INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI 2005–2010

RC-Specific Evaluation of Membrec – Cell membrane recognition and dynamics

Seppo Saari & Antti Moilanen (Eds.)
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**Summary:**
Researcher Community (RC) was a new concept of the participating unit in the evaluation. Participation in the evaluation was voluntary and the RCs had to choose one of the five characteristic categories to participate.

Evaluation of the Researcher Community was based on the answers to the evaluation questions. In addition a list of publications and other activities were provided by the TUHAT system. The CWTS/Leiden University conducted analyses for 80 RCs and the Helsinki University Library for 66 RCs. Panellists, 49 and two special experts in five panels evaluated all the evaluation material as a whole and discussed the feedback for RC-specific reports in the panel meetings in Helsinki. The main part of this report is consisted of the feedback which is published as such in the report.

Chapters in the report:
1. Background for the evaluation
2. Evaluation feedback for the Researcher Community
3. List of publications
4. List of activities
5. Bibliometric analyses

The level of the RCs’ success can be concluded from the written feedback together with the numeric evaluation of four evaluation questions and the category fitness. More conclusions of the success can be drawn based on the University-level report.

**RC-specific information:**

<table>
<thead>
<tr>
<th>Main scientific field of research:</th>
<th>Biological, Agricultural and Veterinary Sciences</th>
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<tbody>
<tr>
<td>Participation category:</td>
<td>2. Research of the participating community is of high quality, but the community in its present composition has yet to achieve strong international recognition or a clear breakthrough</td>
</tr>
<tr>
<td>RC’s responsible person:</td>
<td>Gahmberg, Carl G.</td>
</tr>
<tr>
<td>Keywords:</td>
<td>Research Evaluation, Meta-evaluation, Doctoral Training, Bibliometric Analyses, Researcher Community</td>
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<tr>
<td>RC-specific keywords:</td>
<td>autophagy, calcium, cell adhesion, G protein, glycoconjugate, integrin, leukocyte, microvesicle, platelet, receptor</td>
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<td>Enquiries: <a href="mailto:seppo.o.saari@helsinki.fi">seppo.o.saari@helsinki.fi</a></td>
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# Contents

Panel members ........................................................................................................................................... 1

1 Introduction to the Evaluation ........................................................................................................... 5
  1.1 RC-specific evaluation reports ...................................................................................................... 5
  1.2 Aims and objectives in the evaluation .......................................................................................... 5
  1.3 Evaluation method ......................................................................................................................... 5
  1.4 Implementation of the external evaluation ..................................................................................... 6
  1.5 Evaluation material ......................................................................................................................... 7
  1.6 Evaluation questions and material .................................................................................................. 8
  1.7 Evaluation criteria .......................................................................................................................... 10
  1.8 Timetable of the evaluation ........................................................................................................... 13
  1.9 Evaluation feedback – consensus of the entire panel .................................................................. 13

2 Evaluation feedback .......................................................................................................................... 15
  2.1 Focus and quality of the RC’s research .......................................................................................... 15
  2.2 Practises and quality of doctoral training ....................................................................................... 15
  2.3 The societal impact of research and doctoral training .................................................................... 16
  2.4 International and national (incl. intersectoral) research collaboration and researcher mobility .... 16
  2.5 Operational conditions ................................................................................................................... 16
  2.6 Leadership and management in the researcher community ........................................................... 17
  2.7 External competitive funding of the RC ......................................................................................... 17
  2.8 The RC’s strategic action plan for 2011–2013 .............................................................................. 17
  2.9 Evaluation of the category of the RC in the context of entity of the evaluation material (1-8) ........ 18
  2.10 Short description of how the RC members contributed the compilation of the stage 2 material ... 18
  2.11 How the UH’s focus areas are presented in the RC’s research .................................................... 18
  2.12 RC-specific main recommendations ............................................................................................ 18
  2.13 RC-specific conclusions ............................................................................................................... 18

3 Appendices ......................................................................................................................................... 19
Foreword

The evaluation of research and doctoral training is being carried out in the years 2010–2012 and will end in 2012. The steering group appointed by the Rector in January 2010 set the conditions for participating in the evaluation and prepared the Terms of Reference to present the evaluation procedure and criteria. The publications and other scientific activities included in the evaluation covered the years 2005–2010.

The participating unit in the evaluation was defined as a Researcher Community (RC). To obtain a critical mass with university-level impact, the number of members was set to range from 20 to 120. The RCs were required to contain researchers in all stages of their research career, from doctoral students to principal investigators (Pis). All in all, 136 Researcher Communities participated in this voluntary evaluation, 5857 persons in total, of whom 1131 were principal investigators. PIs were allowed to participate in two communities in certain cases, and 72 of them used this opportunity and participated in two RCs.

This evaluation enabled researchers to define RCs from the “bottom up” and across disciplines. The aim of the evaluation was not to assess individual performance but a community with shared aims and researcher-training activities. The RCs were able to choose among five different categories that characterised the status and main aims of their research. The steering group considered the process of applying to participate in the evaluation to be important, which lead to the establishment of these categories. In addition, providing a service for the RCs to enable them to benchmark their research at the global level was a main goal of the evaluation.

The data for the evaluation consisted of the RCs’ answers to evaluation questions on supplied e-forms and a compilation extracted from the TUHAT – Research Information System (RIS) on 12 April 2011. The compilation covered scientific and other publications as well as certain areas of scientific activities. During the process, the RCs were asked to check the list of publications and other scientific activities and make corrections if needed. These TUHAT compilations are public and available on the evaluation project sites of each RC in the TUHAT-RIS.

In addition to the e-form and TUHAT compilation, University of Leiden (CWTS) carried out bibliometric analyses from the articles included in the Web of Science (WoS). This was done on University and RC levels. In cases where the publication forums of the RC were clearly not represented by the WoS data, the Library of the University of Helsinki conducted a separate analysis of the publications. This was done for 66 RCs representing the humanities and social sciences.

The evaluation office also carried out an enquiry targeted to the supervisors and PhD candidates about the organisation of doctoral studies at the University of Helsinki. This and other documents describing the University and the Finnish higher education system were provided to the panellists.

The panel feedback for each RC is unique and presented as an entity. The first collective evaluation reports available for the whole panel were prepared in July–August 2011. The reports were accessible to all panel members via the electronic evaluation platform in August. Scoring from 1 to 5 was used to complement written feedback in association with evaluation questions 1–4 (scientific focus and quality, doctoral training, societal impact, cooperation) and in addition to the category evaluating the fitness for participation in the evaluation. Panellists used the international level as a point of comparison in the evaluation. Scoring was not expected to go along with a preset deviation.

Each of the draft reports were discussed and dealt with by the panel in meetings in Helsinki (from 11 September to 13 September or from 18 September to 20 September 2011). In these meetings the panels also examined the deviations among the scores and finalised the draft reports together.

The current RC-specific report deals shortly with the background of the evaluation and the terms of participation. The main evaluation feedback is provided in the evaluation report, organised according to the evaluation questions. The original material provided by the RCs for the panellists has been attached to these documents.
On behalf of the evaluation steering group and office, I sincerely wish to thank you warmly for your participation in this evaluation. The effort you made in submitting the data to TUHAT-RIS is gratefully acknowledged by the University. We wish that you find this panel feedback useful in many ways. The bibliometric profiles may open a new view on your publication forums and provide a perspective for discussion on your choice of forums. We especially hope that this evaluation report will help you in setting the future goals of your research.

Johanna Björkroth
Vice-Rector
Chair of the Steering Group of the Evaluation

Steering Group of the evaluation
Steering group, nominated by the Rector of the University, was responsible for the planning of the evaluation and its implementation having altogether 22 meetings between February 2010 and March 2012.

Chair
Vice-Rector, professor Johanna Björkroth

Vice-Chair
Professor Marja Airaksinen
Chief Information Specialist, Dr Maria Forsman
Professor Arto Mustajoki
University Lecturer, Dr Kirsi Pyhältö
Director of Strategic Planning and Development, Dr Ossi Tuomi
Doctoral candidate, MSocSc Jussi Vauhkonen
Panel members

CHAIR
Professor Ary A. Hoffman
Ecological genetics, evolutionary biology,
biodiversity conservation, zoology
University of Melbourne, Australia

VICE-CHAIR
Professor Barbara Koch
Forest Sciences, remote sensing
University of Freiburg, Germany

Professor Per-Anders Hansson
Agricultural engineering, modeling, life cycle
analysis, bioenergy
Swedish University of Agricultural Sciences

Professor Danny Huylebroeck
Developmental biology
Katholieke Universiteit Leuven, Belgium

Professor Jonathan King
Virus assembly, protein folding
Massachusetts Institute of Technology MIT, USA

Professor Hannu J.T. Korhonen
Functional foods, dairy technology, milk hygiene
MTT Agrifood Research Finland

Professor Kristlina Kruus
Microbiological biotechnology, microbiological
enzymes, applied microbiology
VTT Technical Research Centre of Finland

Professor Joakim Lundeberg
Biochemistry, biotechnology, sequencing, genomics
KTH Royal Institute of Technology, Sweden

Professor Dominiek Maes
Veterinary medicine
Ghent University, Belgium

Professor Olli Saastamoinen
Forest economics and policy
University of Eastern Finland

Professor Kai Simons
Biochemistry, molecular biology, cell biology
Max-Planck-Institute of Molecular Cell Biology and
Genetics, Germany

The panel, independently, evaluated all the submitted material and was responsible for the feedback of
the RC-specific reports. The panel members were asked to confirm whether they had any conflict of
interests with the RCs. If this was the case, the panel members disqualified themselves in discussion and
report writing.

Added expertise to the evaluation was contributed by the members from the other panels and by one
evaluator outside the panels.
External Expert
Professor Anders Linde
Oral biochemi
Faculty of Odontology
Göteborg University
Sweden

Experts from the Other Panels
Professor Caitlin Buck, from the Panel of Natural Sciences
Professor Ritske Huismans, from the Panel of Natural Sciences
Professor Johanna Ivaska, from the Panel of Medicine, biomedicine and health sciences
Professor Lea Kauppi, from the Panel of Natural Sciences
Professor Holger Stark, from the Panel of Natural Sciences
Professor Peter York, from the Panel of Medicine, biomedicine and health sciences

EVALUATION OFFICE
Dr Seppo Saari, Doc., Senior Adviser in Evaluation, was responsible for the entire evaluation, its planning and implementation and acted as an Editor-in-chief of the reports.
Dr Eeva Sievi, Doc., Adviser, was responsible for the registration and evaluation material compilations for the panellists. She worked in the evaluation office from August 2010 to July 2011.
MScSc Paula Ranne, Planning Officer, was responsible for organising the panel meetings and all the other practical issues like agreements and fees and editing a part the RC-specific reports. She worked in the evaluation office from March 2011 to January 2012.
Mr Antti Moilanen, Project Secretary, was responsible for editing the reports. He worked in the evaluation office from January 2012 to April 2012.

TUHAT OFFICE
Provision of the publication and other scientific activity data
Mrs Aija Kaitera, Project Manager of TUHAT-RIS served the project ex officio providing the evaluation project with the updated information from TUHAT-RIS. The TUHAT office assisted in mapping the publications with CWTS/University of Leiden.
MA Liisa Ekebom, Assisting Officer, served in TUHAT-RIS updating the publications for the evaluation. She also assisted the UH/Library analyses.
BA Liisa Jäppinen, Assisting Officer, served in TUHAT-RIS updating the publications for the evaluation.

HELSINKI UNIVERSITY LIBRARY
Provision of the publication analyses
Dr Maria Forsman, Chief Information Specialist in the Helsinki University Library, managed with her 10 colleagues the bibliometric analyses in humanities, social sciences and in other fields of sciences where CWTS analyses were not applicable.
Acronyms and abbreviations applied in the report

External competitive funding
AF – Academy of Finland
TEKES - Finnish Funding Agency for Technology and Innovation
EU - European Union
ERC - European Research Council
International and national foundations
FP7/6 etc. /Framework Programmes/Funding of European Commission

Evaluation marks
Outstanding (5)
Excellent (4)
Very Good (3)
Good (2)
Sufficient (1)

Abbreviations of Bibliometric Indicators
P - Number of publications
TCS – Total number of citations
MCS - Number of citations per publication, excluding self-citations
PNC - Percentage of uncited publications
MNCS - Field-normalized number of citations per publication
MNJS - Field-normalized average journal impact
THCP10 - Field-normalized proportion highly cited publications (top 10%)
INT_COV - Internal coverage, the average amount of references covered by the WoS
WoS – Thomson Reuters Web of Science Databases

Participation category
Category 1. The research of the participating community represents the international cutting edge in its field.
Category 2. The research of the participating community is of high quality, but the community in its present composition has yet to achieve strong international recognition or a clear break-through.
Category 3. The research of the participating community is distinct from mainstream research, and the special features of the research tradition in the field must be considered in the evaluation.
Category 4. The research of the participating community represents an innovative opening.
Category 5. The research of the participating community has a highly significant societal impact.

Research focus areas of the University of Helsinki
Focus area 1: The basic structure, materials and natural resources of the physical world
Focus area 2: The basic structure of life
Focus area 3: The changing environment – clean water
Focus area 4: The thinking and learning human being
Focus area 5: Welfare and safety
Focus area 6: Clinical research
Focus area 7: Precise reasoning
Focus area 8: Language and culture
Focus area 9: Social justice
Focus area 10: Globalisation and social change
1 Introduction to the Evaluation

1.1 RC-specific evaluation reports

The participants in the evaluation of research and doctoral training were Researcher Communities (hereafter referred to as the RC). The RC refers to the group of researchers who registered together in the evaluation of their research and doctoral training. Preconditions in forming RCs were stated in the Guidelines for the Participating Researcher Communities. The RCs defined themselves whether their compositions should be considered well-established or new.

It is essential to emphasise that the evaluation combines both meta-evaluation1 and traditional research assessment exercise and its focus is both on the research outcomes and procedures associated with research and doctoral training. The approach to the evaluation is enhancement-led where self-evaluation constituted the main information. The answers to the evaluation questions formed together with the information of publications and other scientific activities an entity that was to be reviewed as a whole.

The present evaluation recognizes and justifies the diversity of research practices and publication traditions. Traditional Research Assessment Exercises do not necessarily value high quality research with low volumes or research distinct from mainstream research. It is challenging to expose the diversity of research to fair comparison. To understand the essence of different research practices and to do justice to their diversity was one of the main challenges of the present evaluation method. Understanding the divergent starting points of the RCs demanded sensitivity from the evaluators.

1.2 Aims and objectives in the evaluation

The aims of the evaluation are as follows:

- to improve the level of research and doctoral training at the University of Helsinki and to raise their international profile in accordance with the University's strategic policies. The improvement of doctoral training should be compared to the University's policy.2
- to enhance the research conducted at the University by taking into account the diversity, originality, multidisciplinary nature, success and field-specificity,
- to recognize the conditions and prerequisites under which excellent, original and high-impact research is carried out,
- to offer the academic community the opportunity to receive topical and versatile international peer feedback,
- to better recognize the University’s research potential.
- to exploit the University's TUHAT research information system to enable transparency of publishing activities and in the production of reliable, comparable data.

1.3 Evaluation method

The evaluation can be considered as an enhancement-led evaluation. Instead of ranking, the main aim is to provide useful information for the enhancement of research and doctoral training of the participating RCs. The comparison should take into account each field of science and acknowledge their special character.

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1 The panellists did not read research reports or abstracts but instead, they evaluated answers to the evaluation questions, tables and compilations of publications, other scientific activities, bibliometrics or comparable analyses.

2 Policies on doctoral degrees and other postgraduate degrees at the University of Helsinki.
The comparison produced information about the present status and factors that have lead to success. Also challenges in the operations and outcomes were recognized.

The evaluation approach has been designed to recognize better the significance and specific nature of researcher communities and research areas in the multidisciplinary top-level university. Furthermore, one of the aims of the evaluation is to bring to light those evaluation aspects that differ from the prevalent ones. Thus the views of various fields of research can be described and research arising from various starting points understood better. The doctoral training is integrated into the evaluation as a natural component related to research. Operational processes of doctoral training are being examined in the evaluation.

**Five stages of the evaluation method were:**
1. Registration – Stage 1
2. Self-evaluation – Stage 2
3. TUHAT\(^3\) compilations on publications and other scientific activities\(^4\)
4. External evaluation
5. Public reporting

**1.4 Implementation of the external evaluation**

**Five Evaluation Panels**
Five evaluation panels consisted of independent, renowned and highly respected experts. The main domains of the panels are:
1. biological, agricultural and veterinary sciences
2. medicine, biomedicine and health sciences
3. natural sciences
4. humanities
5. social sciences

The University invited 10 renowned scientists to act as chairs or vice-chairs of the five panels based on the suggestions of faculties and independent institutes. Besides leading the work of the panel, an additional role of the chairs was to discuss with other panel chairs in order to adopt a broadly similar approach. The panel chairs and vice-chairs had a pre-meeting on 27 May 2011 in Amsterdam.

The panel compositions were nominated by the Rector of the University 27 April 2011. The participating RCs suggested the panel members. The total number of panel members was 50. The reason for a smaller number of panellists as compared to the previous evaluations was the character of the evaluation as a meta-evaluation. The panellists did not read research reports or abstracts but instead, they evaluated answers to the evaluation questions, tables and compilations of publications, other scientific activities, bibliometrics and comparable analyses.

The panel meetings were held in Helsinki:
- On 11–13 September 2011: (1) biological, agricultural and veterinary sciences, (2) medicine, biomedicine and health sciences and (3) natural sciences.
- On 18–20 September 2011: (4) humanities and (5) social sciences.

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\(^3\) TUHAT (acronym) of Research Information System (RIS) of the University of Helsinki

\(^4\) Supervision of thesis, prizes and awards, editorial work and peer reviews, participation in committees, boards and networks and public appearances.
1.5 Evaluation material

The main material in the evaluation was the RCs’ self-evaluations that were qualitative in character and allowed the RCs to choose what was important to mention or emphasise and what was left unmentioned.

The present evaluation is exceptional at least in the Finnish context because it is based on both the evaluation documentation (self-evaluation questions, publications and other scientific activities) and the bibliometric reports. All documents were delivered to the panelists for examination.

Traditional bibliometrics can be reasonably done mainly in medicine, biosciences and natural sciences when using the Web of Science database, for example. Bibliometrics, provided by CWTS/The Centre for Science and Technology Studies, University of Leiden, cover only the publications that include WoS identification in the TUHAT-RIS.

Traditional bibliometrics are seldom relevant in humanities and social sciences because the international comparable databases do not store every type of high quality research publications, such as books and monographs and scientific journals in other languages than English. The Helsinki University Library has done analysis to the RCs, if their publications were not well represented in the Web of Science databases (RCs should have at least 50 publications and internal coverage of publications more than 40%) – it meant 58 RCs. The bibliometric material for the evaluation panels was available in June 2011. The RC-specific bibliometric reports are attached at the end of each report.

The panels were provided with the evaluation material and all other necessary background information, such as the basic information about the University of Helsinki and the Finnish higher education system.

Evaluation material
1. Registration documents of the RCs for the background information
2. Self evaluation material – answers to the evaluation questions
3. Publications and other scientific activities based on the TUHAT RIS:
   3.1. statistics of publications
   3.2. list of publications
   3.3. statistics of other scientific activities
   3.4. list of other scientific activities
4. Bibliometrics and comparable analyses:
   4.1. Analyses of publications based on the verification of TUHAT-RIS publications with the Web of Science publications (CWTS/University of Leiden)
   4.2. Publication statistics analysed by the Helsinki University Library – mainly for humanities and social sciences
5. University level survey on doctoral training (August 2011)
6. University level analysis on publications 2005–2010 (August 2011) provided by CWTS/University of Leiden

Background material

University of Helsinki
- Basic information about the University of the Helsinki
- The structure of doctoral training at the University of Helsinki
- Previous evaluations of research at the University of Helsinki – links to the reports: 1998 and 2005

The Finnish Universities/Research Institutes
- Finnish University system
- Evaluation of the Finnish National Innovation System
- The State and Quality of Scientific Research in Finland. Publication of the Academy of Finland 9/09.

The evaluation panels were provided also with other relevant material on request before the meetings in Helsinki.
1.6 Evaluation questions and material

The participating RCs answered the following evaluation questions which are presented according to the evaluation form. In addition, TUHAT RIS was used to provide the additional material as explained. For giving the feedback to the RCs, the panellists received the evaluation feedback form constructed in line with the evaluation questions:

1. Focus and quality of the RC’s research
   - Description of
     - the RC’s research focus.
     - the quality of the RC’s research (incl. key research questions and results)
     - the scientific significance of the RC’s research in the research field(s)
   - Identification of the ways to strengthen the focus and improve the quality of the RC’s research

The additional material: TUHAT compilation of the RC’s publications, analysis of the RC’s publications data (provided by University of Leiden and the Helsinki University Library)
A written feedback from the aspects of: scientific quality, scientific significance, societal impact, innovativeness
   - Strengths
   - Areas of development
   - Other remarks
   - Recommendations

Numeric evaluation: OUTSTANDING (5), EXCELLENT (4), VERY GOOD (3), GOOD (2), SUFFICIENT (1)

2. Practises and quality of doctoral training
   - Organising of the doctoral training in the RC. Description of the RC’s principles for:
     - recruitment and selection of doctoral candidates
     - supervision of doctoral candidates
     - collaboration with faculties, departments/institutes, and potential graduate schools/doctoral programmes
     - good practises and quality assurance in doctoral training
     - assuring of good career perspectives for the doctoral candidates/fresh doctorates
   - Identification of the RC’s strengths and challenges related to the practises and quality of doctoral training, and the actions planned for their development.

The additional material: TUHAT compilation of the RC’s other scientific activities/supervision of doctoral dissertations
A written feedback from the aspects of: processes and good practices related to leadership and management
   - Strengths
   - Areas of development
   - Other remarks
   - Recommendations

Numeric evaluation: OUTSTANDING (5), EXCELLENT (4), VERY GOOD (3), GOOD (2), SUFFICIENT (1)

3. The societal impact of research and doctoral training
   - Description on how the RC interacts with and contributes to the society (collaboration with public, private and/or 3rd sector).
   - Identification of the ways to strengthen the societal impact of the RC’s research and doctoral training.

The additional material: TUHAT compilation of the RC’s other scientific activities.
A written feedback from the aspects of: societal impact, national and international collaboration, innovativeness
   - Strengths
   - Areas of development
   - Other remarks
   - Recommendations

Numeric evaluation: OUTSTANDING (5), EXCELLENT (4), VERY GOOD (3), GOOD (2), SUFFICIENT (1)
4. International and national (incl. intersectoral) research collaboration and researcher mobility

- Description of
  - the RC’s research collaborations and joint doctoral training activities
  - how the RC has promoted researcher mobility
- Identification of the RC’s strengths and challenges related to research collaboration and researcher mobility, and the actions planned for their development.

A written feedback from the aspects of: scientific quality, national and international collaboration

- Strengths
- Areas of development
- Other remarks
- Recommendations

Numeric evaluation: OUTSTANDING (5), EXCELLENT (4), VERY GOOD (3), GOOD (2), SUFFICIENT (1)

5. Operational conditions

- Description of the operational conditions in the RC’s research environment (e.g. research infrastructure, balance between research and teaching duties).
- Identification of the RC’s strengths and challenges related to operational conditions, and the actions planned for their development.

A written feedback from the aspects of: processes and good practices related to leadership and management

- Strengths
- Areas of development
- Other remarks
- Recommendations

6. Leadership and management in the researcher community

- Description of
  - the execution and processes of leadership in the RC
  - how the management-related responsibilities and roles are distributed in the RC
  - how the leadership- and management-related processes support
    - high quality research
    - collaboration between principal investigators and other researchers in the RC
    - the RC’s research focus
    - strengthening of the RC’s know-how
- Identification of the RC’s strengths and challenges related to leadership and management, and the actions planned for developing the processes

7. External competitive funding of the RC

- The RCs were asked to provide information of such external competitive funding, where:
  - the funding decisions have been made during 1.1.2005-31.12.2010, and
  - the administrator of the funding is/has been the University of Helsinki
- On the e-form the RCs were asked to provide:
  1) The relevant funding source(s) from a given list (Academy of Finland/Research Council, TEKES/The Finnish Funding Agency for Technology and Innovation, EU, ERC, foundations, other national funding organisations, other international funding organisations), and
  2) The total sum of funding which the organisation in question had decided to allocate to the RCs members during 1.1.2005-31.12.2010.

Competitive funding reported in the text is also to be considered when evaluating this point.

A written feedback from the aspects of: scientific quality, scientific significance, societal impact, innovativeness, future significance

- Strengths
- Areas of development
- Other remarks
- Recommendations

8. The RC’s strategic action plan for 2011–2013

- RC’s description of their future perspectives in relation to research and doctoral training.

A written feedback from the aspects of: scientific quality, scientific significance, societal impact, processes and good practices related to leadership and management, national and international collaboration, innovativeness, future significance

- Strengths
- Areas of development
9. Evaluation of the category of the RC in the context of entity of the evaluation material (1-8)

The RC’s fitness to the chosen participation category
A written feedback evaluating the RC’s fitness to the chosen participation category
- Strengths
- Areas of development
- Other remarks
- Recommendations

Numeric evaluation: OUTSTANDING (5), EXCELLENT (4), VERY GOOD (3), GOOD (2), SUFFICIENT (1)

10. Short description of how the RC members contributed the compilation of the stage 2 material

Comments on the compilation of evaluation material

11. How the UH’s focus areas are presented in the RC’s research?

Comments if applicable

12. RC-specific main recommendations based on the previous questions 1-11

13. RC-specific conclusions

1.7 Evaluation criteria

The panellists were expected to give evaluative and analytical feedback to each evaluation question according to their aspects in order to describe and justify the quality of the submitted material. In addition, the evaluation feedback was asked to be pointed out the level of the performance according to the following classifications:
- outstanding (5)
- excellent (4)
- very good (3)
- good (2)
- sufficient (1)

Evaluation according to the criteria was to be made with thorough consideration of the entire evaluation material of the RC in question. Finally, in questions 1-4 and 9, the panellists were expected to classify their written feedback into one of the provided levels (the levels included respective descriptions, ‘criteria’). Some panels used decimals in marks. The descriptive level was interpreted according to the integers and not rounding up the decimals by the editors.

Description of criteria levels

Question 1 – FOCUS AND QUALITY OF THE RC’S RESEARCH

Classification: Criteria (level of procedures and results)

Outstanding quality of procedures and results (5)
Outstandingly strong research, also from international perspective. Attracts great international interest with a wide impact, including publications in leading journals and/or monographs published by leading international publishing houses. The research has world leading qualities. The research focus, key research questions scientific significance, societal impact and innovativeness are of outstanding quality.

In cases where the research is of a national character and, in the judgement of the evaluators, should remain so, the concepts of “international attention” or “international impact” etc. in the grading criteria above may be replaced by “international comparability”.

Other remarks
Recommendations
Operations and procedures are of outstanding quality, transparent and shared in the community. The improvement of research and other efforts are documented and operations and practices are in alignment with the documentation. The ambition to develop the community together is of outstanding quality.

**Excellent quality of procedures and results (4)**

Research of excellent quality. Typically published with great impact, also internationally. Without doubt, the research has a leading position in its field in Finland.

Operations and procedures are of excellent quality, transparent and shared in the community. The improvement of research and other efforts are documented and operations and practices are to large extent in alignment with the documentation. The ambition to develop the community together is of excellent quality.

**Very good quality of procedures and results (3)**

The research is of such very good quality that it attracts wide national and international attention.

Operations and procedures are of very good quality, transparent and shared in the community. The improvement of research and other efforts are documented and operations and practices are to large extent in alignment with the documentation. The ambition to develop the community together is of very good quality.

**Good quality of procedures and results (2)**

Good research attracting mainly national attention but possessing international potential, extraordinarily high relevance may motivate good research.

Operations and procedures are of good quality, shared occasionally in the community. The improvement of research and other efforts are occasionally documented and operations and practices are to large extent in alignment with the documentation. The ambition to develop the community together is of good quality.

**Sufficient quality of procedures and results (1)**

In some cases the research is insufficient and reports do not gain wide circulation or do not have national or international attention. Research activities should be revised.

Operations and procedures are of sufficient quality, shared occasionally in the community. The improvement of research and other efforts are occasionally documented and operations and practices are to some extent in alignment with the documentation. The ambition to develop the community together is of sufficient quality.

**Question 2 – DOCTORAL TRAINING**

**Question 3 – SOCIETAL IMPACT**

**Question 4 – COLLABORATION**

Classification: Criteria (level of procedures and results)

**Outstanding quality of procedures and results (5)**

Procedures are of outstanding quality, transparent and shared in the community. The practices and quality of doctoral training/societal impact/international and national collaboration/leadership and management are documented and operations and practices are in alignment with the documentation. The ambition to develop the community together is of outstanding quality. The procedures and results are regularly evaluated and the feedback has an effect on the planning.

**Excellent quality of procedures and results (4)**

Procedures are of excellent quality, transparent and shared in the community. The practices and quality of doctoral training/societal impact/international and national collaboration/leadership and management are documented and operations and practices are to large extent in alignment with the documentation. The ambition to develop the community together is of excellent quality. The procedures and outcomes are evaluated and the feedback has an effect on the planning.

**Very good quality of procedures and results (3)**

Procedures are of very good quality, transparent and shared in the community. The practices and quality of doctoral training/societal impact/international and national collaboration/leadership and
management are documented and operations and practices are to large extent in alignment with the
documentation. The ambition to develop the community together is of very good quality.

Good quality of procedures and results (2)
Procedures are of good quality, shared occasionally in the community. The practices and quality of
doctoral training/societal impact/international and national collaboration/leadership and
management are documented and operations and practices are to large extent in alignment with the
documentation. The ambition to develop the community together is of good quality.

Sufficient quality of procedures and results (1)
Procedures are of sufficient quality, transparent and shared in the community. The practices and
quality of doctoral training/societal impact/international and national collaboration/leadership and
management are occasionally documented and operations and practices are to some extent in
alignment with the documentation. The ambition to develop the community together is of sufficient
quality.

Question 9 – CATEGORY
Participation category – fitness for the category chosen
The choice and justification for the chosen category below should be reflected in the RC’s responses to the
evaluation questions 1–8.

1. The research of the participating community represents the international cutting edge in its field.
2. The research of the participating community is of high quality, but the community in its present
composition has yet to achieve strong international recognition or a clear break-through.
3. The research of the participating community is distinct from mainstream research, and the special
features of the research tradition in the field must be considered in the evaluation. The research is
of high quality and has great significance and impact in its field. However, the generally used
research evaluation methods do not necessarily shed sufficient light on the merits of the
research.
4. The research of the participating community represents an innovative opening. A new opening can
be an innovative combination of research fields, or it can be proven to have a special social,
national or international demand or other significance. Even if the researcher community in its
present composition has yet to obtain proof of international success, its members can produce
convincing evidence of the high level of their previous research.
5. The research of the participating community has a highly significant societal impact. The
participating researcher community is able to justify the high social significance of its research.
The research may relate to national legislation, media visibility or participation in social debate,
or other activities promoting social development and human welfare. In addition to having
societal impact, the research must be of a high standard.

An example of outstanding fitness for category choice (5)  
The RC’s representation and argumentation for the chosen category were convincing. The RC recognized
its real capacity and apparent outcomes in a wider context to the research communities. The specific
character of the RC was well-recognized and well stated in the responses. The RC fitted optimally for the
category.

- Outstanding (5)
- Excellent (4)
- Very good (3)
- Good (2)
- Sufficient (1)

The above-mentioned definition of outstanding was only an example in order to assist the panellists in
the positioning of the classification. There was no exact definition for the category fitness.

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The panels discussed the category fitness and made the final conclusions of the interpretation of it.
1.8 Timetable of the evaluation

The main timetable of the evaluation:

1. Registration November 2010
3. External peer review May–September 2011
4. Published reports March–April 2012
   - University level public report
   - RC specific reports

The entire evaluation was implemented during the university’s strategy period 2010–2012. The preliminary results were available for the planning of the following strategy period in late autumn 2011. The evaluation reports will be published in March/April 2012. More detailed time schedule is published in the University report.

1.9 Evaluation feedback – consensus of the entire panel

The panellists evaluated all the RC-specific material before the meetings in Helsinki and mailed the draft reports to the evaluation office. The latest interim versions were on-line available to all the panellists on the Wiki-sites. In September 2011, in Helsinki the panels discussed the material, revised the first draft reports and decided the final numeric evaluation. After the meetings in Helsinki, the panels continued working and finalised the reports before the end of November 2011. The final RC-specific reports are the consensus of the entire panel.

The evaluation reports were written by the panels independently. During the editing process, the evaluation office requested some clarifications from the panels when necessary. The tone and style in the reports were not harmonized in the editing process. All the reports follow the original texts written by the panels as far as it was possible.

The original evaluation material of the RCs, provided for the panellists is attached at the end of the report. It is essential to notice that the exported lists of publications and other scientific activities depend how the data was stored in the TUHAT-RIS by the RCs.
2 Evaluation feedback

2.1 Focus and quality of the RC’s research

- Description of
  - the RC’s research focus
  - the quality of the RC’s research (incl. key research questions and results)
  - the scientific significance of the RC’s research in the research field(s)
- Identification of the ways to strengthen the focus and improve the quality of the RC’s research

ASPECTS: Scientific quality, scientific significance, societal impact, innovativeness

The RC is focused on cell membranes. This is an area of great importance in contemporary biology. The group members are spread out on a wide variety of subjects spanning cell adhesion, synapse formation, glycoconjugates, cell signalling, membrane trafficking, functional lipidomics and platelet biology. Some of the RC leaders are at the international cutting edge while the younger groups still have work to do to push themselves to the forefront. One challenge for the future will be to achieve more synergy between the research topics of the participating groups. Membrane research requires multidisciplinary know-how and this means at least some overlapping research themes. One important area that is totally missing is membrane biophysics. Cell membranes are dynamic and inclusion of this aspect would require new know-how that now is lacking.

Numeric evaluation: 4 (Excellent)

2.2 Practises and quality of doctoral training

- Organising of the doctoral training in the RC. Description of the RC’s principles for:
  - recruitment and selection of doctoral candidates
  - supervision of doctoral candidates
  - collaboration with faculties, departments/institutes, and potential graduate schools/doctoral programmes
  - good practises and quality assurance in doctoral training
  - assuring of good career perspectives for the doctoral candidates/fresh doctorates
- Identification of the RC’s strengths and challenges related to the practises and quality of doctoral training, and the actions planned for their development.
- Additional material: TUHAT compilation of the RC’s other scientific activities/supervision of doctoral dissertations

ASPECTS: Processes and good practices related to leadership and management

The recruitment of PhD students is either from Master students that continue to a PhD or then the different PIs recruit themselves. This is a weakness of the RC. Considering the international competition today, a more unified recruitment system should be considered. One challenge will be to focus the research goals so that the PhD students will learn to cooperate. This is an important training issue and facilitates future success.

During 2005-2010 the RC produced 12 PhD degrees and a total of 53 person years of postdoctoral training was provided. Presently, there are 15 PhD students in the RC out of which five are foreigners. The quality of the training is reflected in the publication record: 121 publications have been published with 12-6 citations on the average. This is a sign of strength in their programme.
The PIs have a major role in undergraduate instruction. Though difficult to capture quantitatively, this almost certainly raises the preparation of students going into diverse Finnish PhD programs. The pedagogical discipline of undergraduate teaching often also increases the quality of doctoral training.

**Numeric evaluation: 4.5 (Excellent)**

### 2.3 The societal impact of research and doctoral training

- **Description on how the RC interacts with and contributes to the society (collaboration with public, private and/or 3rd sector).**
- **Identification of the ways to strengthen the societal impact of the RC’s research and doctoral training.**
- **Additional material: TUHAT compilation of the RC’s other scientific activities.**

ASPECTS: Societal impact, national and international collaboration, innovativeness

The PIs of the RC have been actively involved in societal impact of research. But how this is reflected in the doctoral training is not evident. The university should consider new ways to prepare PhD students for careers outside research. This is the venue most will take anyway. The courses should be RC wide. The plan of the RC to write articles for the lay public is a great one and should be implemented. Also the contacts to industry that the RC is cultivating are important and these activities should be intensified.

**Numeric evaluation: 4.5 (Excellent)**

### 2.4 International and national (incl. intersectoral) research collaboration and researcher mobility

- **Description of**
  - the RC’s research collaborations and joint doctoral training activities
  - how the RC has promoted researcher mobility
- **Identification of the RC’s strengths and challenges related to research collaboration and researcher mobility, and the actions planned for their development.**

ASPECTS: Scientific quality, national and international collaboration

The RC is well connected internationally. Objectively this is documented by the publications. Together with laboratories outside Finland there is an extensive seminar programme on the Viikki campus. In addition, there is a wide exchange of know-how on the campus and with other Finnish centres. The international impact of the RC would be strengthened by measures that would increase synergy between the research groups within the RC. Perhaps an annual retreat to discuss how to achieve this goal would be a useful instrument.

**Numeric evaluation: 4 (Excellent)**

### 2.5 Operational conditions

- **Description of the operational conditions in the RC’s research environment (e.g. research infrastructure, balance between research and teaching duties).**
- **Identification of the RC’s strengths and challenges related to operational conditions, and the actions planned for their development.**

ASPECTS: Processes and good practices related to leadership and management

The RC has an excellent infrastructure with equipment that covers the needs of the groups. Overall the Viikki campus is an excellent resource and facilitates research activities on a competitive international level. However, the continued demands on new equipment and resources require rational planning over
the RC on the campus. Are there mechanisms in place that for instance oversee the purchase of new equipment such that unnecessary purchases are avoided? The RC plans to move into drug screening. This is an extremely difficult area into which millions are invested worldwide with little success. Why should the RC move into this area?

2.6 Leadership and management in the researcher community

- Description of
  - the execution and processes of leadership in the RC
  - how the management-related responsibilities and roles are distributed in the RC
  - how the leadership- and management-related processes support
    - high quality research
    - collaboration between principal investigators and other researchers in the RC
    - the RC’s research focus
    - strengthening of the RC’s know-how
  - Identification of the RC’s strengths and challenges related to leadership and management, and the actions planned for developing the processes

ASPECTS: Processes and good practices related to leadership and management

The RC has a strong leadership, Carl Gahmberg, and the PIs form a Board that oversees the activities. Although the RC is producing high-quality research, more thoughts should be given to the research focus of the RC. The challenge will be to find themes that would help to synergize the RC. To be internationally competitive today means continuous efforts to find the cutting edges. A group in membrane biophysics would strengthen the RC.

2.7 External competitive funding of the RC

- The RCs were asked to provide information of such external competitive funding, where:
  - the funding decisions have been made during 1.1.2005–31.12.2010, and
  - the administrator of the funding is/has been the University of Helsinki
- On the e-form the RCs were asked to provide:
  1) The relevant funding source(s) from a given list (Academy of Finland/Research Council, TEKES/The Finnish Funding Agency for Technology and Innovation, EU, ERC, foundations, other national funding organisations, other international funding organizations), and
  2) The total sum of funding which the organisation in question had decided to allocate to the RCs members during 1.1.2005–31.12.2010.

Competitive funding reported in the text is also to be considered when evaluating this point.

ASPECTS: Scientific quality, scientific significance, societal impact, innovativeness and future significance

The PIs of the RC are funded from different sources: They have been in the RC for altogether 25.4 years and have received 5.98 MEUR. This is an average of 0.235 MEUR per year, which is less than some other RCs on the Viikki campus. One striking feature is that no EU funding has been secured. Here is room for improvement.

2.8 The RC’s strategic action plan for 2011–2013

- RC’s description of their future perspectives in relation to research and doctoral training.

ASPECTS: Scientific quality, scientific significance, societal impact, processes and good practices related to leadership and management, national and international collaboration, innovativeness, future significance
The strategic action plan outlines topics involving collaborations between members of the RC. The focus will be to move to cell-cell interactions and cell surface receptors. Challenges will be to move the research in these areas away from description to mechanistic analyses. There is clearly a need for more work to sharpen the ideas that are now circulating in the RC. Are there plans to recruit more groups and if so, in what area?

2.9 Evaluation of the category of the RC in the context of entity of the evaluation material (1-8)

The RC’s fitness to the chosen participation category.

Category 2. The research of the participating community is of high quality, but the community in its present composition has yet to achieve strong international recognition or a clear break-through.

The RC has chosen category 2 which states that ‘The research of the participating community is of high quality, but the community in its present composition has yet to achieve strong international recognition or a clear break-through’. This is to the point and describes the situation of MEMBREC. Thus, the challenge is to move beyond the present stage. In the previous sections the panel has outlined issues to be tackled and for which new solutions should be implemented.

Numeric evaluation: 4 (Excellent)

2.10 Short description of how the RC members contributed the compilation of the stage 2 material

—

2.11 How the UH’s focus areas are presented in the RC’s research

Focus area 2: The basic structure of life

The RC’s activities are in line with the outlined focus areas of UH.

2.12 RC-specific main recommendations

In the coming period the strong senior leadership which has been provided by Gahmberg will need to be supplemented from younger faculty. Given the competitive funding environment, a clear strategy for cooperation, interaction and concentration in this diverse area should be developed. The instructional efforts are a resource for the entire Bio community and should be maintained.

2.13 RC-specific conclusions

See 2.12 above.
3 Appendices

A. Original evaluation material
   a. Registration material – Stage 1
   b. Answers to evaluation questions – Stage 2
   c. List of publications
   d. List of other scientific activities

B. Bibliometric analyses
   a. Analysis provided by CWTS/University of Leiden
   b. Analysis provided by Helsinki University Library (66 RCs)
NAME OF THE RESEARCHER COMMUNITY:
Cell membrane recognition and dynamics (Membrec)

LEADER OF THE RESEARCHER COMMUNITY:
Professor Carl G. Gahmberg, Department of Biosciences, Faculty of Biological and Environmental Sciences

RC-SPECIFIC MATERIAL FOR THE PEER REVIEW:

- Material submitted by the RC at stages 1 and 2 of the evaluation
  - STAGE 1 material: RC’s registration form (incl. list of RC participants in an excel table)
  - STAGE 2 material: RC’s answers to evaluation questions
- TUHAT compilations of the RC members’ other scientific activities 1.1.2005-31.12.2010
  (analysis carried out by CWTS, Leiden University)

NB! Since Web of Science(WoS)-based bibliometrics does not provide representative results for most RCs representing humanities, social sciences and computer sciences, the publications of these RCs will be analyzed by the UH Library
(results available by the end of June, 2011)
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

RC-SPECIFIC STAGE 1 MATERIAL (registration form)

1 RESPONSIBLE PERSON

Name: Gahmberg, Carl G.
E-mail: 
Phone: 358-9-19159028
Affiliation: Division of Biochemistry and Biotechnology
Street address: P.O. Box 56 (Viikinkaari 5), 00014 University of Helsinki

2 DESCRIPTION OF THE PARTICIPATING RESEARCHER COMMUNITY (RC)

Name of the participating RC (max. 30 characters): Cell membrane recognition and dynamics
Acronym for the participating RC (max. 10 characters): Membrec

Description of the operational basis in 2005-2010 (eg. research collaboration, joint doctoral training activities) on which the RC was formed (MAX. 2200 characters with spaces): Our researcher community on the Viikki campus unites the different groups working on cell membrane research, which makes cooperation more efficient than was previously possible. All groups have a background in cell membrane biochemistry and cell biology, but with somewhat different research goals and topics. There are, however, many common interests. It is noteworthy that five of the participating PIs have been recruited to the UH Viikki campus in 2005-2010.

Our RC has impressive and increasing experience in membrane protein, carbohydrate and lipid biochemistry, as well as in membrane cell biology and receptor and signalling research. We work primarily on mammalian systems, and common interests between the groups include cell adhesion, neurobiology, and various types of receptors and their ligands. We are also interested in membrane traffic, especially in the form of autophagy and microvesiculation.

Modern research in the field depends on sophisticated methods and equipment, as well as trained people, and this is much more easily accomplished by pooling resources. In the past two years, we have obtained important core facility-type equipment, including a FACS analyzer, a FACS sorter, a mass spectrometer and a Biacore apparatus.

The PIs come from the Division of Biochemistry and Biotechnology, the Division of Physiology and Neuroscience, and the Department of Veterinary Biosciences. This fact enables the formation of a multidisciplinary research environment offering high-class education. The RC has organized a number of postgraduate courses for participants from both abroad and from UH and other domestic institutions.
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

RC-SPECIFIC STAGE 1 MATERIAL (registration form)

3 SCIENTIFIC FIELDS OF THE RC

Main scientific field of the RC’s research: biological, agricultural and veterinary sciences

RC’s scientific subfield 1: Biochemistry and Molecular Biology

RC’s scientific subfield 2: Cell Biology

RC’s scientific subfield 3: Biochemical Research Methods

RC’s scientific subfield 4: --Select--

Other, if not in the list: Cell Membrane Research

4 RC’S PARTICIPATION CATEGORY

Participation category: 2. Research of the participating community is of high quality, but the community in its present composition has yet to achieve strong international recognition or a clear break-through

Justification for the selected participation category (MAX. 2200 characters with spaces): The chosen category (#2) is justified by the high quality of research as evidenced by publication records of the PIs and success in obtaining competitive external funding (e.g., Academy of Finland). On the other hand, the RC has been formed more recently, and as yet has not had enough time to exploit its full potential. Thus, category #2 is considered the most appropriate. All seven PIs who make up the RC have publications in the 2005-2010 period in the leading journals (IF 5 or higher), including both top-tier general journals like Science, Molecular Cell, Nature Medicine, Nature Methods, and EMBO Journal, and leading specialty journals, e.g., Autophagy, Blood, Br J Pharmacol, Cell Death and Differentiation, J Biol Chem, J Cell Biol, J Neurosci, J Mol Biol, J Thromb Haemost, and Neuron. The overall publication record (entire career) of the PIs consists of >700 publications, which have received a total of 29 000 citations (ISI Web of Science, Nov 2011), yielding an average of 41 citations per article. The member PIs represent scientists at different stages of their career, ranging from established leaders in their respective fields (notably CG) to younger scientists with less extensive but solid track records (RK, PS), as evident in the bibliographic information of the individual scientists (see below). All PIs have served as expert reviewers for international funding agencies and leading scientific journals, and as invited speakers at international scientific meetings.

The PIs share a strong interest in the biochemistry and cell biology of biological membranes and membrane receptors. As parts of this RC, their complementary expertises are combined in order to increase the potential for world-class breakthroughs.

Bibliographic information of the PIs to complement the information available in TUHAT, which only covers the period 2005-2010 (PI/# of publications/# of citations/h-index):

Eskelinen/74/3800/27
Finne/146/6500/46
Gahmberg/279/11400/59
Keinänen/89/5500/29
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

RC-SPECIFIC STAGE 1 MATERIAL (registration form)

Kukkonen/62/1000/19
Käkelä/46/600/14
Siljander/23/600/14

5 DESCRIPTION OF THE RC'S RESEARCH AND DOCTORAL TRAINING

Public description of the RC's research and doctoral training (MAX. 2200 characters with spaces): The research topic of the community is the cell membrane, the outermost part of all cells, as well as membranes inside the cell. Since membranes are composed of lipids, proteins and carbohydrates, expertise on all these components is needed. Furthermore, cell membranes mediate many different types of biological functions that influence each other, which calls for cooperation between researchers with different backgrounds. The researcher community has thus been put together to collectively aim at results it would not be possible to achieve in smaller and more specialized groups.

The researcher community has impressive experience in various fields of research related to membranes. These include membrane protein, carbohydrate, and lipid biochemistry, cell biology, receptor research, and cellular signalling. Common interests of the groups include the mechanisms of how cells bind to other cells, how they bind biologically important molecules, and how they mediate signals. Another important area of interest is membrane traffic.

Successful research depends on the availability of trained people as well as advanced methods and equipment, which have been achieved by pooling resources. As an example, in the past two years, we have acquired some sophisticated instruments important for cell analysis and sorting as well as molecular interaction studies. These efforts will be continued to further build up the research potential of the community.

The researcher community has a strong background in postgraduate training. Five of the seven principal investigators are affiliated with the Division of Biochemistry and Biotechnology, which has a track record of the highest number of PhDs at the University of Helsinki and more than 90 adjunct professors. The researcher community has organized and offers a number of postgraduate courses in English for domestic and international participants. Our regular seminars also bring together scientists and students from the different groups. These activities, together with the strong research track record, strengthen the quality of our doctoral training.

Significance of the RC's research and doctoral training for the University of Helsinki (MAX. 2200 characters with spaces): The RC harbours key knowledge in membrane research, including membrane traffic, membrane receptors, signalling and cell recognition. The PIs have significant cooperation within UH, which also reflects the central position of the research conducted by the RC. The PIs actively contribute to the Viikki Campus research community (e.g. the Research Group Organization, research infrastructure initiatives, research seminar series). The PIs are also visible through many external collaborations with other universities and research institutions (in Finland and abroad), scientific organizations (societies, research foundations, graduate schools, advisory boards, journals) and the organizing of conferences.
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

RC-SPECIFIC STAGE 1 MATERIAL (registration form)

During the evaluation period, PIs have given numerous invited international presentations. CGG has received many international honours and memberships in exclusive scientific societies (academies) for his contributions to science.

All PIs are involved in both undergraduate (B.Sc. and M.Sc. levels) and doctoral education. All PIs have long-time pedagogic experience and/or pedagogic education. At the Div. of Biochemistry and Biotechnology, a significant proportion of students proceed further to the doctoral degree. Additionally, groups at other research institutes and e.g. the Medical Faculty of UH benefit considerably from the high theoretical and practical knowledge of our graduates. The same high standards apply to the postgraduate training. PIs actively take part in the organization of postgraduate courses, a part of which are included in graduate school curricula. Altogether 35 doctoral students were supervised by the PIs in 2005-2010 (22 within UH). The Div. of Biochemistry and Biotechnology, especially, is also important in coordinating doctoral thesis studies and defenses for a significant number of students conducting research in non-university institutions. The high number of PhDs produced benefits UH both in terms of funding received from the Ministry of Education and in various rankings. The good reputation of the RC enables further recruitment of high-level doctoral candidates and researchers.

Keywords: autophagy, calcium, cell adhesion, G protein, glycoconjugate, integrin, leukocyte, microvesicle, platelet, receptor

6 QUALITY OF RC’S RESEARCH AND DOCTORAL TRAINING

Justified estimate of the quality of the RC’s research and doctoral training at national and international level during 2005-2010 (MAX. 2200 characters with spaces): The RC has continuously published highly cited articles in high-impact journals and other journals important in our field, e.g. Science, Science Signaling, Molecular Cell, J Cell Biol, EMBO J, J Biol Chem, Blood, J Mol Biol, Glycobiology, Mol Immunol, and J Cell Sci in 2005-2010. PIs have given lectures at several important conferences, e.g. Gordon, and acted in the ERC Advanced Grants Evaluation Committee (Biochemistry and Structural Biology) 2008 and 2010. CGG has been elected to the Royal Swedish Academy of Sciences and the Royal Society of Arts and Sciences in Gothenburg, and obtained the biggest prize in medicine in Finland (the J.W. Runeberg Prize) in 2010. He is the most highly cited scientist of the campus (when excluding self-citation). The groups have obtained substantial external funding from the Academy of Finland and several foundations.

The groups have attracted a large number of applications from graduate students and postdoctoral fellows from several countries. They have also collaborated with top-class scientists from Harvard University, University of Cambridge, The Weizmann Institute of Science, NIH (Bethesda), Karolinska Institutet, The University of Texas MD Anderson Cancer Center (Houston), etc.

In 2005–2010, the RC produced 12 PhDs. Altogether 59 graduate students obtained a PhD from the Division of Biochemistry and Biotechnology during this period, which shows that a large proportion of our students continue into research. One important reason for this is that our students start working in the research groups and get interested in pursuing research early on. The pedagogical training of the RC members
further increases the quality of PhD training. The level of the PhD theses is generally high, and 3-6 articles in international journals are required. Several former students have obtained EMBO fellowships and gone on to work as postdoctoral fellows in prestigious laboratories. The PIs are also members in numerous thesis committees.

Comments on how the RC’s scientific productivity and doctoral training should be evaluated (MAX. 2200 characters with spaces): The scientific productivity of the RC is best evaluated by the number of highly cited peer-reviewed publications, H-factors and total citations. Since five of the PIs have only recently joined UH, their previous performances should be considered as a predictor of future productivity. The participation of the RC’s members in scientific conferences and functions (reviewing, editing, grants, memberships, honours) and other international research collaborations should be accounted in productivity. Finally, the forming of a multidisciplinary researcher community can be expected to increase both the productivity and the innovativeness of forthcoming research and doctoral training.

Information should be collected on how much of the theoretical work power has been available for research. The research output of lecturers and professors cannot be fairly compared with that of full-time researchers employed in research institutes, since e.g. teaching alone can take over 50 % of their time. Output should also be related to the sizes of the RCs. An RC of 120 researchers producing 50 papers a year is less efficient than an RC of 20 researchers producing 25 papers. Therefore, the numerical comparisons of the outputs should be related to the calculated research manpower. Finally, the phase of the RC should be acknowledged in the evaluation: in 2005-2010, our RC has just started, whereas other RCs may have been fully operational even before.

The fact that the RC provides a multifaceted, international and productive research environment is also reflected in the quality of our doctoral training, which could best be evaluated by the high number of PhDs graduating from the RC and by how well past students have filtered into science and society. Moreover, PhD thesis prizes and other honours indicate high-impact training. The pedagogical training of RC members further increases the quality of PhD training, and should be taken into consideration.

Our publishing strategy is to publish in international high-impact journals and in the leading journals of our particular fields, where topical research has a fast and strong influence.
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<tr>
<th>Last name</th>
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<th>Affiliation</th>
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Name of the RC’s responsible person: Gahmberg, Carl

E-mail of the RC’s responsible person:

Name and acronym of the participating RC: Cell membrane recognition and dynamics, MEMBREC

The RC’s research represents the following key focus area of UH: 2. Elämän perusrakenne – The basic structure of life

Comments for selecting/not selecting the key focus area: All living organisms consist of living cells, and thus the cell is the basic unit of life. All living cells are lined by membranes, and moreover, the cell organelles, including the nucleus, mitochondria, endoplasmic reticulum, and endosomal/lysosomal compartments, are also lined by membranes. In addition to this very central structural role, cell membranes serve equally important and very versatile roles in signal transduction and intracellular vesicle traffic. Therefore, it is clear that membranes are of pivotal importance in all living organisms. The focus of our RC is on the structure, dynamics, and functions of cell membranes, including the plasma membrane that surrounds the cell and the intracellular membranes that delimit the cell organelles.

The goal of the RC’s collaborative efforts is to analyze the functional and molecular parallels in the cell-cell interactions occurring in the immune and nervous systems.

Description of the RC’s research focus, the quality of the RC’s research (incl. key research questions and results) and the scientific significance of the RC’s research for the research field(s):

Cellular membranes constitute major signaling domains with their integral receptors, ion channels and adhesion molecules, and a variety of mobile extra- and intracellular signaling components. Cell recognition and adhesion are governed by the plasma membrane determinants. The membranes are dynamic structures that contain specialized regions: cell-cell and cell-substrate adhesion structures, caveolae, synaptic densities, and other functional microdomains, in which specific interactions between (glyco)proteins and lipids regulate fundamental processes like molecular motion, cellular remodeling, vesicular traffic and signaling pathways. Yet another example of the central role of membranes and membrane-limited organelle functions is their participation in the determination of cell fate, i.e. normal growth and differentiation versus induction of apoptosis or uncontrolled growth (e.g. neoplasia).

Consequently, studies of membrane processes have become one of the central themes in biomedicine. Thus, important new membrane functions may be discovered by adopting integrative and interdisciplinary approaches of both conventional and system scale.

The RC laboratories (indicated by PI initials) are complementary to each other in terms of interests and methodology. 1) CG is studying cellular adhesion, with the main focus on the regulation of leukocyte integrin activity by intracellular signaling molecules and protein phosphorylation. Another, more recent, research line has revealed a role for ICAMS/integrin interaction in the regulation of synapse formation and activity. The group utilizes a wide repertoire of protein biochemical and immunological methods. 2) JF focuses on cell surface glycoconjugates, particularly the polylsialic acid structures of cell adhesion molecules like N-CAM, and of bacterial polysaccharide capsules. The ligand interactions and functional roles of these structures in the nervous system and in bacterial adhesion are studied. The methods include biochemical analysis of glycans and their binding interactions. 3) KK aims to understand the...
mechanisms that guide the subunit assembly and maturation of AMPA receptors, crucial for glutamatergic synapses, and how external protein interactions regulate the cellular trafficking and activity of these receptors. Methodology covers molecular biology, electrophysiology, and structural and functional analysis of ligand interactions and cellular trafficking of the proteins. 4) JK investigates G-protein-coupled receptor signaling, mainly with respect to orexin receptors. Calcium and lipid messenger signaling mechanisms, as well as signaling regulating cell death, are studied. JK has wide expertise in optical monitoring and measurement of intracellular signaling pathways. 5) ELE is working on autophagy and lysosomal membrane proteins; the main topics are the origin and structure of autophagosomal membranes, the role of small GTPases in autophagy, as well as the functions of the lysosomal membrane protein LAMP-2. ELE utilizes morphological techniques and new methods for 3D imaging at organelle level (electron tomography, 3view). 6) The approach of RK is functional lipidomics, i.e. mass spectrometry of system-scale alterations in cell lipidomes related to specific physiological functions. Protein-lipid interactions regulating ion channels, membrane pumps, and cell signaling in different membrane microdomains are studied. Other interests include the role of lipids in the pathogenesis of neurodegenerative disorders and stem cell differentiation and function. 7) PS focuses on platelet-derived microparticles, their molecular composition (including the lipidome) and functions in particular. In addition, the functional role of platelets in immunity, microvesiculation of leukocytes, and the interactions between microparticles and leukocytes are actively pursued. Platelets are also an uncharacterized source of several neuronal effectors (AMPA receptors, BDNF). Major results from each group are summarized in the attached Figure 1.

The aim of forming the MEMBREC RC has been to bring together the key knowledge in membrane biochemistry/biology at the Viikki campus (Figure 2). The RC harbors expertise in the central areas of membrane receptor and ion channel functions, signaling pathways employing protein and lipid messengers, and membrane traffic. The scientific collaboration networks cover the areas not intimately mastered by the RC itself, and the RC is likely to expand in future. We bring together different theoretical and practical knowledge and thereby promote both current projects and new openings. The major strengths of the RC are 1) profound understanding of basic biochemistry and cell biology, 2) implementation of this knowledge on central cell biological and physiological questions, and 3) a wide range of technical expertise, which in a complementary fashion allows wide coverage of the field. The recognized concept is that the understanding of the complex membrane processes requires thorough fundamental knowledge of the underlying biochemical processes. This firm base, combined with cutting-edge technology, prepares the way to well-grounded yet innovative projects studying the complex biochemical processes at cellular and organismal levels. As detailed in section 8, we will focus our collaborative efforts on analyzing the functional and molecular parallels in the cell-cell interactions in the immune and nervous systems.

The quality of the research in the RC is demonstrated by the large number of high-quality publications, the large sum of competitive funding, and the numerous expert commissions and scientific positions of trust, as well as awards. The RC members have continuously published highly cited articles in high-impact journals and other journals important in our field (e.g. Science, Science Signaling, Molecular Cell, J Cell Biol, EMBO J, J Biol Chem, Blood, J Mol Biol, Glycobiology, Autophagy, Mol ImmunoL, and J Cell Sci in 2005-10), even though the PIs have been able to allocate only approximately half their working time for research and doctoral training; the rest is used for administration and undergraduate teaching. When the entire careers of the PIs in the RC are taken into consideration, their publications have been cited altogether about 30,000 times. A total of 691 scientific articles have been published, 14 of which in journals with IF over 20, 41 in IF between 10 and 20, and 194 in IF between 5 and 10. CG is the most cited scientist on the Viikki campus (when excluding self-citation). In 2005-10, the PIs have been invited to give 50 talks in international scientific conferences or symposia, and an equal number in Finland.
**RC-SPECIFIC STAGE 2 MATERIAL**

PIs are well-ranked experts in their own scientific fields. The expertise of the PIs was acknowledged by several Finnish and International expert assignments in 2005-10, including review of grants (e.g. ERC) and Professorships and Adjunct Professorships (tens of reviews), review and examination of doctoral dissertations (tens of reviews) and peer-review of scientific publications (approximately 300 reviews). The activity of the PIs in their own fields is also evidenced by the active participation in scientific organizations (also in positions of honor), organizing of symposia etc. The RC members have obtained a total of 6.1 M € of competitive external research funding in 2005-10. Moreover, the PIs have collaborations with top-class scientists, e.g. from the universities/institutes in Harvard, Cambridge, Weizmann, NIH, Karolinska, and Houston.

In 2005-10, the RC produced 12 PhD degrees, and a total of 53 person-years of postdoctoral training was given.

**Ways to strengthen the focus and improve the quality of the RC’s research.**

The RC is now in its initial stage (5 out of 7 PIs were recruited to UH during 2005-10) where the experience, knowledge and equipment are being mapped, and the cooperation is finding its form. This planning phase has been identified as a central process to build on. MEMBREC research seminars have been established for this purpose; the research and technical approaches in each member group are presented and discussed. This paves way for improving the quality of our work a) by raising the scientific level of separate projects through transfer of technology and knowledge, b) through initiation of collaborative research projects, and c) by pursuing funds for advanced equipment for common use. Several cooperation areas or knowledge transfer projects have already been identified. Doctoral training can also be improved by this approach, through better supervision, wider scientific and methodological basis for projects, and common educational initiatives, such as applications for international training positions and the organizing of new multidisciplinary courses in membrane biology.

**2. Practices and Quality of Doctoral Training (max. 8800 characters with spaces)**

- **How is doctoral training organised in the RC?** Description of the RC’s principles for recruitment and selection of doctoral candidates, supervision of doctoral candidates, collaboration with faculties, departments/institutes, and potential graduate schools/doctoral programmes, good practises and quality assurance in doctoral training, and assuring good career perspectives for the doctoral candidates/fresh doctorates.

The RC members come from the Faculty of Biological and Environmental Science, the Division of Biochemistry and Biotechnology (DBB) (GC, KK, JF, PS, ELE), and the Division of Physiology and Neurobiology (RK), as well as from the Faculty of Veterinary Medicine (JK). DBB has a long and successful experience in doctoral education - 239 PhDs have graduated since 1981 when CG was appointed professor. The research on the Division of Physiology and Neurobiology is primarily focused on neuroscience, and there, as well, a significant number of PhD students are trained. In the Veterinary Medicine, most students become practicing veterinarians. The groups in all the units mentioned above benefit greatly from the formation of the current RC. By forming this consortium with increased interaction and collaboration, common research seminars and modern multidisciplinary courses, we predict that the doctoral education will become even better.

DBB educates students from their entrance to the University, starting from the BSc and MSc degrees, and in many cases until the PhD degree. The division gets excellent students; only 7-10% of the applicants are accepted to the BSc and MSc curricula. During their early studies, the students are introduced to research through two eight-week projects in the research laboratories of DBB. Moreover, all research group leaders of DBB deliver lectures on their research topics to the new students. This
helps the students realize what they are interested in, and, on the other hand, gives the teachers the chance to recruit the best students to their research groups. Thus, at DBB, a significant proportion of MSc graduates proceed to the doctoral degree, which also reflects the standard of teaching. Many doctoral candidates join the RC this way, but obviously other routes are also very important. To recruit new PhD students, we advertise locally, through our home pages, and through the FinBioNet online job market. Traditionally, the PI who wishes to recruit a PhD student has been responsible for the choice, but with the formation of the RC, this task can also become a joint project. The good reputation of the RC enables recruitment of high-level doctoral candidates and researchers, also from abroad. Whenever possible, the students are interviewed before the decision is made (based solely on the motivation and previous performance of the students). Once a student has been selected to join a research group, s/he must also apply for a PhD studentship from the Faculty by supplying a research plan and a schedule for the tentative studies. The majority (80%) of our PhD students are female, which reflects the situation in our MSc curricula. The RC also makes the effort to support the female PhDs in their careers after their graduation. At present, the RC member groups have 15 PhD students, 5 of whom are from abroad.

Most PhD students are initially supported from grants awarded to the PIs. After showing their ability in the PhD project, most students manage to get a position in one of the local or national graduate programs, which contribute either the total salary or part of the salary for a maximum of four years. The supervisor normally works in the same laboratory as the PhD student, and is thus available to discuss the experiments regularly. The Faculty of Biological and Environmental Sciences appoints a follow-up group of three researchers for every doctoral student. These groups meet with the student at least once a year to discuss the PhD project, including the laboratory work and the studies. Moreover, the students present their results in laboratory group meetings organized by the home division, the MEMBREC RC, and the Viikki Research Group Organization. Further, both the research groups and graduate programs use their funds to enable the students to participate in at least one international meeting per year. Finally, we would like to point out that some of the PIs in the RC (ELE,PS) also have formal training in university pedagogy and supervision.

The RC members have extensive collaboration in doctoral training especially with the Medical and Science Faculties, as well as with the research institutes such as the Institute of Neurosciences and the Institute of Biotechnology. The collaboration includes shared lecture courses, practical courses, and education in the use of novel or demanding techniques. RK takes part in collaborative supervision of doctoral studies in the Finnish Red Cross and Wihuri Research Institute, mainly funded by these outer parties. Many of our PhD students are in graduate programs, primarily in the Viikki Graduate Programme in Molecular Biosciences, the Helsinki Graduate Program in Biotechnology and Molecular Biology, Drug Discovery Graduate School, Glycoscience Graduate School and the Finnish Graduate School of Neurosciences. The RC members contribute to the curricula of the graduate programs and organize specific postgraduate courses that are included in graduate program curricula (e.g., the course Cell Fractionation and Electron Microscopy, and the monthly Cell Biology Club seminars). Finally, the Faculties on the Viikki campus organize courses for PhD students on transferable skills, including scientific writing, oral presentation, science communication, pedagogy and biobusiness.

For PhD theses, 3-5 articles in international journals are commonly required. In addition, the students need to earn 60 study points from courses, lectures, or participation in scientific meetings with posters or oral presentations. The Faculty appoints two external reviewers and an official opponent, often from abroad, for each PhD thesis. This rigorous review process ensures the high quality of the PhD theses, but, on the other hand, the requirement of published articles makes it difficult to achieve the PhD degree in the recommended time of four years.
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

RC-SPECIFIC STAGE 2 MATERIAL

The PhD graduates from the RC are employed in research groups in Finland and abroad, by the industry, by the public sector and by various commercial organizations. Commonly, those who plan a career in research spend 1-3 years as postdoctoral fellows, often abroad. In most cases, PhDs who graduate from the RC get postdoctoral positions easily because they have published several papers in international journals and have excellent laboratory skills. Several former PhD students of the RC have obtained EMBO fellowships and continued their careers as postdoctoral fellows in prestigious laboratories, which reflects the high quality of the doctoral training in the RC.

- RC’s strengths and challenges related to the practises and quality of doctoral training, and the actions planned for their development.

The Ministry of Education has set the goal of shortening the time in which PhD students need to finish their degree. Currently, it takes approximately six years to earn a PhD in biosciences in Finland, and it will be difficult to shorten this time as long as the requirement of 3-5 published papers is maintained. Nevertheless, the momentum gained by building this RC will undoubtedly produce more and improved PhD training opportunities with a wide research scope in the biology of membranes. One of the ideas under development is to promote PhD student interaction by setting up a “PhD nursery”, which facilitates effective peer support by increasing scientific interaction within related research topics, e.g., by introducing discussion groups and regular seminars. Further, we plan to encourage our PhD students to take courses on transferable skills, and facilitate their networking possibilities by sending them to our collaborating laboratories in Finland and abroad for laboratory visits.

- Description of how the RC interacts with and contributes to the society (collaboration with public, private and/or 3rd sector).

The RC performs mainly basic (as opposed to applied) research and therefore its influence into the society is primarily mediated through research and teaching. Scientific publications and presentations in meetings disseminate the results to a wider audience, including the international academic scientific community and the pharmaceutical industry. Further, the RC members supervise graduate students and are also heavily involved in undergraduate teaching.

The RC members have numerous commitments in the public area and in external scientific organizations. CG has been the chairman (inspector) of one of the largest student organizations of the University of Helsinki for 18 years. He is also on the board of the Delegation of Finnish Scientific Societies, which organizes the Finnish Science Days (a biannual science fair to the lay public), distributes grants for scientific publishing, and runs the Finnish Science Ethical Committee. Furthermore, he is a member of the boards of Folkhälsan (an organization of 1300 employees and 17000 volunteers, dealing with kindergartens, care of the elderly and the disabled etc.) and the Minerva Foundation for Medical Research, and the chairman of the scientific committees of both Folkhälsan and Minerva. RK supports the research activities of Finnish Game and Fisheries Research Institute and Natural Heritage. PS is a board member of the Society for Adjunct Professors/Docents of the UH. This society brings together former and present teachers and experts of UH working in various public, private and third sector organizations and institutions. JF has various tasks in the trade union of University Professors.

The RC has also communicated science to the lay public. CG is the permanent secretary of the Finnish Society of Science and Letters and has had many public appearances and contacts with the general public. ELE has acted as an expert in cell biology for the exhibition Science Changing the World, currently held in the Finnish Science Center Heureka. JK has participated in the public discussion on issues related to both science and education, and contributed towards articles in daily papers on the topics ranging...
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

RC-SPECIFIC STAGE 2 MATERIAL

from absinth to student intake at universities. We will also use our RC’s new website to inform the lay public of our work, including research and teaching.

The RC also interacts with private companies. CG is on the board of Medix, an international biotechnology company. JF is the Chairman of the Board of the biotechnology company Bioligand. JK has been collaborating with the Orion pharmaceutical company. As an academic partner of Finnish Red Cross Blood Service, RK contributes to a program organized by the Strategic Centre for Health and Well-being and funded by TEKES and Finnish biomedical companies. The efforts of this program are equally shared between the academic and company partners and aim to foster related Finnish business. KK is involved in biotechnology collaborations in Finland (VTT) and abroad (Kyushu Institute of Technology, Japan).

- Ways to strengthen the societal impact of the RC's research and doctoral training.

The RC provides an efficient way to strengthen the scientific impact of its members through more efficient collaboration, and a means to aim at ambitious scientific goals requiring concerted multidisciplinary approaches. The RC also serves as a platform for a more structured doctoral training. Inviting speakers from research institutes and from pharmaceutical and biotechnology industry to our common weekly seminars will help to catalyze interaction with the private and public sectors. For doctoral students and undergraduates, the seminars give further opportunities to learn and practice scientific communication skills that are important for interaction with the society.

We also plan to contribute to the education of the lay public by writing joint popular articles in non-scientific journals to increase awareness of the nature and importance of basic research in our field. We will encourage our PhD students to participate in courses on scientific communication. We also plan to organize open doors days at our departments, where PhD students and postdocs will play a major role.

- Description of the RC's research collaborations and joint doctoral training activities and how the RC has promoted researcher mobility.

The RC harbors key knowledge in membrane research, including membrane traffic, receptors, signaling and cell recognition. Hence the RC has tremendous potential for significant novel research collaborations which can be built on the preexisting collaborative efforts of the individual PIs. The RC members currently contribute to the Viikki Campus research community (e.g. the Research Group Organization, infrastructure initiatives, seminars) and have several cooperations within the UH (Biomedical, Haartman Institute, Neuroscience Center and Institute of Biotechnology) and with the University Hospital, which reflects the centrality of the research conducted. The RC members are nationally active in many external collaborations with other universities (Jyväskylä and Turku, Åbo Akademi) and research institutions (Wihuri and Minerva Research Institutes, and Red Cross Blood Service) and with industry (Orion). Particularly important are the international collaborations, which have a track record of producing top-class publications, e.g., in Science, Mol Cell and EMBO J. All RC members have extensive lists of international research collaborations, which also support the whole RC. Collaborations involve researchers in universities /research institutes in Estonia, Belgium, Germany, Israel, Italy, the Netherlands, Sweden, UK and USA, and encompass projects on carbohydrates and their ligands, functions of various lipid species, detailed analyses of membrane receptor interactions and signaling, protein structures, autophagy, and membrane vesiculation as well as various system-scale approaches. From this pool, a wide scope of expertise in the biology of membranes can be drawn for...
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

RC-SPECIFIC STAGE 2 MATERIAL

PhD training and evaluation, review boards, seminar speakers, and conferences, as well as basic research activities such as learning new techniques or acquiring reagents.

Researcher mobility in the RC takes many forms. The members, including PhD students, actively participate in international congresses and visit collaborative laboratories for various lengths of time, e.g. to learn new methods. Foreign visitors have also been hosted in the PIs' laboratories for the same purpose. In addition, some PIs are involved in international review boards and are familiar with research policies in those countries. Finally, based on the scientific contacts of the RC, several distinguished scientists, e.g. Nobel laureates have given talks at the seminar series on the Viikki campus.

All PIs are involved in doctoral education as supervisors and thesis committee members. Some have recruited international PhD students to their groups or have supervisor duties abroad, or their students have international PhD co-supervisors or members in thesis committees. These activities promote international exchange already at the PhD student level. Members of the RC are also heavily involved in the undergraduate (BSc and MSc level) teaching. This allows us to establish novel courses based on the scientific strengths of the RC, which also benefits the PhD students. E.g., currently, there are no joint laboratory courses targeting the entire field of membrane biology. The RC is now planning to initiate such courses.

- **RC's strengths and challenges related to research collaboration and researcher mobility, and the actions planned for their development.**

  The key strength of the RC is the variety of expertise in different but complementary approaches to membrane recognition and dynamics. This forms a strategic platform for novel openings and increased collaborative opportunities, since almost all aspects of membrane biology are represented either by the RC's own research or by their collaborators'. Another strength is the high quality of the RC's work and its PhD students. These properties make the RC an attractive collaborative partner, which enables recruitment of high-level PhD students and researchers, also from abroad. The RC's activities will be displayed on its website, linked to the University web pages and the TUHAT database. The major challenge is getting the collaboration to work in a focused manner; joint grant applications, novel multidisciplinary courses and shared PhD training will serve as unifying targets. Researcher mobility could be improved by reciprocal exchange or even rotations. Resources for sabbaticals would be beneficial for the PIs, since their considerable teaching duties restrict research potential.

5 OPERATIONAL CONDITIONS (MAX. 4400 CHARACTERS WITH SPACES)

- **Description of the operational conditions in the RC’s research environment (e.g. research infrastructure, balance between research and teaching duties).**

  The Viikki biosciences campus houses the Faculties of Biological and Environmental Sciences, Pharmacy, Veterinary Medicine, and Agriculture and Forestry, as well as the Neuroscience Center and the Institute of Biotechnology, which together employ approximately 1800 staff members and 6500 students. The PIs on the campus form a Research Group Organization, which is divided into nine research programs (e.g. cell biology, neurobiology, drug discovery, structural biology, genomics). The research programs enhance interaction between laboratories by organizing and supporting seminars and managing the Viikki Doctoral Programme in Molecular Biosciences.

  The RC members are employed in the Faculty of Biological and Environmental Science (CG, KK, JF, PS, ELE, RK) and the Faculty of Veterinary Medicine (JK). The PIs have laboratory space with basic equipment and cell culture facilities in their home divisions. The home departments also house high-
quality equipment that is imperative for the research of the RC members. Such equipment include e.g.,
FACS (fluorescence-assisted cell sorter) machines, Biacore facility for the detection of protein-protein
interactions, live-cell imaging setup, electrospray ionization mass spectrometer for lipid analysis, several
HPLC (high-performance liquid chromatography) setups, quantitative thin layer chromatography
equipment, oocyte electrophysiology setup, and several wide-field fluorescence microscopes with CCD
cameras. Moreover, on the Viikki campus, the RC members have access to further high-quality
equipment, including excellent core facilities on light microscopy (three confocal microscopes, live cell
imaging, high-content screening of live cells), electron microscopy (transmission and scanning electron
microscopy, cryo-fixation, cryo-sectioning, freeze-substitution, electron tomography, 3View system for
3D electron microscopy), protein chemistry (protein mass spectrometry), biological NMR (protein NMR
spectrometry, titration microcalorimetry), and DNA sequencing and genomics. Most core facilities also
have permanent staff to run the units and maintain the equipment, as well as help and train the users.
To conclude, the Viikki campus offers an excellent research environment for the study of the structure,
function and dynamics of cellular membranes.

All PIs of the RC are employed as members of the permanent teaching staff, either as professors or
university lecturers. Their teaching and administration responsibilities take on the average 50 % of their
total working time, which means that none of them is a full-time researcher. (The PhD students and
postdoctoral scientists in the RC member groups have a smaller teaching responsibility, limited to
approximately 5 % of their working time.) On the other hand, the involvement in teaching makes it
possible for the RC members to spread their knowledge and know-how to both undergraduate and
graduate students, and to recruit motivated students to their laboratories.

- RC’s strengths and challenges related to operational conditions, and the actions planned for their
development.

The RC has a broad spectrum of know-how, its members master a plentitude of techniques on different
membrane-related fields, and it has access to a wide selection of equipment and core facilities on the
Viikki campus. Since the campus is large, the chances of setting up and supporting new core facilities
and instruments are better than in small isolated units. Furthermore, the campus houses numerous
research groups which possess knowledge and know-how that supports the RC in fields and techniques
that are not mastered by the RC members.

One major challenge is raising funding for a lipidomics core laboratory. Another challenge is seeking
funding for high- or immediate throughput screening equipment that we plan to use for drug screening
with fluorescent assays. Such equipment is not accessible anywhere in Finland, and this constitutes a
major problem in drug development and other quantitative projects. These challenges will be addressed
by collaborative infrastructure grant applications, e.g. to the Academy of Finland, the UH Infrastructure
funding, and Biocenter Finland.

6 LEADERSHIP AND MANAGEMENT IN THE RESEARCHER COMMUNITY (MAX. 4400 CHARACTERS WITH SPACES)

- Description of the execution and processes of leadership in the RC, how the management-related
  responsibilities and roles are distributed in the RC and how the leadership- and management-related
  processes support high quality research, collaboration between principal investigators and other
  researchers in the RC, the RC’s research focus and strengthening of the RC’s know-how.

CG is primarily responsible for the leadership of the RC, but, importantly, the PIs form a board that
handles all more important issues. CG retired from the chairmanship of the Division of Biochemistry and
Biotechnology (DDB) on January 1st 2011, which means that he will have more time for research and
running the RC. Furthermore, we have a half-time secretary (Leea Sokura) who takes care of daily matters. The board of the RC will decide on e.g. purchase of new equipment, arrangement of seminars, invitation of foreign guests, and allocation of funds for salaries, consumables and traveling. Along with the common management of the RC, each of the PIs in the RC independently leads his/her own research group and manages his/her own grants.

These management processes support high-quality research as they help to attract, identify and recruit excellent students and postdoctoral fellows from Finland and abroad. The members of the RC advertise our research at international and national meetings and conferences. The most important goal is, however, publishing in top-class journals. The RC circulates manuscripts prepared by its members to collect feedback and to ensure excellent quality before submissions. The RC is also important in the case that one member group suffers from temporary lack of grant funding. In this case the management, i.e. the RC board, may be able to help.

Seminars are not always enough to keep the RC members well informed about what the different groups are doing. Therefore, the board will arrange more informal gatherings outside where all group members will meet for 1-2 days. It is particularly important that also the younger members get to know each other and learn what the others are doing. Novel methods or exciting scientific news can be effectively communicated this way. We feel that it is an essential obligation of the PIs to assure that the younger members are successful and able to compete for academic positions. Finally, the board is currently setting up a website for the RC (http://www.vetmed.helsinki.fi/english/membrec/). This site will be used to inform both the RC members and the scientific community about our research and teaching activities. The open PhD and postdoctoral positions will also be advertised on this website. In the future, we also plan to use the website to inform the lay public of our work.

1. **RC’s strengths and challenges related to leadership and management, and the actions planned for developing the processes.**

Our strength is that each PI runs his/her research group independently, but in the RC the PIs form a larger community that has wider expertise and impact. The RC helps its members to realize their common goals and the benefits of networking and cooperation. Together, the RC members can identify areas in which they are particularly strong, and where more resources should be allocated, but also areas where improvement is needed. Such decisions need extensive discussions, but it is clear that the PIs are very enthusiastic about the common effort.

It would be useful to establish a practice of research assessment by the same advisory board at regular intervals. This advisory board would meet the RC members and evaluate the research, thus helping to reveal our strengths and challenges. It would further be useful if the RC had “free” money which could be used on short notice for buying equipment or hiring graduate or postdoctoral students. The decision-making of UH and granting bodies is slow, which has previously caused us to lose excellent candidates because of lack of funding.

### 7 EXTERNAL COMPETITIVE FUNDING OF THE RC

- **Listing of the RCs external competitive funding, where:**
  - the funding decisions have been made during 1.1.2005-31.12.2010, and
  - the administrator of the funding is/has been the University of Helsinki

- **Academy of Finland (AF)** - total amount of funding (in euros) AF has decided to allocate to the RC members during 1.1.2005-31.12.2010: 4200000
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

RC-SPECIFIC STAGE 2 MATERIAL

- Finnish Funding Agency for Technology and Innovation (TEKES) - total amount of funding (in euros): TEKES has decided to allocate to the RC members during 1.1.2005-31.12.2010: 50000

- European Union (EU) - total amount of funding (in euros): EU has decided to allocate to the RC members during 1.1.2005-31.12.2010:

- European Research Council (ERC) - total amount of funding (in euros): ERC has decided to allocate to the RC members during 1.1.2005-31.12.2010:

- International and national foundations - names of international and national foundations which have decided to allocate funding to the RC members during 1.1.2005-31.12.2010, and the amount of their funding (in euros):
  - names of the foundations: Maj and Tor Nessling Foundation; Magnus Ehrnroth Foundation; University of Helsinki Foundations; University of Helsinki Science Foundation; Sigrid Juselius Foundation; Nordic Microscopy Society; Robert Bosch Stiftelse; Novo Nordisk Foundation; K. Albin Johansson Foundation; Finska Läkaresällskapet; Medicinska Understödfsöreningen Liv och Hälso; Cancer Society of Finland; Jenni and Antti Wihuri Foundation
  - total amount of funding (in euros) from the above-mentioned foundations: 1230000

- Other international funding - names of other international funding organizations which have decided to allocate funding to the RC members during 1.1.2005-31.12.2010, and the amount of their funding (in euros):
  - names of the funding organizations:
  - total amount of funding (in euros) from the above-mentioned funding organizations:

- Other national funding (incl. EVO funding and Ministry of Education and Culture funded doctoral programme positions) - names of other national funding organizations which have decided to allocate funding to the RC members during 1.1.2005-31.12.2010, and the amount of their funding (in euros):
  - names of the funding organizations: Finnish Red Cross Blood Service; University of Helsinki Nanotechnology Program (Henakoto); Biocentrum Helsinki funding; DDGS (Drug Discovery Graduate School); Rector’s travel grants; Doctoral programme positions
  - total amount of funding (in euros) from the above-mentioned funding organizations: 50000

8 RC’S STRATEGIC ACTION PLAN FOR 2011–2013 (MAX. 4400 CHARACTERS WITH SPACES)

- Description of the RC’s future perspectives in respect to research and doctoral training.
  During 2011-13, the RC will strengthen the links between the member groups and create a platform for efficient sharing of key methodologies and doctoral training practices. These actions have already been initiated and will increase the international competitiveness of the RC members and facilitate breakthroughs in projects that require broader technical expertise and a multidisciplinary approach. In addition, we anticipate that close collaboration within the RC will foster entirely novel ideas and experimental avenues that would not be feasible otherwise.

  We will focus our collaborative efforts on the analysis of functional and molecular parallels in the cell-cell interactions in the immune and nervous systems. Recent studies have revealed that the parallels, observed at morphological level, between the immunological synapse and the synapses in the central
nervous system may actually extend deeper into the molecular mechanisms underlying cell-cell interactions and their regulation. Similar (sometimes even identical) proteins, including adhesion molecules, receptors and scaffolding molecules, have been found to function in the two systems in establishing the critical adhesive events and links between the membrane proteins and the cytoskeleton. Furthermore, neurotransmitter receptors long thought to operate exclusively in neuronal communication have been identified in lymphocytes and platelets, suggesting novel regulatory functions. We will use the range of expertise and tools present in our RC to further analyze these similarities. The results may also shed light on the basic, evolutionarily old molecular elements of functional cell contacts. Specific topics include (i) the role of ICAM5/integrin interaction in synapse formation and its links to other synaptic components (CG, KK, JF); (ii) the role of specific glycans and lipids in neuronal and immunological synapses and in the vesicular traffic of key membrane proteins (JF, ELE, RK, KK, CG); and (iii) Ca2+ signaling and novel regulatory mechanisms of lymphocyte and platelet activation and neuronal function, including the role of autophagy, microvesiculation and lymphocyte/platelet glutamate receptors (JK, ELE, RK, PS, CG, KK). These topics have been selected on the basis of the shared interest, the added value that a concerted action is expected to bring, and the international competitiveness our RC is expected to have in this area. We feel that our ability to employ a broad range of experimental approaches, including electron tomography, dynamic Ca2+ imaging, sophisticated lipid analysis, and a wide repertoire of protein-ligand interaction techniques, together with the track records of the RC members in their respective fields offer us a definitive edge in this important research area. The plan outlined above is still developing, and we expect to use it in grant applications in the near future to secure funding for these collaborative studies.

As stated in section 2 Practices and quality in doctoral training, the PhD students of the RC are mostly associated with existing PhD programs and follow their respective curricula. Doctoral Programs running on the Viikki campus offer courses on molecular biosciences and on general academic skills. The RC plans to complement this training by organizing an annual course on membrane biology (including lectures, seminars and practicals) to be incorporated into the MSc and PhD level curricula. In this, we can build on the existing seminar-type courses, such as Membrane Biochemistry (by CG) and Receptors and Signals (by KK).

We will continue the weekly MEMBREC seminars as the main avenue for information sharing and as a platform for training of presentation skills for students. In order to form new collaborative links (or strengthen the existing ones), speakers will also be invited from outside laboratories, especially on methods/approaches outside our expertise.

Importantly, we plan to rotate students between the RC member laboratories, and to have shared graduate students. This will not only help to distribute the methods, practices and know-how, but is also important in strengthening the internal cohesion in the newly formed RC.

| 9 SHORT DESCRIPTION OF HOW THE RC MEMBERS HAVE CONTRIBUTED TO THE COMPILATION OF THE STAGE 2 MATERIALS (MAX. 1100 CHARACTERS WITH SPACES). |

All PIs of the RC actively participated in the compilation of the materials. Each PI was responsible for one or two sections presented in the electronic form (CG, sections 2 and 6; JK and RK, section 1; JF, section 3; PS, section 4; ELE sections 5 and 9, and the Appendix; and KK, section 8). The preliminary texts and Appendix were circulated to the other PIs, and they were eagerly commented on. We met several times to discuss the texts, the evaluation process, and our collaborations. All PIs felt that the process of putting together these materials was very rewarding and beneficial for future research enterprises and collaborations.
Appendix – Cell membrane recognition and dynamics – Gahmberg – Figure 1.

**Major research results of the MEMBREC laboratories in 2005-2010**

**Gahmberg lab**
- The group showed that specific phosphorylations in the alfa- and beta-chains of the leukocyte LFA-1 integrin are needed for cell adhesion.
- Identification of the first natural inhibitor of LFA-1. Collaboration with T. Chavakis, NIH.

**Finne lab**
- Identification of polysialic acid as a prognostic marker in human neuroblastoma.
- Determination of the molecular mechanism of iron incorporation and peroxide resistance in pathogenic streptococci.
- Development of magnetic nanoparticles and glycodendrimers as tools for the identification and inhibition of pathogenic bacteria.

**Keinänen lab**
- Identification of a role for glutamate as a molecular chaperone in AMPA receptor trafficking.
- Identification of a key role of the ligand binding domain in the subunit-specific assembly and trafficking of AMPA receptors.
- Structural and functional elucidation of the PDZ interaction between GluA1 AMPA receptors and the scaffolding protein SAP97/Dlg1.

**Kukkonen lab**
- Identification of p38 MAPK pathway in orexin receptor signaling to cell death.
- Discovery of engagement of multiple lipid signaling pathways in orexin receptor signaling.

**Käkelä lab**
- Discovery of cholesterol-dependent functional interaction of BK potassium channel and Na/K-ATPase in human melanoma cells.
- Studies on the role of lipidome alterations in the pathogenesis of human inherited neurodegenerative diseases. Collaboration with Thomas Braulke, University Medical Center Hamburg-Eppendorf.

**Eskelinen lab**
- Demonstration that the membranes of nascent autophagosome are connected with the rough endoplasmic reticulum, which suggests that the latter delivers membrane to the autophagosome.

**Siljander lab**
- Novel research on platelet-derived microparticles.
- Eberhard Mammen Young Investigator Prize.
- Discovery of novel integrin binding sites and affinity-state dependent interaction of platelet alpha2beta1 integrin with collagen mimetic peptides. Collaboration with Richard Farndale, University of Cambridge, and Johan Heemskerk, University of Maastricht.
Cell membrane recognition and dynamics

- Cell-cell interactions in immune and nervous systems
- PhD and postdoctoral training
  - Protein-protein interactions
  - Lipid mass spectrometry – Glycomics
  - Electrophysiology – Live cell imaging
  - 3D electron microscopy

Appendix
Cell membrane recognition and dynamics (MEMBREC)
Gahmberg
Figure 2.
1 Analysis of publications


<table>
<thead>
<tr>
<th>Publication type</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>Total Count 2005 - 2010</th>
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<tbody>
<tr>
<td>A1 Refereed journal article</td>
<td>17</td>
<td>16</td>
<td>17</td>
<td>19</td>
<td>21</td>
<td>21</td>
<td>111</td>
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<tr>
<td>A2 Review in scientific journal</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>A3 Contribution to book/other compilations (refereed)</td>
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<td>4</td>
<td>1</td>
<td></td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A4 Article in conference publication (refereed)</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B1 Unrefereed journal article</td>
<td>1</td>
<td>2</td>
<td>6</td>
<td>1</td>
<td></td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>B2 Contribution to book/other compilations (non-refereed)</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>B3 Unrefereed article in conference proceedings</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C2 Edited book, compilation, conference proceeding or special issue of journal</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>E1 Popular article, newspaper article</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>H1 Patents</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>
2 Listing of publications

A1 Refereed journal article

2005


Molecular and Cellular Neuroscience, vol 24, no. 7, pp. 1150-1158.


2006


INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

MEMBREC/Gahmberg


Öhman, TJ, Rintahakka, J, Källkinen, N, Matikainen, S, Nyman, TA 2009, 'Actin and RIG-I/MAVS signaling components translocate to mitochondria upon influenza A virus infection of human primary macrophages', Journal of Immunology, vol 182, no. 9, pp. 5682-5692.

2010


Mikkola, ET, Gahmberg, CG 2010, Hydrophobic interaction between the SH2 Domain and the Kinase Domain Is Required for the Activation of Cat', Journal of Molecular Biology, vol 399, no. 4, pp. 618-627.


INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

RC-SPECIFIC TUHAT COMPILATIONS OF PUBLICATIONS DATA 2005-2010

MEMBREC/Gahmberg


A2 Review in scientific journal

2005


2008


2009

A3 Contribution to book/other compilations (refereed)

2005

7
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

MEMREC/Gahmberg

2008
Kukkonen, J 2008, 'OX1 Receptor', in SJ Enna, DB Bylund (eds), xPharm, Elsevier, pp. 11 s.
Kukkonen, J 2008, 'Drexin receptors', in SJ Enna, DB Bylund (eds), xPharm, Elsevier, pp. 5 s.
Kukkonen, J 2008, 'OX2 Receptor', in SJ Enna, DB Bylund (eds), xPharm, Elsevier, pp. 11 s.

2009

A4 Article in conference publication (referred)

2007

B1 Unrefered journal article

2006

2007

2008

2009

B2 Contribution to book/other compilations (non-referred)

2008
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

MEMBREC/Gahmberg

B3 Unrefereed article in conference proceedings

2009


C2 Edited book, compilation, conference proceeding or special issue of journal

2007

E1 Popular article, newspaper article

2010

H1 Patents

2010
## 1 Analysis of activities 2005-2010

<table>
<thead>
<tr>
<th>Activity type</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supervisor or co-supervisor of doctoral thesis</td>
<td>30</td>
</tr>
<tr>
<td>Prizes and awards</td>
<td>8</td>
</tr>
<tr>
<td>Editor of research journal</td>
<td>6</td>
</tr>
<tr>
<td>Peer review of manuscripts</td>
<td>153</td>
</tr>
<tr>
<td>Assessment of candidates for academic posts</td>
<td>7</td>
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<tr>
<td>Membership or other role in review committee</td>
<td>3</td>
</tr>
<tr>
<td>Membership or other role in research network</td>
<td>4</td>
</tr>
<tr>
<td>Membership or other role in national/international committee, council, board</td>
<td>28</td>
</tr>
<tr>
<td>Membership or other role in public Finnish or international organization</td>
<td>5</td>
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<tr>
<td>Membership or other role of body in private company/organisation</td>
<td>5</td>
</tr>
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</table>
2 Listing of activities 2005-2010

Supervisor or co-supervisor of doctoral thesis

Carl G. Gahmberg,
Supervision of Doctoral thesis (Henrietta Nyman-Huttunen), Carl G. Gahmberg, 01.01.1999 → ...
Supervision of Doctoral thesis (Tiina Hilden), Carl G. Gahmberg, 1999 → 2005, Finland
Supervision of Doctoral thesis (Michael Stefanidakis), Carl G. Gahmberg, 2001 → 2006, Finland
Supervision of Doctoral thesis (Eisa Mikkola), Carl G. Gahmberg, 15.08.2003 → ...
Supervision of Doctoral thesis (Liisa Uotila), Carl G. Gahmberg, 2003 → ...
Supervision of Doctoral thesis (Susanna Nummi), Carl G. Gahmberg, 2005 → 2008, Finland
Supervision of Doctoral thesis (Lin Ning), Carl G. Gahmberg, 19.01.2006 → ...
Supervision of Doctoral thesis (Farhana Jahan), Carl G. Gahmberg, 2009 → ...
Supervision of Doctoral thesis (Sunseta Narumanchi), Carl G. Gahmberg, 2010 → ...

Mikaela Grönholm,
The Neurofibromatosis 2 tumor suppressor merlin in cytoskeleton organization and cell cycle regulation, Mikaela Grönholm, 2007

Jukka Finne,
Ph.D. Thesis Supervision, Jukka Finne, 2006, Finland
Ph.D. Thesis Supervision, Jukka Finne, 2009, Finland
Ph.D. Thesis Supervision, Jukka Finne, 2010, Finland

Kari Keinänen,
Supervision of Ph.D. student, Kari Keinänen, 01.01.2005 → ..., Finland
Supervision of Ph.D. Student, Kari Keinänen, 01.03.2008 → ..., Finland

Jyrki (P) Kukkonen,
Supervisor (doctoral thesis), Jyrki (P) Kukkonen, 2005, Sweden
Doctoral thesis supervision (ongoing), Jyrki (P) Kukkonen, 01.08.2007 → ..., Finland
Supervisor (doctoral thesis), Jyrki (P) Kukkonen, 2008, Sweden
Doctoral thesis supervision (ongoing), Jyrki (P) Kukkonen, 01.06.2009 → ..., Finland
Doctoral thesis supervision (ongoing), Jyrki (P) Kukkonen, 15.04.2009 → ..., Finland
Supervisor (doctoral thesis), Jyrki (P) Kukkonen, 2010, Sweden

Eeva-Liisa Eskelinen,
Supervision of PhD thesis, Eeva-Liisa Eskelinen, 01.01.2005 → 2009, Germany
Supervisor of PhD thesis, Eeva-Liisa Eskelinen, 01.01.2005 → 2007, Germany
Supervisor of a PhD thesis, Eeva-Liisa Eskelinen, 01.09.2007 → 2013, Finland

Pia Siljander,
PhD supervisor, Pia Siljander, 11.03.2010 → ...

Reijo Käkelä,
Supervision of MSc/doctoral thesis, Feven Tigistu Sahle / University of Helsinki, Reijo Käkelä, 01.08.2010 → 15.05.2015, Finland
Prizes and awards

Carl G. Gahmberg,
Chevalier d’Ordre des Palmes Académiques, Carl G. Gahmberg, 2009, France
The J. W. Runeberg Prize, Carl G. Gahmberg, 2010

Mikaela Grönholm,
Best thesis in biomedicine in 2005, Mikaela Grönholm, 2005
Ph.D. with honours, Mikaela Grönholm, 2005
Best supervisor for Master thesis work, Mikaela Grönholm, 2006, Finland

Jyrki (P) Kukkonen,
Franzén-Fuxe Prize 2003, Jyrki (P) Kukkonen, 2003 → ..., Sweden

Eeva-Liisa Eskelinen,
Competent Master’s Thesis supervisor 2010, Eeva-Liisa Eskelinen, 2010, Finland

Pia Siljander,
Eberhard Mammen Young Investigator award, Pia Siljander, 2010, Australia

Editor of research journal

Carl G. Gahmberg,
Biochemical Journal, Carl G. Gahmberg, 2005 → ..., United Kingdom

Jukka Finne,
Member of the Editorial Board of Glycoconjugate Journal, Jukka Finne, 1984 → ..., United States

Jyrki (P) Kukkonen,
Drug Design Reviews Online, Jyrki (P) Kukkonen, 2003 → 2005

Eeva-Liisa Eskelinen,
Member of Editorial Board in Autophagy journal, Eeva-Liisa Eskelinen, 01.01.2006 → ..., United States

Peer review of manuscripts

Carl G. Gahmberg,
Biochemical Journal, Carl G. Gahmberg, 2005 → ..., United Kingdom
Blood, Carl G. Gahmberg, 2005 → ..., United States
Brain Research, Carl G. Gahmberg, 01.01.2005 → 31.12.2005, United States
Clinical and Experimental Immunol., Carl G. Gahmberg, 2005 → ..., United Kingdom
EMBO Journal, Carl G. Gahmberg, 01.01.2005 → 31.12.2005, United Kingdom
Experimental Cell Research, Carl G. Gahmberg, 2005 → ..., United States
Immunology, Carl G. Gahmberg, 2007 → ..., United Kingdom
Biochim. Biophys. Acta, Carl G. Gahmberg, 2009 → ...

Mikaela Grönholm,
Oncogene, Mikaela Grönholm, 01.01.2008 → ...
Cancer Research, Mikaela Grönholm, 01.01.2009 → ...


INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

RC-SPECIFIC TUHAT COMPILATIONS OF OTHER SCIENTIFIC ACTIVITIES 2005-2010

MENBREC/Gahmberg

BMC Neuroscience, Mikaela Grönholm, 01.01.2010 → ...
Cancer Research, Mikaela Grönholm, 01.01.2010 → ...

Kari Keinänen,
Manuscript review, Kari Keinänen, 01.2005, United States
Manuscript review, Kari Keinänen, 02.2005, United States
Manuscript review, Kari Keinänen, 04.2005, United States
Manuscript review, Kari Keinänen, 01.2006, United States
Manuscript review, Kari Keinänen, 02.2007, United States
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Manuscript review, Kari Keinänen, 10.2007, United States
Manuscript review, Kari Keinänen, 04.2008, United States
Manuscript review, Kari Keinänen, 01.2009, United States
Manuscript review, Kari Keinänen, 02.2009, United States
Manuscript review, Kari Keinänen, 03.2009, United Kingdom
Manuscript review, Kari Keinänen, 04.2009, United Kingdom
Manuscript review, Kari Keinänen, 05.2009, United Kingdom
Manuscript review, Kari Keinänen, 06.2009, United Kingdom
Manuscript review, Kari Keinänen, 08.2009, United States
Manuscript review, Kari Keinänen, 09.2009, United States
Manuscript review, Kari Keinänen, 03.2010, United States
Manuscript review, Kari Keinänen, 04.2010, United States
Manuscript review, Kari Keinänen, 08.2010, United States
Manuscript review, Kari Keinänen, 10.2010, United States
Manuscript review, Kari Keinänen, 02.2011, United States
Manuscript review, Kari Keinänen, 04.2011, United States
Manuscript review, Kari Keinänen, 05.2011, United States
Manuscript review, Kari Keinänen, 06.2011, United States
Manuscript review, Kari Keinänen, 12.2011, United States

Jyrki (P) Kukkonen,
Acta Physiologica Scandinavica (currently Acta Physiologica), Jyrki (P) Kukkonen, 2005
Acta Physiologica Scandinavica (currently Acta Physiologica), Jyrki (P) Kukkonen, 2005
Neuroscience, Jyrki (P) Kukkonen, 2005
The Journal of Physiology, Jyrki (P) Kukkonen, 2005
Cellular and Molecular Life Sciences, Jyrki (P) Kukkonen, 2006
European Journal of Pharmaceutical Sciences, Jyrki (P) Kukkonen, 2006
Neuroscience Letters, Jyrki (P) Kukkonen, 2006
Acta Physiologica, Jyrki (P) Kukkonen, 2007
Acta Physiologica, Jyrki (P) Kukkonen, 2007
Cellular and Molecular Life Sciences, Jyrki (P) Kukkonen, 2007
Expert Opinion in Therapeutic Targets, Jyrki (P) Kukkonen, 2007
Journal of Neuroendocrinology, Jyrki (P) Kukkonen, 2007
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

RC-SPECIFIC TUHAT COMPILATIONS OF OTHER SCIENTIFIC ACTIVITIES 2005-2010

Membrec/Gahmberg

Journal of Neuroscience Research, Jyrki (P) Kukkonen, 2007
Journal of Pharmacology and Experimental Therapeutics, Jyrki (P) Kukkonen, 2007, United States
Neurochemical Research, Jyrki (P) Kukkonen, 2007
Pharmacological Research, Jyrki (P) Kukkonen, 2007
Regulatory Peptides, Jyrki (P) Kukkonen, 2007
Trends in Pharmacological Sciences, Jyrki (P) Kukkonen, 2007
Cellular and Molecular Life Sciences, Jyrki (P) Kukkonen, 2008
Acta Physiologica, Jyrki (P) Kukkonen, 2009
Acta Physiologica, Jyrki (P) Kukkonen, 2009
Cellular and Molecular Life Sciences, Jyrki (P) Kukkonen, 2009, Switzerland
Cellular and Molecular Life Sciences, Jyrki (P) Kukkonen, 2009, Switzerland
Journal of Neurochemistry, Jyrki (P) Kukkonen, 2009
Neuroscience Letters, Jyrki (P) Kukkonen, 2009
BBA - Molecular Cell Research, Jyrki (P) Kukkonen, 2010
Biochemical Pharmacology, Jyrki (P) Kukkonen, 2010
Journal of Cell Science, Jyrki (P) Kukkonen, 2010
Journal of Neurochemistry, Jyrki (P) Kukkonen, 2010
Journal of Pharmacy and Pharmacology, Jyrki (P) Kukkonen, 2010
Pharmacological Reports, Jyrki (P) Kukkonen, 2010, Poland

Eeva-Lisa Eskelinen

Reviewer for Autophagy journal, Eeva-Lisa Eskelinen, 2006, United States
Reviewer for BMC Cell Biology, Eeva-Lisa Eskelinen, 2006
Reviewer for Cell Death and Differentiation, Eeva-Lisa Eskelinen, 2006
Reviewer for FEBS Journal, Eeva-Lisa Eskelinen, 2006
Reviewer for Autophagy journal, Eeva-Lisa Eskelinen, 2007 → ..., United States
Reviewer for Biochemistry and Cell Biology journal, Eeva-Lisa Eskelinen, 2007
Reviewer for Cell Death and Differentiation, Eeva-Lisa Eskelinen, 2007
Reviewer for Oncogene journal, Eeva-Lisa Eskelinen, 2007
Reviewer for BMC Biochemistry, Eeva-Lisa Eskelinen, 2007
Reviewer for Autophagy journal, Eeva-Lisa Eskelinen, 2008, United States
Reviewer for BBA Molecular Cell Research, Eeva-Lisa Eskelinen, 2008
Reviewer for Biological Chemistry, Eeva-Lisa Eskelinen, 2008
Reviewer for Brain Cell Biology, Eeva-Lisa Eskelinen, 2008
Reviewer for Cell Death and Differentiation, Eeva-Lisa Eskelinen, 2008
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

RC-SPECIFIC TUHAT COMPILATIONS OF OTHER SCIENTIFIC ACTIVITIES 2005-2010

MEMBREC/Gahmberg

Reviewer for Life Sciences, Eeva-Lisa Eskelinen, 2008
Reviewer for Nature Cell Biology, Eeva-Lisa Eskelinen, 08.2008
Reviewer for Nature Cell Biology, Eeva-Lisa Eskelinen, 08.2008
Reviewer for Nature Cell Biology, Eeva-Lisa Eskelinen, 10.2008
Reviewer for The Anatomical Records, Eeva-Lisa Eskelinen, 2008
Reviewer for Trends in Cell Biology, Eeva-Lisa Eskelinen, 2008
Reviewer for international grant applications, Eeva-Lisa Eskelinen, 2008
Reviewer for Autophagy journal, Eeva-Lisa Eskelinen, 01.01.2009 → 31.12.2009, United States
Reviewer for Journal of Immunology, Eeva-Lisa Eskelinen, 01.01.2009 → 31.12.2009
Reviewer for Nature Cell Biology, Eeva-Lisa Eskelinen, 01.2009
Reviewer for Nature Cell Biology, Eeva-Lisa Eskelinen, 03.2009
Reviewer for international grant applications, Eeva-Lisa Eskelinen, 01.01.2009 → 31.12.2009
Reviewer for Autophagy journal, Eeva-Lisa Eskelinen, 01.01.2010 → 31.12.2010
Reviewer for Cancer Letters, Eeva-Lisa Eskelinen, 01.01.2010 → 31.12.2010
Reviewer for Cancer Letters, Eeva-Lisa Eskelinen, 01.01.2010 → 31.12.2010
Reviewer for Cell Death &amp; Disease journal, Eeva-Lisa Eskelinen, 01.01.2010 → 2010
Reviewer for European Journal of Cell Biology, Eeva-Lisa Eskelinen, 01.01.2010 → 31.12.2010
Reviewer for Experimental Cell Research journal, Eeva-Lisa Eskelinen, 01.01.2010 → 31.12.2010
Reviewer for F1000 Biology&amp;Medicine Reports, Eeva-Lisa Eskelinen, 01.01.2010 → 31.12.2010
Reviewer for Journal of Cell Biology, Eeva-Lisa Eskelinen, 04.2010, United States
Reviewer for Journal of Cell Biology, Eeva-Lisa Eskelinen, 08.2010
Reviewer for Journal of Cellular and Molecular Medicine, Eeva-Lisa Eskelinen, 01.01.2010 → 31.12.2010
Reviewer for Journal of Lipids, Eeva-Lisa Eskelinen, 01.01.2010 → 31.12.2010
Reviewer for Nature Biotechnology, Eeva-Lisa Eskelinen, 01.01.2010 → 31.12.2010
Reviewer for Nature Cell Biology, Eeva-Lisa Eskelinen, 01.01.2010 → 31.12.2010
Reviewer for PLOS One, Eeva-Lisa Eskelinen, 01.2010
Reviewer for PLOS One, Eeva-Lisa Eskelinen, 04.2010
Reviewer for PLOS One, Eeva-Lisa Eskelinen, 08.2010
Reviewer for Proc Natl Acad Sci USA, Eeva-Lisa Eskelinen, 01.01.2010 → 31.12.2010, United States
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

RC-SPECIFIC TUHAT COMPILATIONS OF OTHER SCIENTIFIC ACTIVITIES 2005-2010

MEMREC/Gahmberg

Reviewer for international grant applications, Eeva-Lisa Eskelinen, 01.01.2010 → 31.12.2010

Pia Siljander, Invited reviewer, Pia Siljander, 2007 → ...

Reijo Käkelä, Aquatic Toxicology, reviewer, May 2006, Reijo Käkelä, 10.05.2006, Netherlands
Archives of Environmental Contamination and Toxicology, reviewer, Oct 2006, Reijo Käkelä, 24.10.2006, United States
Marine Biology, reviewer, Dec 2006, Reijo Käkelä, 01.12.2006
Lipids, reviewer, Jan 2008, Reijo Käkelä, 14.01.2008, United States
Marine Ecology Progress Series, reviewer, June 2008, Reijo Käkelä, 02.06.2008, Germany
Marine Ecology Progress Series, reviewer Nov 2008, Reijo Käkelä, 24.11.2008
Marine Ecology Progress Series, reviewer, May 2008, Reijo Käkelä, 29.05.2008
Marine Ecology Progress Series, reviewer, Oct 2008, Reijo Käkelä, 02.10.2008
Environmental Pollution, reviewer, July 2009, Reijo Käkelä, 10.07.2009
Journal of Comparative Physiology B, reviewer, June 2009, Reijo Käkelä, 03.06.2009
Marine Ecology Progress Series, reviewer, April 2009, Reijo Käkelä, 02.04.2009
Marine Ecology Progress Series, reviewer, Jan 2009, Reijo Käkelä, 01.01.2009
Marine Biology, reviewer, Dec 2010, Reijo Käkelä, 03.12.2010
Marine Biology, reviewer, March 2010, Reijo Käkelä, 25.03.2010
Polar Biology, reviewer, Sept 2010, Reijo Käkelä, 30.09.2010

Assessment of candidates for academic posts

Kari Keinänen, Assessor for Professorship, Kari Keinänen, 09.2005, United States
Assessor for Professorship, Kari Keinänen, 01.2006, United States
Assessor for Professorship, Kari Keinänen, 12.2006, United States
Assessor for Docentship, Kari Keinänen, 11.2007, Finland
Assessor for Docentship, Kari Keinänen, 08.2007, Finland

Pia Siljander, Dosentuurin asiantuntijalausunto, Pia Siljander, 10.2010

Reijo Käkelä, Adjunct professorship evaluation, Päivi Soppela, University of Oulu, Reijo Käkelä, 05.05.2006 → 08.05.2006, Finland

Membership or other role in review committee

Kari Keinänen, Grant review, Kari Keinänen, 11.2007, Austria
Grant review, Kari Keinänen, 01.2007, Canada

Pia Siljander, Evaluator of post doctoral research grants, Pia Siljander, 2008 → …
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

MEMBREC/Gahmberg

Membership or other role in research network
Eeva-Liisa Eskelinen,
Vice coordinator of the Cell Biology Program in Viikki Research Groups organization, Eeva-Liisa Eskelinen, 01.01.2008 → 31.12.2011, Finland
Member of European Study Group of Lysosomal Storage Diseases, Eeva-Liisa Eskelinen, 2010 → …

Reijo Käkelä,
Member of "Glycolipids European NetWork GLEN", Reijo Käkelä, 16.02.2009 → 31.12.2011
Participant of "Intelligent Monitoring of Human Health" (SalVe, SHOK) Programme, Reijo Käkelä, 01.06.2010 → 31.12.2013, Finland

Membership or other role in national/international committee, council, board
Carl G. Gahmberg,
European Molecular Biology Organization (EMBO), Carl G. Gahmberg, 1980 → …
Academia Europea, Carl G. Gahmberg, 1989 → …
ALLEA, Carl G. Gahmberg, 2005 → 2008, Netherlands
Stiftelsen för strategisk forskning (GLIBS), Carl G. Gahmberg, 2005 → 2008, Sweden
Suomen Tiedekomitea Valtuuskunta, Carl G. Gahmberg, 2005 → …, Finland
Suomen Tieteellisten Seuran Valtuuskunta, Carl G. Gahmberg, 2005 → …, Finland
The Finnish Society of Sciences and Letters, Carl G. Gahmberg, 01.01.2005 → …, Finland
Wahls Foundation, Carl G. Gahmberg, 2005 → …, Finland
World Cultural Council, Carl G. Gahmberg, 2005 → …, Mexico
World Innovation Foundation, Carl G. Gahmberg, 2005 → …, United Kingdom
The Royal Swedish Academy of Sciences (Nobel), Carl G. Gahmberg, 2007 → …, Sweden
Advanced Grants Selection Committee, Carl G. Gahmberg, 2008
Evaluation of Samfundet Folkhälsan's research, Carl G. Gahmberg, 2008 → …, Finland
Ruth and Nils-Erik Stenbäck Foundation, Carl G. Gahmberg, 2008 → …, Finland
The Royal Society of Arts and Sciences in Gothenburg, Carl G. Gahmberg, 2008 → …, Sweden
Advanced Grants Selection Committee, Carl G. Gahmberg, 2010

Mikaela Grönholm,
Finska Kemistsamfundet (Finnish Chemistry Society), board member, Mikaela Grönholm, 2003 → …

Jukka Finne,
Member of the Board of The International Glycoconjugate Organization, Jukka Finne, 1991 → …
Chairman of the Board of the Glyco Section of Societas Biophysica, Biochimica et Microbiologica Fenniae, Jukka Finne, 2006 → …, Finland
Member of the Board of the Glycoscience Graduate School, Jukka Finne, 2006 → …, Finland
Member of the Steering Committee of European Science Foundation research networking programme EuroGlycoScience Forum, Jukka Finne, 2009 → 2014
Elected member of the science academy the Finnish Society of Sciences and Letters, Jukka Finne, 2010 → …, Finland
Member of the Board of Societas Biophysica, Biochimica et Microbiologica Fenniae, Jukka Finne, 2010 → …, Finland
Member of the Scientific Board of the University of Helsinki, Jukka Finne, 2010 → 2012, Finland

Kari Keinänen,
Advisory Board Member (GluTarget), Kari Keinänen, 01.2009 → 06.2013, Denmark
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

RC-SPECIFIC TUHAT COMPILATIONS OF OTHER SCIENTIFIC ACTIVITIES 2005-2010

MEMBREC/Gahmberg

Jyrki (P) Kuukkonen,
Breast Cancer Campaign, Jyrki (P) Kuukkonen, 01.01.2007 → 31.12.2007, United Kingdom

Pia Siljander,
Member of the Society of Adjunct Professors in the University of Helsinki, Pia Siljander, 25.10.2010

Membership or other role in public Finnish or international organization

Carl G. Gahmberg,
Evaluation of research at University of Uppsala, Carl G. Gahmberg, 28.03.2007 → 01.04.2007, Sweden

Kari Keinänen,
Faculty Board Member, Kari Keinänen, 01.01.2010 → ..., Finland

Sarah Kate Coleman,
Regular Member, Sarah Kate Coleman, 2005 → 2010, United Kingdom
Regular Member, Sarah Kate Coleman, 2005 → 2010, United Kingdom
Regular Member, Sarah Kate Coleman, 2008 → 2010, United States

Membership or other role of body in private company/organisation

Carl G. Gahmberg,
Medix, Carl G. Gahmberg, 2005 → ..., Finland

Minerva, Carl G. Gahmberg, 2005 → ..., Finland

Nylands Nation, inspektor, Carl G. Gahmberg, 01.01.2005 → 2010, Finland

Samfundet Folkhälsan, Carl G. Gahmberg, 2005 → ..., Finland

Jukka Finne,
Chairman of the Board of the company Bioligand Oy, Jukka Finne, 1993 → ..., Finland
Research Group: Gahmberg C

Basic statistics
- Number of publications (P) 121
- Number of citations (TCS) 1,530
- Number of citations per publication (MCS) 12.64
- Percentage of uncited publications 18%
- Field-normalized number of citations per publication (MNCS) 1.36
- Field-normalized average journal impact (MNJS) 1.34
- Field-normalized proportion highly cited publications (top 10%) 1.11
- Internal coverage .93

Trend analyses

Collaboration

Performance (MNCS) by collaboration type
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING
AT THE UNIVERSITY OF HELSINKI
by CWTS, Leiden University, the Netherlands

Research profile

[Bar chart showing research profile with categories such as Biochemistry & Molecular Biology, Cell Biology, etc., with bars indicating the number of publications.]