhow. It has helped FIMM to function increasingly as a hub in Molecular Medicine both Europe-wide and globally.

FIMM profits immensely from its location in the midst of the University Clinics in Helsinki where it can serve as a bridge between basic biological and clinical research. Its role as a center of Molecular Medicine is promoted by FIMM being part not only of the University of Helsinki, but also of the Biocenter Finland network. The tight ties to the VTT Technical Research Center of Finland and to THL, the National Institute for Health in Welfare also facilitate the networking function of FIMM. Connections with the CSC-IT Center for Science has also provided exceptional links supporting FIMM computational biology research. Important is that this networking function requires autonomy and freedom to operate beyond what is possible for normal University Departments.

Today FIMM has almost 200 staff with scientists from more than 20 countries. In a remarkably short time FIMM has succeeded to build up a successful research programme and a technology platform at a quality level, equaling the best in the world. FIMM has the advantage of having access to the Finnish genomic resources. They are unique in the world, and they provide enormous potential. At the same time FIMM is opening up a new area of biomedical research- personalized medicine - aimed at creating the molecular tools and the methods required to stratify human diseases so that more personalized treatment of scourges such as cancer and metabolic diseases will be possible.

The Evaluation Committee is full of praise for what Olli Kallioniemi and his faculty have been able to achieve in only five years. It should be stressed that the technologies that FIMM is using are now at the cutting edge of a rapidly moving area of research. Without FIMM in place, it would have been hard to keep pace with developments elsewhere with serious consequences for human genomics and Molecular Medicine in Finland.

For more than half a century, Finland has invested funds and work into the collection and analysis of data regarding its genetically unique population. The Finnish population structure and the wealth of data on epidemiological and clinical cohorts collected over decades by visionary Finnish leaders in

human genetics provide a unique resource for molecular analysis and genetic insights. Through intelligent collaborations with the Wellcome Trust Sanger Institute near Cambridge, and now the Broad Institute in Boston, FIMM investigators have ensured that the scientific world is very much aware of this tremendous resource. FIMM is now in the position to capitalize from this investment and move the research into clinical practice and commercial applications. This period has already been initiated and during the next 5 years it will be increasingly evident how successful this investment has been!

The Evaluation Committee wants to highlight several achievements from this buildup period:

1. A research consortium with the groups of Kallioniemi, Heckman/Knowles, Aittokallio, Wennerberg from FIMM and Porkka from HUCH (Helsinki University Central Hospital) has started a collaboration to stratify the treatment of acute myeloid leukemia. A new method has been designed to test potential drugs in high-throughput with high sensitivity employing leukemic cells from individual patients. The outcome of the first study promises success for the personalized medicine approach that FIMM is pursuing.
2. The efforts to utilize Finnish genome data to improve personalized and predictive medicine have produced several studies that illustrate the value of the Finnish cohorts. Genome-wide association studies have been completed for cardiovascular disease (Ripatti, Saarela), diabetes (Ripatti), puberty (Widén), migraine (Palotie, Saarela), multiple sclerosis, primary immune deficiencies (Saarela), and schizophrenia (Hennah). These studies have been (and will be further) followed up by next generation DNA sequencing to reveal the full potential of genetic variation in different diseases.
3. The group of Lundin has invented novel tools for image-based diagnostics. Pathology has until now been based on the pathologist looking at samples in the microscope. Lundin et al. have digitalized tissue section images and have produced amazing, new ways to display the images on screens and to analyze the digital data. This type of technology called webmicroscopy will revolutionize the field of pathology, medical teaching, and research. The work is backed up by the FIMM IT Unit (Miettinen) that has created an intelligent Cloud-based IT-system with CSC. It manages the enormous data flow and remains under the control of the FIMM IT group. This is a unique environment of great importance for successful developments in genomics, personalized medicine and image-based diagnostics in the future.

Overall, the Evaluation Committee is impressed with the successful buildup of FIMM since its start in 2008. Kallioniemi, who became Director in December 2007, has done a superb job. The University of Helsinki can be proud of this extraordinary success.

But one pressing issue remains; how to secure continued funding. Until recently, the overall level of research funding in Finland was adequate for a country that strived to become a world leader in the knowledge economy. But, now the wind has changed. Research funding is actually decreasing. This poses an enormous challenge for FIMM. The EMBL model that foresees a continuous turnover in research staff demands a budget of the size that FIMM has had in the last five years. Without adequate funding in the future, this model will break down. The model is essential for an institute like FIMM because the turnover of group leaders promotes creative change through the influx of new blood, ideas, and methods. In a small country like Finland, international research institutions are difficult to maintain in a competitive state. Attracting the best talent requires funding at a competitive level.

The Evaluation Committee wants to emphasize that molecular medicine in Finland is now entering a most fruitful phase. After years of research and data collection, FIMM can now move Finnish population genetics into the clinic and into enterprises. Why is this? Because of the unique bottle neck history of the Finnish population, many potential disease-promoting genetic variants are at elevated frequency, so FIMM can pioneer studies with this smaller populations cohorts than is the case in all other countries with the know how to tap this information.

Therefore, the Evaluation Committee stresses that the situation is critical. With too little funding there is a risk that FIMM and Finland will be overrun. Well-funded leading institutions in the world can leave Finland behind by using approaches based on brute force to overcome the handicap that they have with their population cohorts. FIMM has structured its collaborations to ensure that the credit comes to Helsinki, but without the Institute this is unlikely to remain the case.

The Evaluation Committee finds the disease research programme undertaken by FIMM to be quite broad. It recommends a consolidation phase in the next five years during which the leadership should internally scrutinize all the topics to define which are the most worthwhile to pursue. They need to judge what is required to reach a critical mass in each subject area. A critical assessment of the projects and the definition of a sharpened focus are needed in the next five-year period.

The Evaluation Committee also stresses that in order for commercial applications to be successful, the technology transfer mechanisms that FIMM has as its disposal will have to be improved in the life sciences. Presently, University of Helsinki is no model in this respect. Nevertheless, excellent examples of translational links to the clinic have already been established.

The Evaluation Committee also recommends that the mentoring system for group leaders that FIMM has put in place should be invigorated. Turnover of young group leaders demands more career support than it is the case now.

The Evaluation Committee also recommends that FIMM develops actions aimed at supporting the Finnish community of Clinical Geneticists to improve the study on inherited diseases. In particular it would be useful to identify one FIMM researcher/scientist in charge for establishing a network with Clinical Geneticists in order to provide them with the facilities and expertise of FIMM for identifying new genes for inherited diseases and to solve molecular diagnostics problems.

IV. Feedback from PhD students and postdocs

This section summarises the feedback obtained from the PhD students and postdocs regarding their training, the facilities available to them and any other matters raised.

Graduate programme

In a discussion with about 30 of the graduate students, the Evaluation Committee obtained a highly favorable impression of the graduate programme. The participants represented different stages of the programme. The majority was from outside of Finland. It seemed that the students were satisfied with their projects, with the running of the program, the flat hierarchy in the institute, and other aspects of their education. As a group they were enthusiastic about the institute and their own experience. In fact, those Evaluation Committee members that have had experience interviewing student groups in other universities and institutes have seldom encountered such a satisfied and motivated group.

The graduate students at FIMM are recruited either directly to individual groups or through a centralized admission based on applications and interviews. The students accepted though the latter procedure then go through rotations in different laboratories and attend courses during their first year. The experience of centralized admission of graduate students is very positive at other prestigious institutes, like the EMBL, with increased visibility of the institute and generally higher level of qualification of the applicants. The Committee therefore recommends that the number of graduate student recruited through centralized admission is increased.

The only critical issue to surface in the discussion concerned the rules imposed on the PhD thesis by the Faculty of Medicine graduate school, i.e. the number of first author papers, the restrictions in collaborations, etc. These rules are particularly detrimental and counterproductive to the collaborative, team-oriented work performed in FIMM where papers tend to have many authors and contributors. We urge the leaders of the graduate schools to reconsider these rules, and adjust the practices at the University of Helsinki to those employed elsewhere in Europe.

The Evaluation Committee also met with the postdocs. They had similar problems that one encounters in other research institutes. They are worried about their career prospects and how to be able to find a position after their FIMM period. Therefore the Evaluation Committee recommends that FIMM is to follow the example of other leading research institutions and establish a postdoc programme. EMBL has such a programme. Establishing a similar FIMM programme would allow the postdocs to organize themselves as a group within the institute with the aim to provide them with career advice and to organize an annual retreat.

V. Signatures



Professor Kai Simons
Max-Planck-Institute of Molecular Cell Biology and Genetics
Germany
Chair of the Scientific Advisory Board of FIMM and the Evaluation Committee

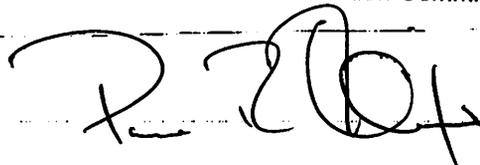


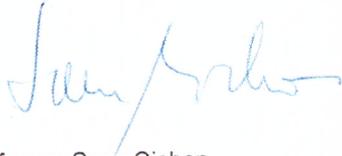
Professor Carl-Henrik Heldin
Ludwig Institute for Cancer Research
Uppsala University
Sweden
Member of the Scientific Advisory Board of FIMM and the Evaluation Committee

Professor Cornelia van Duijn
Erasmus University Medical School
The Netherlands
Member of the Scientific Advisory Board of FIMM and the Evaluation Committee

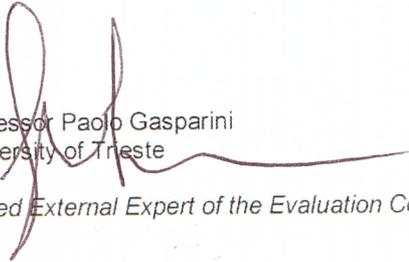


Dr Paul Flicek
Senior Team Leader
Vertebrate Genomics in the EMBL-EBI
EMBL Outstation – Hinxton
European Bioinformatics Institute
UK
EMBL Representative of the Evaluation Committee





Professor Sven Cichon
Division of Medical Genetics
University of Basel
Switzerland
Invited External Expert of the Evaluation Committee

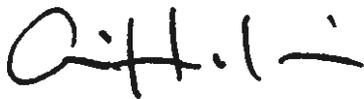


Professor Paolo Gasparini
University of Trieste
Italy
Invited External Expert of the Evaluation Committee



17/6/2013

Professor Gregory Gibson
School of Biology
Georgia Institute of Technology
USA
Invited External Expert of the Evaluation Committee



20/6/2013

Professor Ari Helenius
ETH Zurich
Switzerland
Invited External Expert of the Evaluation Committee

Programme 7 May 2013

5-year Evaluation of the Institute for Molecular Medicine Finland (FIMM)

Evaluation Committee Members and FIMM Group Leaders in Annex of this Programme

Programme, Tuesday 14 May 2013*Venue: Faculty Club, Biomedicum Helsinki 1 (6th floor), Street Address: Haartmaninkatu 8, Helsinki***8.00** *Taxi transportation from Hotel Haven to Biomedicum Helsinki***8.20—8.50** **Internal Meeting of the Evaluation Committee**

Kai Simons, Professor, Chair of the SAB of FIMM and Evaluation Committee

8.50—9.30 **Overview of FIMM and future plans**

Olli Kallioniemi, MD, PhD, Professor, Director of FIMM

9.30—9.50 **FIMM Technology Centre**

Janna Saarela, MD, PhD, Research Director

9.50—10.10 **FIMM Biobanking Infrastructure**

Kimmo Pitkänen, PhD, Head of Development

10.10—10.30 **Discussion and Coffee break****Research Programme on Human Genomics***(All Group Leaders' presentations on 14 May: 15 min. presentation + 15 min. discussion)***10.30—11.00** Samuli Ripatti, PhD, FIMM-EMBL Group Leader, Professor**11.00—11.30** Elisabeth Widén, MD, PhD, Group Leader**11.30—12.00** Janna Saarela, MD, PhD, Research Director**12.00—12.30** William Hennah, PhD, Academy of Finland Research Fellow

12.30—13.30 Lunch break

**13.30—14.00 Research Programme on Systems Medicine & Group Kallioniemi
Grand Challenge, Individualized Systems Medicine (ISM)**

Olli Kallioniemi, MD, PhD, Professor

14.00—14.30 Translational Research and Group Lundin

Johan Lundin, MD, PhD, Research Director

14.30—15.00 Krister Wennerberg, PhD, FIMM-EMBL Group Leader

15.00—15.30 Denis Kainov, PhD, EMBL FIMM-EMBL Group Leader

15.30—15.45 Break

15.45—16.15 Sergey Kuznetsov, PhD, FIMM-EMBL Group Leader

16.15—16.45 Emmy Verschuren, PhD, FIMM-EMBL Group Leader

16.45—17.15 Tero Aittokallio, PhD, FIMM-EMBL Group Leader

17.15—18.00 Discussion with FiDiPro Professors Leif Groop, Jonathan Knowles and Juni Palmgren

18.00 *Taxi transportation from Biomedicum Helsinki to Hotel Haven*

19.30 **Dinner at Restaurant Sipuli**

Evaluation Committee Members, FIMM Group Leaders and FiDiPro Professors

Chair and Vice Chair of the Board of FIMM, Professors Kimmo Kontula and Anna-Elina Lehesjoki invited

Programme, Wednesday 15 May 2013

Venues: *FIMM Meeting Rooms, Biomedicum Helsinki 2U, Street Address: Tukholmankatu 8, Helsinki*
Faculty Club, Biomedicum Helsinki 1 (6th floor), Street Address: Haartmaninkatu 8, Helsinki

- 8.00** *Taxi transportation from Hotel Haven to Biomedicum Helsinki*
- 8.30—9.15** **Research Programme on Human Genomics & Group Palotie**
Grand Challenge, Human Genomics
Aarno Palotie, Research Director
- 9.15—12.30** **Parallel Sessions with the Group Leaders including possible detailed one-on-one discussions between Evaluation Committee Members and Group Leaders.**
- | Human Genomics | Systems Medicine |
|---|---|
| <i>Evaluation Committee Members:</i>
To be confirmed. | <i>Evaluation Committee Members:</i>
To be confirmed. |
| <i>FIMM Group Leaders:</i>
Aarno Palotie
Janna Saarela
Samuli Ripatti
Elisabeth Widén
William Hennah | <i>FIMM Group Leaders:</i>
Olli Kallioniemi
Johan Lundin
Sergey Kuznetsov
Emmy Verschuren
Denis Kainov
Kristen Wennerberg
Tero Aittokallio |
- 12.30—13.30** **Working lunch for the Evaluation Committee**
- 13.30—14.30** **Tour at FIMM: Biobank, DNaseq lab, HTS, Imaging**
- 14.30—15.00** **Doctoral Training at FIMM**
(15 min. presentation + 15 min. discussion)
Gretchen Repasky, PhD, Research Training Coordinator
- 15.00—16.00** **Meeting with students**
Meeting with postdocs
- 16.00—17.00** **Internal meeting of the Evaluation Committee and initial write-up of the main points**
- 17.00—18.00** **Initial feedback to the Chair and Vice Chair of the Board and Director of FIMM**
- 18.00** *Taxi transportation from Biomedicum Helsinki to Hotel Haven*
- 19.30** **Dinner at Restaurant Pure Bistro**

Participants

Members of the SAB of FIMM:

Professor Kai Simons, Max-Planck-Institute of Molecular Cell Biology and Genetics, Germany (Chair)
 Professor Carl-Henrik Heldin, Ludwig Institute for Cancer Research, Uppsala University, Sweden
 Professor Cornelia van Duijn, Erasmus University Medical School, the Netherlands

EMBL Representative:

Dr Paul Flicek, EMBL-EBI, Hinxton, UK

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 Professor Paolo Gasparini, University of Trieste, Italy
 Professor Gregory Gibson, School of Biology, Georgia Institute of Technology, USA
 Professor Ari Helenius, ETH Zurich, Switzerland

FIMM Group Leaders:

Human Genomics

Aarno Palotie (15 May 2013)
 Janna Saarela
 Samuli Ripatti
 Elisabeth Widén
 William Hennah

Systems Medicine

Olli Kallioniemi
 Johan Lundin
 Sergey Kuznetsov
 Emmy Verschuren
 Denis Kainov (14 May 2013)
 Krister Wennerberg
 Tero Aittokallio

Finland Distinguished Professors:

FiDiPro Professor Leif Groop, FIMM; Professor in Endocrinology, Chief Physician, Lund University and Department of Endocrinology, Scania University Hospital, Sweden; Director of Lund University Diabetes Centre and EXODIAB, Sweden

FiDiPro Professor Jonathan Knowles, FIMM; Professor Emeritus, School of Life Sciences, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland; Visiting Professor in Translational Medicine, University of Oxford, UK

FiDiPro Professor Juni Palmgren, FIMM; Secretary General; Council for Research Infrastructures, The Swedish Research Council, Sweden; Guest Professor of Biostatistics, Department of Medical Epidemiology and Biostatistics, Karolinska Institutet, Stockholm, Sweden

Chair and the Vice Chair of the Board of FIMM:

Vice Rector, Professor Kimmo Kontula, Faculty of Medicine, University of Helsinki (Chair)
 Research Director, Professor Anna-Elina Lehesjoki, Neuroscience Center, University of Helsinki (Vice Chair)

Other Participants from FIMM:

Head of Development Kimmo Pitkänen, Biobank Infrastructure
 Administrative Manager Reetta Niemelä, Administration Unit

Practicalities of the visit

Contact persons at FIMM:

- Reetta Niemelä: reetta.niemela@helsinki.fi, +358 50 5686795, evaluation material, programme
- Heidi Arling: heidi.arling@helsinki.fi, +358 50 3185597, travel arrangements
- Emilia Vanamo: emilia.vanamo@helsinki.fi, +358 50 3185639, travel and meeting arrangements

Flights and local transportation in Helsinki:

- Please contact Heidi Arling if you wish that your flights will be booked via Area Travel Agency (charged directly from FIMM/University of Helsinki).
- If you prefer to book your flights yourself, please inform Heidi Arling your arrival and departure.
- We recommend you to take a taxi from Helsinki-Vantaa Airport to Hotel Haven. It takes about 30—40 minutes with a taxi from the airport to the Helsinki City center (35—45 euros).

Accommodation:

- Hotel Haven (street address: Unioninkatu 17, Helsinki, <http://www.hotelhaven.fi/en>).
- We have made a reservation for you from 13 May to 16 May; reservations have been adjusted according to your flights.

Venues on 14—15 May 2013:

- Faculty Club in Biomedicum Helsinki 1 building (6th floor, street address: Haartmaninkatu 8, Helsinki) and FIMM, Meeting rooms, Biomedicum Helsinki 2U building (street address: Tukholmankatu 8, Helsinki)
- We will arrange transportation from Hotel Haven to FIMM on 14 and 15 May 2013 at 8.00 and back to the Hotel at 18.00.

Dinners on 14—15 May 2013

- 14 May 2013: Restaurant Sipuli (street address: Kanavaranta 7, 00160 Helsinki, <http://www.ravintolasipuli.fi/en>)
- 15 May 2013: Restaurant Pure Bistro (street address: Pohjoisesplanadi 9, 00170 Helsinki)

Reimbursements of travel costs:

- FIMM will cover all travel costs for the Evaluation Committee members. Please save all original tickets, receipts etc. and send them back to us together with the travel expense claim form (will be sent to you later).

Further information on the University of Helsinki and the City of Helsinki:

- <http://www.helsinki.fi/university/>
- <http://www.helsinki.fi/eng/>
- <http://www.fmi.fi/weather/local.html?place=Helsinki>
- <http://mappery.com/Helsinki-Tourist-Map>