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

RC-Specific Evaluation of CardioMed – Cardiovascular Medicine

Seppo Saari & Antti Moilanen (Eds.)
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University of Helsinki
Administrative Publications 80/37
Evaluations

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:

Main scientific field of research: Medicine, Biomedicine and Health Sciences

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 breakthrough

RC’s responsible person: Mervaala, Eero

RC-specific keywords: Cardiovascular pharmacology; Regenerative medicine, Cell therapy, Personalized medicine; Pharmacogenetics; Drug development; Nutrition; Functional foods; Metabolism; Translational Research; Inflammation

Keywords: Research Evaluation, Meta-evaluation, Doctoral Training, Bibliometric Analyses, Researcher Community
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 ....................................................................................................................... 17
  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 ..................................................................................... 18
  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 .................................................................................................................... 19

3 Appendices .................................................................................................................................................... 21
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 Lorenz Poellinger
Cancer biology, cell and molecular biology
Karolinska Institute, Sweden

VICE-CHAIR
Professor Cornelia van Duijn
Genetic epidemiology, Alzheimer’s disease and related disorders
Erasmus Medical Centre, the Netherlands

Professor Johanna Ivaska
Molecular cell biology, cell adhesion, cancer biology
University of Turku, VTT Technical Research Centre, Finland

Professor Olli Lassila
Immunology, medical microbiology
University of Turku, Finland

Professor Hans-Christian Pape
Neuroscience, neurophysiology
University of Münster, Germany

Professor Thomas Ruzicka
Dermatology, allergology
Ludwig-Maximilians-Universität (LMU) München, Germany

Professor Lars Terenius
Experimental alcohol and drug dependence research, mental disorders, preventive medicine
Karolinska Institute, Sweden

Professor Peter York
Physical pharmaceutics, pharmaceutical chemistry, pharmaceutical technology
University of Bradford, Great Britain

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 two evaluators outside the panels and by three members from the other panels.

External Experts
Professor Olli Carpén
Pathology, cancer cell metastasis
University of Turku
Finland

Professor Anders Linde
Oral biochemistry
Faculty of Odontology
Göteborg University
Sweden
Experts from the Other Panels
Professor Jan-Otto Carlsson, from the Panel of Natural Sciences
Professor Danny Huylebroek, from the Panel of Biological, Agricultural and Veterinary Sciences
Professor Holger Stark, from the Panel of Natural 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.

MSocSc 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 Mollanen, 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-evaluation\(^1\) 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.

\(^1\) 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.

\(^3\) 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 panellists 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
   - 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”.
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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5 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 divided into four main topics: cardiovascular pharmacology, regenerative therapy, nutrition/functional food and clinical cardiology/hypertension genetics within a relative small RC size, especially when divided into four main topics. This breadth raises concerns over the research focus of the RC.

They have produced a high productivity on papers with generally good impact and citation rates as well as some IP with patents, although efforts should be made to increase the impact of publications especially those categorized as food science and technology to enhance international standing of these works. Despite the diversity in topics, they managed in different interdisciplinary and translational approaches, the balance of basic and clinical sciences, as well as their promising merging.

New therapeutical approaches with new medical entities in combination with international core programs or international associations resulted in a heterogeneous, but successful RC.

The thematic overlap in some of the main topics may require further focus for internal RC cooperation in addition when considering expanding connections to other topics related RCs within UH.

Numeric evaluation: 3 (Very good)

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

There is a good training program for the PhD students. The outlook for good positions is good although the general number of free position for excellent academics is limited. The teaching work-load for the PhD students as well as for the supervisors at different levels is not clear, but the impression is given that there is an overload or imbalance of too much teaching and a smaller part for research.

Detail of the overall duration of PhD studies should be provided and, as with numerous RCs, it seems to be much longer than the internationally accepted three to four years. The workload for PhD students should be given in more details and more attention given to the important role of the PhD thesis committee.
An alumni register would be helpful to follow the career of the former students. The international exchange can be enlarged by sending the PhD students to foreign labs. Here the installation of European networks and grants would be helpful.

With the different institutes there appears to be different PhD student programs. With a general core structure for a number of RCs or institutes, complimented by different specialized course for the detailed programmes of the RC, the work-load may be reduced.

It is not clear if it is free to choose from one to three supervisors. A number of two to three seems to be more appropriate. An increase of meetings for PhD committees from a minimum of one per annum would benefit doctoral students and help to direct and improve the mentoring and advisory support by supervisors.

The gender problem can be raised in general terms in respect to the higher classification of students and PhD students. It is not restricted to this RC, but a general question.

Another general problem is related to the career development after PhD graduation.

**Numeric evaluation: 3 (Very good)**

### 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 RC members are involved in different national scientific organizations and have taken over leadership responsibilities. As clinical research usually has more direct and therefore, larger impact on society, this may be stressed with further popular contributions to community. It should be stated that the already achieved social and public effects are at a very good level.

**Numeric evaluation: 3 (Very good)**

### 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 has carried out very well concerning the international exchange and cooperation with broad contacts all over the world with some clear focus on Europe. The exchange has been productive in both ways. International winter schools are productive in developing positive multinational interactions. Numerous exchange programs are performed with other European countries including on joint doctoral training.

**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

Research is performed in a modern laboratory space.

Administrative work and teaching duties seem to take a lot of time from research. UH should take care that an appropriate balance can be maintained.

The room facilities and the conditions of instruments are unclear from the broad description.

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

Different members of the RC have successfully taken leadership roles in different national and international organisations.

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 level of external grants for funding research at circa €3.8m is good with funding from the Academy of Finland, TEKES, Finnish Foundation for CV Research, and EVO-funding as well as the pharmaceutical and food industries. With an absence of funding from the EU, the RC is advised to examine ways to secure grants or be involved in collaborative programmes from this source.
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

For the near future the current activities of the RC should be further supported in the different interdisciplinary and translational steps in basic and clinical research.

The interaction between the main topics and the groups within the RC should be strengthened.

As the communication and exchange with national and international scientist is already at a high level the communication of scientific findings to publicity should be operating at the same level.

In some cases nutrition and genetics play major roles and the problem/topic of epigenetics may be considered by the RC at an early stage in the future.

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 is one of the national leading research teams with good quality in international research.

Within the relative small RC size, they have achieved a very good performance in research and doctoral training, and good visibility.

Participation 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’ is appropriate at this stage of development of the RC.

Numeric evaluation: 4 (Excellent)

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

The processes employed were fair and appropriate.

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

Focus area 6: Clinical research

The selected UH focus area 6 – ‘Clinical research’ – is appropriate for the research activities of the RC.

2.12 RC-specific main recommendations

The leading national status of the RC in its fields of research and doctoral training were recognized by the Panel and continuing activities are encouraged. In order to add value and to improve further the recognized quality of the work of the RC, major efforts, perhaps via a coordinated approach, should be made to publish the outputs of the research in high impact journals, where possible, which will raise the profile and international standing and status of the RC.
Whilst appreciating the importance of the areas of study and interest of the RC, some concern was expressed by the Panel regarding the breadth and scope of the research activities in this relatively small RC, and attention to this issue is recommended with consideration given to a more focused portfolio of topics. In addition, it is suggested that some clarification of supervisory processes and requirements for doctoral students would be beneficial.

In order to broaden the range of funding opportunities for the group and encourage international standing and further contacts, it is suggested that efforts are directed towards securing access to EU funding perhaps via contributions to networks or grant applications, and consideration given to achieving value from the IP positions created by the RC from the translational research work.

2.13 RC-specific conclusions

The Panel was encouraged to note the evidence of the successes of the RC in their research and doctoral training programmes and recognize the potential for achieving a stronger international standing and position. A key issue in driving this factor is the publication of research findings in high impact journals and to secure external international support and funding, such as via EU networks and grants.

The Panel was also of the view that given the size and dimension of the RC, attention should be given to refocusing the somewhat broad portfolio of their research activities, and the RC should reflect on the benefits of a consolidation of chosen topics which may be strengthened via cooperation with other RCs working in overlapping areas of interest.
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:
Cardiovascular Medicine (CardioMed)

LEADER OF THE RESEARCHER COMMUNITY:
Professor Eero Mervaala, Institute of Biomedicine, Faculty of Medicine

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)
**1 RESPONSIBLE PERSON**

Name: Mervaala, Eero  
E-mail: eero.mervaala@helsinki.fi  
Phone: 09-19125355  
Affiliation: Institute of Biomedicine  
Street address: P.O.BOX 63 (Haartmaninkatu 8) 00014 University of Helsinki

**2 DESCRIPTION OF THE PARTICIPATING RESEARCHER COMMUNITY (RC)**

Name of the participating RC (max. 30 characters): Cardiovascular Medicine  
Acronym for the participating RC (max. 10 characters): CardioMed  
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): CardioMed is a research community between several research groups working in the field of cardiovascular medicine. The research groups are located in the Institute of Biomedicine (pharmacology, physiology), and Department of Clinical Medicine. Cardiovascular Research in CardioMed is conducted in a highly interdisciplinary way, through a meaningful combination of basic and clinical research and international collaboration. CardioMed provides a framework in which researchers can carry out their scientific work at high level, and translate their findings into new forms of prevention, diagnostics, and therapies of cardiovascular diseases. The research community is based on long-lasting research collaboration between the principal investigators as well as on joint doctoral training. The research community combines their expertise on preclinical cardiovascular pharmacology and drug development, nutritional research and functional foods, regenerative therapy as well as on clinical medicine and hypertension genetics. Some of the principal investigators in CardioMed (professor Korpela, professor Mervaala and docent Tikkanen (coordinator)) are members of the Helsinki Hypertension Centre of Excellence (Helsinki University Central Hospital). Docent Kankuri, docent Tikkanen and professor Harjula are members of international Core-to-Core Program on Regenerative Therapy. The groups led by Professor Korpela and professor Mervaala have been selected as participants in a novel research consortium "Strategic Centre for Health and Wellbeing Salve Ltd". The following group leaders are board members of the Finnish Hypertension Society (Mervaala (president), Tikkanen, Hiltunen).

**3 SCIENTIFIC FIELDS OF THE RC**

Main scientific field of the RC’s research: medicine, biomedicine and health sciences  
RC’s scientific subfield 1: Cardiac and Cardiovascular System  
RC’s scientific subfield 2: Pharmacology and Pharmacy  
RC’s scientific subfield 3: Nutrition and Dietetics  
RC’s scientific subfield 4: Medicine, Research and Experimental
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): CardioMed is a novel Research Community, the investigators are relatively young, and the size of the Research Community relatively small. Therefore the community has not yet been able to achieve strong international recognition or a clear break-through. Professor Mervaala was nominated as full-time professor of Cardiovascular and Metabolic Pharmacology in the Institute of Biomedicine in 2008, and professor Korpela as professor of Medical Nutrition Physiology later in 2008.

Public description of the RC’s research and doctoral training (MAX. 2200 characters with spaces): The research activities in CardioMed are organized in 4 main topics: (1) Cardiovascular pharmacology, (2) Regenerative therapy, (3) Nutrition/functional foods, (4) Clinical cardiology/hypertension genetics.

Cardiovascular Pharmacology Group led by professor Eero Mervaala. The group investigate the molecular mechanisms of cardiac hypertrophy and heart failure with a special interest on local renin-angiotensin system, inflammation, novel angiogenic factors (VEGF-family members), mitochondrial function, and drug development (calcium sensitzers, in collaboration with pharmaceutical industry).

Regenerative Therapy led by docent Esko Kankuri and professor Ari Harjula. Kankuri’s and Harjula’s groups participate on international Core-to-Core Program on Regenerative Therapy aiming at construction of cardiac tissue using integrated gene, cell, and tissue engineering technology and its application for the treatment of cardiac failure.

Nutrition/Functional Foods is led by professor Riitta Korpela and professor Heikki Vapaatalo. Korpela’s group is regarded as one of the frontier groups in the area of functional foods. The group uses both in vitro and animal models and has a long experience in clinical trials. Both groups will investigare pharmacological and physiological effects of novel milk protein-derived biopeptides in preclinical and clinical studies. They aim at developing novel antihypertensive and cholesterol-lowering functional food items in collaboration with food industry.

Clinical cardiology/hypertension genetics is led by docent Ilkka Tikkanen. Tikkanen acts also as the coordinator of Helsinki Hypertension Centre of Excellence in Helsinki University Central Hospital. Tikkanen’s group studies end-organ and tissue damage secondary to cardiovascular, heart and kidney diseases and the molecular mechanisms involved herein. Docent Jukka Lehtonen’s research interest lies within renin-angiotensin system and inflammatory heart diseases. Docent Timo Hiltunen’s research covers monogenic forms and pharmacogenetics of hypertension.

Significance of the RC’s research and doctoral training for the University of Helsinki (MAX. 2200 characters with spaces): CardioMed’s research is interdisciplinary and translational, and combines basic and clinical research. The RC produces experts in the several fields (in particular pharmacology), with high employment opportunity in the Finnish Medicines Agency or in the pharmaceutical/food industry.
CardioMed has an excellent track record in doctoral training and mentoring, and the members of CardioMed have very actively taken part in teaching duties in the Medical Faculty. CardioMed provides an excellent infrastructure for integrated Cardiovascular Medicine and translational research.

CardioMed addresses areas of general public interest and impact, as cardiovascular diseases are the leading cause of death and disability in the developed countries.

**Keywords:** Cardiovascular pharmacology; Regenerative medicine, Cell therapy, Personalized medicine; Pharmacogenetics; Drug development; Nutrition; Functional foods; Metabolism; Translational Research; Inflammation

**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): CardioMed is a novel Research Community, and therefore the quality of CardioMed’s research and doctoral training has not been evaluated with justification during the period under evaluation. However, all the research groups have received substantial external funding during the period under evaluation (Academy of Finland, Sigrid Juselius Foundation, National Technology Agency, University of Helsinki, Helsinki University Central Hospital) indicating high quality of their research and doctoral training.

Comments on how the RC’s scientific productivity and doctoral training should be evaluated (MAX. 2200 characters with spaces): For methods of assessing CardioMed’s scientific productivity and doctoral training we suggest the following: 1) amount of external funding, 2) number of doctoral candidates who have finished their PhD studies during the period under evaluation, 3) number of publications and quality of the publications, 4) number of patents/patent applications.

It should also be underlined that all principal investigators, post-doctoral researchers and doctoral candidates working in the Institute of Biomedicine have a substantial amount of teaching duties, since Institute of Biomedicine is responsible for the first two years’ courses for medical students and dentists, as well as for TRANSMED-Master of Science program. Such teaching load should be taken into consideration when evaluating the CardioMed research community.
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INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

RC-SPECIFIC STAGE 2 MATERIAL

Background Information

Name of the RC’s responsible person: Mervaala, Eero
E-mail of the RC’s responsible person: eero.mervaala@helsinki.fi
Name and acronym of the participating RC: Cardiovascular Medicine, CARDIOMED
The RC’s research represents the following key focus area of UH: 6. Kliininen tutkimus – Clinical research
Comments for selecting/not selecting the key focus area: Part of the RC’s research represents very closely one of the key focus areas of UH, namely clinical research. However, it should be underlined that the RC’s research also represents basic and translational research in cardiovascular and nutritional medicine.

Focus and Quality of RC’s Research (max. 8800 characters with spaces)

- 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).

Cardiovascular diseases represent a major public health problem and the leading cause of death in Finland. RC provides a highly interdisciplinary framework in which cardiovascular research can be carried out at high level aiming at translation of novel innovations into medical applications. RC’s research addresses clinically important issues such as hypertension, metabolic syndrome, left ventricular hypertrophy, myocardial infarction and heart failure. RC has also a strong interest on nutrition, regenerative medicine and personalized drug therapy ("pharmacogenetics").

RC’s research activities are organized in 4 main topics: 1) Cardiovascular and Metabolic Pharmacology and drug development, 2) Regenerative Medicine, 3) Medical Nutrition Physiology and development of functional foods, and 4) Clinical cardiology, hypertension genetics and personalized drug therapy.

Cardiovascular Pharmacology Group (Institute of Biomedicine, Principal Investigator (PI) prof. Eero Mervaala) investigates the pathophysiology of hypertension and the molecular mechanisms of cardiac hypertrophy and post-infarct heart failure as well as the mechanisms of cardiovascular aging (funded by Academy of Finland 2008-2011). The group showed a key role for local renin-angiotensin system in the pathogenesis of cardiac remodelling and cardiovascular aging. It was shown that angiotensin II induces oxidative stress, inflammation and mitochondrial dysfunction by blood pressure-independent mechanisms. Metabolomics analysis revealed distinct energy substrate utilization in cardiac hypertrophy. The group has evaluated the potential of novel oral calcium sensitizers in the treatment of heart failure (two patents). In collaboration with prof. Kari Alitalo’s group we have investigated the role of angiogenic factors as coronary growth factors and regulators of cardiac growth and metabolism. It was found that VEGF-B acts as a growth factor without inducing angiogenesis, vascular leak, or inflammation. VEGF-B also altered lipidomic profile in the heart and induced cardiac hypertrophy via blood pressure-independent mechanisms. The group has collaborated with food industry to generate novel nutritional strategies to combat obesity (one patent) and to develop novel salt alternatives for hypertension control (patent application). Finally, the group has started a project to investigate the therapeutic role of small molecule compounds and stem cells in acute kidney injury. Prof. Mervaala has supervised 6 PhD theses between years 2005-2010, and four PhD thesis will be finished in year 2011 (under evaluation).
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

RC-SPECIFIC STAGE 2 MATERIAL

Regenerative Pharmacology Group (Institute of Biomedicine/Institute of Clinical Medicine). The team led by professor Ari Harjula and docent Esko Kankuri focuses on cardiac regenerative therapies using cell sheet technology, nemesis-activated fibroblasts, stem and precursor cells. Cell sheets that are transplanted topically on myocardium help to solve the problem of fatal arrhythmias as associated with intramyocardial cell injections. Using this technique we have shown for example that bcl-2-mediated anti-apoptotic protection helps early myoblast sheet survival. Our preclinical research focuses on development of methodology (gene therapy, pharmacotherapy) to enhance regenerative cell sheet transplantation therapy. Furthermore we aim at discovery of functional indicators and molecular predictors of cell transplant clinical efficacy. In May 2011 we will complete a randomized double-blinded clinical trial on intramyocardial stem cell transplantation at coronary artery bypass graft surgery. The study provides the first placebo-controlled evidence using functional cardiac magnetic-resonance imaging on the efficacy of unfractionated bone marrow precursor cell transplantation therapy in heart failure patients. We have also established a “Core-to-Core Consortium” together with professor Axel Haverich from the Hannover Medical School, Division of Thoracic & Cardio Surgery, Hannover, Germany and with professor Yoshiki Sawa from the Osaka University Graduate School of Medicine, Osaka, Japan. The aim is to provide clinical proof of concept for heart failure therapy using autologous myoblast and bone marrow stromal/stem cell sheets. We coordinate additional five European clinical cardiac centers and cell sheet manufacturing at Finnish Red Cross Blood Service.

Medical Nutrition Physiology Group (Institute of Biomedicine, PIs prof. Riitta Korpela and prof. Heikki Vapaatalo) combines translational research to clinical medicine. The group investigates health effects of nutritional components (milk, berries, plant sterols) and their mechanisms of action. The main focus has been on milk casein-derived tripeptides (Ile-Pro-Pro, Val-Pro-Pro). The group has shown in experimental models of hypertension, that milk tripeptides decrease blood pressure and improve vascular function. The mechanisms mediating the antihypertensive and vasculoprotective effects of milk tripeptides involve inhibition of angiotensin converting enzyme, central regulation of blood pressure and vascular homeostasis (one patent). Recently, the group has examined the effects of tripeptides on neurodegeneration and retinal blood flow in collaboration with pharmaceutical industry (Santen, Pharmatory) (one patent). The group has participated in several clinical studies where the antihypertensive effect of tripeptides was demonstrated in mildly hypertensive subjects. These findings have been translated into novel functional food items that are in the market in EU and Japan. Prof. Vapaatalo has supervised 3 PhD theses (plus 2 PhD projects in progress) and has produced more than 30 original articles on milk peptides between years 2005-2010. Prof. Korpela has supervised 8 PhD theses during the evaluation period, and currently she acts also as a coordinator in a novel research consortium “Strategic Centre for Health and Wellbeing SalWe Ltd”.

Unit of Cardiovascular Research (Institute of Clinical Medicine/ Minerva Foundation Institute for Medical Research, PI docent Ilkka Tikkanen). The group studies mechanisms and repair of end-organ damage in cardiovascular and renal diseases in experimental animals and clinical trials. In this context the local expression of components of the renin-angiotensin-aldosterone system, other vasoactive factors and apoptosis in hypertension, heart failure, and in progression of renal damage has been studied. In addition, the cardiovascular and renal protective properties of new cardiovascular drugs have been evaluated. The group was able to demonstrate that calcium signalling in cardiac cells is altered in familial catecholaminergic polymorphic ventricular tachycardia due to mutated ryanodine receptors predisposing to cardiac arrhythmias in these patients. The group showed that the activity of bradykinin degrading enzyme neutral endopeptidase was increased in stenotic aortic valves in parallel with increased expression of bradykinin receptors suggesting a therapeutic role for NEP-inhibitory compounds. In clinical hypertension projects in collaboration with prof. Kimmo Kontula it was shown that 1) the CYP2C9 genotype modifies the activity of the renin-angiotensin-aldosterone system and 2)
AGTR1 1166C allele is associated with high serum aldosterone levels and low plasma renin activity in patients with essential hypertension. Recently, the Unit has focused on exploring the reparative mechanisms of cardiac injury after myocardial infarction. These studies showed that induction heme oxygenase-1 promotes cardiomyocyte regeneration and angiogenesis after MI.

- Ways to strengthen the focus and improve the quality of the RC’s research.
  - to deepen the already existing, already working collaboration within the RC
  - to strengthen the translational research approach in the RC by applying the methodology and hypotheses created in basic studies to clinical research questions utilizing the available collaboration and patient materials in the University Hospital Clinics (Cardiology, Thoracic surgery) and through the network within the Helsinki Hypertension Centre of Excellence
  - to strengthen the current collaboration with research groups in research programs in UH (Prof. Kimmo Kontula, Research Program of Molecular Medicine; prof. Kari Alitalo, Research Program of Molecule and Cancer Biology) as well with the groups working in the field of obesity, diabetes, mitochondria and lipids
  - to strengthen the collaboration with our international collaborators
  - to initiate a PhD Study seminar common to all members of the RC. Seminars will be given by PhD students, researchers participating in the RC, and invited speakers.
  - Post-doctoral fellows and international collaboration would strengthen the research.

- 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.

Recruitment and selection of doctoral candidates is based on their excellence in undergraduate studies and/or MSc thesis, or an open call.

PhD students in the RC usually have two supervisors of different disciplines and a PhD Thesis Committee. The PhD Thesis Committee includes the student, the supervisor(s), and at least two external members representing top class specialists in different disciplines. The Members of the PhD Thesis Committee are suggested by the student and supervisor, and accepted by the Faculty of Medicine. The external members should have substantial knowledge of the field of the project in order to be able to give critical comments and to estimate the ongoing project’s potential to result in thesis defense. The PhD Thesis Committee is keeping regular meetings at least once a year.

The supervisors together with the PhD Thesis Committee are responsible of ensuring that during the PhD studies the student gains detailed knowledge of his/her research field as well as adequate understanding of the related fields of biomedicine. Like in graduate schools, the goal for the PhD student is to achieve a doctoral degree within a four-year period.

PhD students generate a personal study plan including both research and coursework. Following this the PhD project is registered at the Faculty of Medicine.

PhD students in the RC will get their theoretical postgraduate training mainly via participating in the courses organized by graduate schools and department programs as well as the courses coordinated by
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

RC-SPECIFIC STAGE 2 MATERIAL

the Faculty of Medicine. The graduate schools also organize a wide variety of practical training courses, seminar series, and scientific symposia for graduate students.

Each research group in the RC is organizing their own weekly group meetings. PhD students participate actively on these regular meetings.

The Institutes (Institute of Biomedicine, Institute of Clinical Medicine and Minerva Foundation Institute for Medical Research) are organizing weekly post-graduate seminar series for PhD students. Institute of Biomedicine (Pharmacology) is organizing an annual follow-up meeting for PhD students. In this meeting PhD students give presentations on their research project.

PhD students are encouraged to participate in international meetings and congresses, and represent their work there. Travel costs are covered mainly by the research groups, and to some extent, by travel grants.

A close dialogue with other universities, industry and “the third sector” is maintained via our own post-docs working there and still collaborating with the RC group, as well as by inviting key researchers in the field to give lectures in our Institute. For industry, mutual interest and successful joint research projects with PhD students are important means to recruit potential new employees. Seven of the eight PhDs graduated from Medicinal Nutrition Physiology Group during the evaluation time are employed by industry at the moment.

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

The strength of our RC is the close collaboration with industry and the third sector. International exchange is also increasing both via in-coming and out-coming students.

Several PhD students from our RC were recruited to pharmaceutical and food industry as well as to Finnish Medicines Agency during the evaluation period indicating high quality of our doctoral training, and our capacity to generate experts in the field of pharmacology and medical nutrition.

Most of the research groups utilize PhD Student Committees in the supervision and follow-up of PhD students. PhD students participate actively and regularly in group meetings, department meetings as well as the courses organized by the graduate schools.

There is a substantial lack of coherent research career development possibilities (post-doc positions), although the tenure track system was very recently started in the University of Helsinki.

3 SOCIETAL IMPACT OF RESEARCH AND DOCTORAL TRAINING (MAX. 4400 CHARACTERS WITH SPACES)

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

Members of the RC form the nucleus of Helsinki Hypertension Centre of Excellence. The Helsinki Hypertension Centre of Excellence is part of the European Hypertension Excellence Centre network of the European Society of Hypertension (ESH). It was approved by ESH in June 17, 2008, serves the Hospital District of Helsinki and Uusimaa, and collaborates nationally with Turku Hypertension Centre and Tampere University Hospital. Within the centre, it collaborates with all specialties involved in hypertension and hypertension related cardiovascular diseases (diagnosis, prevention, treatment, education and research).
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

RC-SPECIFIC STAGE 2 MATERIAL

Leading doctors/scientists: Speciality
- Ilkka Tikkanen*, docent, head - nephrology
- Frej Fyhrquist*, professor(emer) - internal medicine
- Timo Hiltunen, docent - hypertension genetics, internal medicine
- Eero Honkanen, docent - nephrology
- Olli Häppölä, docent - nephrology
- Ilkka Immonen, docent - nephrology
- Hannu Jalanko, professor - pediatrics
- Risto Kaaja*, professor - hypertension in women/obstetric hypertension
- Kimmo Kontula*, professor - hypertension genetics, internal medicine
- Riitta Korpela, professor - nutritional physiology
- Mauri Lepäntalo, professor - vascular surgery
- Eero Mervaala, professor - cardiovascular and metabolic pharmacology
- Markku S. Nieminen*, professor - cardiology
- Tuula Tikkanen*, docent - internal medicine/general practise
- Matti Välimäki, professor - endocrinology

*clinical hypertension specialists of the European Society of Hypertension

Hospital/Research locations:
- Helsinki University Central Hospital (departments of nephrology, cardiology, endocrinology, vascular surgery, neurology, ophthalmology, pediatrics, and obstetrics & gynaecology)
- Helsinki City Hospital Laakso (outpatient clinics)
- Biomedicum Helsinki, University of Helsinki

Finnish Hypertension Society
- Eero Mervaala, current president and board member
- Ilkka Tikkanen, past president and board member
- Finnish Hypertension Society has vast societal impact: It is responsible for current care guidelines, organizes post-graduate training and education, and public counselling

Finnish Nutrition Society
- Riitta Korpela, current president and board member

Prof. Korpela is the chairman of the Finnish Society of Nutrition Science and a Finnish representative in the European Joint Programming initiative ”A healthy diet for a healthy life”.


The Medical Nutrition Physiology Group leads a Tekes-funded project (Valio, Unilever, DSM, Finnish Red Cross, Oriola) and is a participant in the industry-lead Health and Wellness SHOK program. The group is partner of the European Science Foundation funded European Network for Gastrointestinal Health Research.

- **Ways to strengthen the societal impact of the RC’s research and doctoral training.**
  Participation in the TEKES-funded SHOK program.
  Increasing visibility by organizing public presentations and open seminars and by writing popular articles.
  Taking actively part into the actions organized by Helsinki Hypertension Centre of Excellence, Finnish Hypertension Society, and Finnish Nutrition Society.

### 4 INTERNATIONAL AND NATIONAL (INCL. INTERSECTORAL) RESEARCH COLLABORATION AND RESEARCHER MOBILITY (MAX. 4400 CHARACTERS WITH SPACES)

- **Description of the RC’s research collaborations and joint doctoral training activities and how the RC has promoted researcher mobility.**
  Cardiovascular Pharmacology Group
  National Collaborators (outside CARDIOMED)
  Kari Alitalo, professor, research program of Molecule and Cancer Biology
  Matti J. Tikkanen, professor (UH)
  Matej Oresic, professor (Technical Research Centre of Finland)
  Karl-Heinz Herzig, professor (University of Oulu)
  Ove Eriksson, docent (UH)
  Risto Lapatto, docent (Helsinki University Hospital)
  Collaboration with pharmaceutical industry: Orion Pharma
  Collaboration with food industry: Valio
  Main International Collaborators
  Profs. Friedrich Luft, Michael Bader, Dominik Muller, Max DelBruck Center for Molecular Medicine (MDC), Berlin, Germany
  Jens Titze, MD, PhD, University of Erlangen, Germany
  Ramaroson Andriatsitohaina, MD, PhD, University of Angers, France.
  Prof. Mervala is currently hosting one visiting PhD student from Russia (Alyona Inczhutova, MD, CIMO fellowship for 18 months) and one PhD student from Italy (Alice Bradachia, MSc, 6 months).
  Regenerative Pharmacology Group
  National collaborators (outside CARDIOMED)
  Finnish Red Cross Blood Service (Senior Medical Officer Matti Korhonen)
  Regea Institute for Regenerative Medicine (Docent Susanna Miettinen)
International collaborators
Osaka University Graduate School of Medicine, Japan (Prof. Yoshiki Sawa)
Hannover Medical School, Germany (prof. Axel Haverich)
Slovak Academy of Sciences (DSc Jozef Bizik)

Medical Nutrition Physiology Group
International collaboration with University of Strasbourg and INRA, Toulouse, France.
National collaboration with National Institute for Health and Welfare, Hospital District of Helsinki and Uusimaa, Finnish Institute of Occupational Health and Institute of Medical Technology, University of Tampere.
Joint doctoral training with INRA France and in 2011 also University of Cork, Ireland.
One PhD student (Hanne Keränen) is working in INRA France since December 2009. Pauliina Ehlers performed one experiment in Strasbourg University. Other short visits have been performed during the evaluation time in Strasbourg University and INRA France.

Unit of Cardiovascular Research
Collaborators (national):
Ari Harjula, Professor (Helsinki University Hospital)
Esko Kankuri, Docent (University of Helsinki)
Markku Kupari, Professor (Helsinki University Hospital)
Eero Mervaala, Professor (University of Helsinki)
Kari Pulkki, Professor (University of Kuopio)
Ilkka Pörsti, Professor (University of Tampere)

International collaboration/research mobility:
European Society of Hypertension Excellence Centre Network: Clinical Hypertension Trials
Jere Paavola acted as a visiting research fellow at the Yale University School of Medicine, New Haven, CT, USA, 10/2008-4/2010

The RC has also promoted researcher mobility via recruitment of PhD students from pharmaceutical and food industry. RC has taken a strong responsibility to provide doctoral training in Pharmacology and Medical Nutrition for its PhD students. Several previous PhD students of the RC have been recruited in pharmaceutical industry, food industry as well as in Finnish Medicines Agency during the evaluation period.

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

The RC has a very wide collaboration network both nationally as well as internationally which enables researcher mobility.
The European Science Foundation funded European Network for Gastrointestinal Health Research will give opportunities and grants to student exchange programs. An international winter school for PhD students in the field of nutrition and inflammation was organized by the RC in 2009 and the second one will be organized in 2012.

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 RC has adequate and modern laboratory space in the Institute of Biomedicine, Institute of Clinical Medicine and Minerva Foundation Institute for Medical Research, and either possess or have access to a number of state-of-the-art equipment and technologies (Biomedicum Helsinki Core facility Units). Clinical Research is conducted in the Institute of Clinical Medicine / Helsinki University Hospital. Funding of novel equipments is based on applications for funding submitted to “infrastructural calls” opened by UH, Academy of Finland, or locally by the Institute of Biomedicine.

All principal investigators have a substantial amount of teaching duties in their Institutes. Every PhD student also participates to some extent to teaching duties (max. 40 hours per year).

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

The RC has been successful in getting external funding.

RC’s research activities are dependent on competitive external and complementary short-term funding, and therefore grant applications demand a significant part of the principal investigator’s time. All principal investigators have a substantial amount of teaching duties in their Institutes.

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.

The research carried out in the RC is based on the principle that research groups enjoy independence of action. Scientific research in the groups is driven by the principal investigators. Principal investigators are also responsible for obtaining external funding for their research and leading their research group following their strategic research plans. As all the principal investigators are affiliated either to Institute of Biomedicine, Institute of Clinical Medicine or Minerva Foundation Institute for Medical Research, the RC receives to some extent technical and administrative support from the Institutes’ budget funding.

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

RC’s research is multidisciplinary and translational, which can be considered as a strength of the RC. Members of the RC are young, team leaders innovative, and there is an open dialogue and collaboration between different research groups within the RC, as well as with other research groups working in the same field.
There is a substantial lack of coherent research career development possibilities (i.e. post-doctoral positions), although the tenure track system was very recently started in the University of Helsinki.

**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: **363250**

- **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: **1341279**

- **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: Sigrid Juselius Foundation, Päivikki ja Sakari Sohlberg Foundation, Finnish Foundation for Cardiovascular Research
  - total amount of funding (in euros) from the above-mentioned foundations: **334500**

- **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: EVO-funding, pharmaceutical industry, food industry, University of Kuopio Funds, University of Helsinki Funds
  - total amount of funding (in euros) from the above-mentioned funding organizations: **1754896**

**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.**

  The mission of the RC is to elucidate novel therapeutic targets and to develop safer and more efficient prevention and intervention strategies for cardiovascular disease continuum.
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

RC-SPECIFIC STAGE 2 MATERIAL

Main focus of RC’s research will be a more comprehensive, translational approach to cover the ‘cardiovascular disease continuum’ from risk factors (including diet and dietary interventions) and genetic background to prevention and treatment of cardiac, vascular and renal end organ damage and dysfunction.

Aims and tools:
- further development and strengthening of the existing versatile basic methodology and collaboration
- utilization and application of novel experimental models (e.g. zebra fish methodology, cell cultures including iPS-cells, gene expression and transfection studies) and tools (genomics - miRNA/transcriptomics – proteomics – metabolomics),
- more systematic application of basic findings and methodology to clinical patient materials and questions to improve early diagnostic and prognostic evaluation (application of genomics - miRNA/transcriptomics – proteomics – metabolomics) as well as tailored prevention treatment of cardiovascular diseases
- collaboration with University Hospital Clinics
- utilization of the Helsinki Hypertension Centre of Excellence network (national, international)
- to initiate a PhD Study seminar common to all members of the RC. Seminars will be given by PhD students, researchers participating in the RC, and invited speakers.
- Principal investigators are encouraged to use more frequently PhD Thesis Committees, and to utilize more structural forms to follow the progress of the PhD thesis like in the graduate schools
- the visibility of the research carried out in RC is increased through high-level publications and active participation in scientific meetings.
- Principal investigators are encouraged to take full use of their national and international contacts to attract promising post-doctoral students to our 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 principal investigators have contributed to the compilation of the stage 2 materials by providing detailed information on their research activities and doctoral training to the responsible person (Prof. Mervala). All principal investigators have also contributed to the writing of the strategic action plan for 2011-2013.
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

RC-SPECIFIC TUHAT COMPILATIONS OF PUBLICATIONS DATA 2005-2010

CardioMed/Mervaala

1 Analysis of publications

- Associated person is one of Eero Mervaala, Eero.Mervaala@helsinki.fi, Riitta Anneli Korpela, Riitta.Korpela@helsinki.fi, Heikki Vapaatalo, Heikki.Vapaatalo@helsinki.fi, Ari Heijula, ari.heijula@helsinki.fi, Ilkka Tikkanen, Ilkka.Tikkanen@helsinki.fi, Esko-Markus Kantur, Esko.Kantur@helsinki.fi, Eeva Lane, eeva.lane@helsinki.fi, Petri Miettinen, Petri.Miettinen@helsinki.fi, Mervi Annan Louhelainen, Mervi.Louhelainen@helsinki.fi, Agnieszka Biala, agnieszka.biala@helsinki.fi, Juha Ketomaa, Juha.Ketomaa@helsinki.fi, Erik Vahtola, Erik.Vahtola@helsinki.fi, Evetina Tauriainen, evetina.tauriainen@helsinki.fi, Jin Shi, jin.shi@helsinki.fi, Paulina Ehlers, paulina.ehlers@helsinki.fi, Pasi Lautisto, pasi.lautisto@helsinki.fi, Jere Paavola, Jere.Paavola@helsinki.fi, Antti-Matias Sillanen, antti.sillanen@helsinki.fi, Kristo Nuutila, kristo.nuutila@helsinki.fi, Matti Puska, matti.puska@helsinki.fi

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2 Listing of publications

A1 Refereed journal article

2005


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

RC-SPECIFIC TUHAT COMPILATIONS OF PUBLICATIONS DATA 2005-2010

CardioMed/Mervaala


2006


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

RC-SPECIFIC TUHAT COMPILATIONS OF PUBLICATIONS DATA 2005-2010

CardioMed/Mervaala


2007


2008


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

RC-SPECIFIC TUHAT COMPILATIONS OF PUBLICATIONS DATA 2005-2010

CardioMed/Mervaala


2009


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

RC-SPECIFIC TUHAT COMPILATIONS OF PUBLICATIONS DATA 2005-2010

CardioMed/Mervaala


A2 Review in scientific journal

2005


2007


Jauhiainen, T, Korpela, R 2007, 'Milk peptides and blood pressure', *Journal of Nutrition*, vol 137, pp. 825S-829S.


2008


A3 Contribution to book/other compilations (refereed)

2005


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

RC-SPECIFIC TUHAT COMPILATIONS OF PUBLICATIONS DATA 2005-2010

CardioMed/Mervaala


2009

A4 Article in conference publication (refereed)

2005

2006


2008

2009

B1 Unrefered journal article

2005


2006


2007


2008

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

2006

D2 Article in professional hand or guide book or in a professional data system, or text book material

2006


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

2006
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

RC-SPECIFIC TUHAT COMPILATIONS OF PUBLICATIONS DATA 2005-2010

CardioMed/Mervaala


2010

E1 Popular article, newspaper article

2005

2007

2008

H1 Patents

2007

2008
1 Analysis of activities 2005-2010

Associated person is one of Eero Mervaala, Eero.Mervaala@helsinki.fi, Riitta Amnel Korpela, Riitta.Korpela@helsinki.fi, Heikki Vapaatalo, Heikki.Vapaatalo@helsinki.fi, Ari Harjula, Ari.Harjula@helsinki.fi, Ilkka Tikkanen, Ilkka.Tikkanen@helsinki.fi, Eero Merku Kantur, Eero.Kantur@helsinki.fi, Mika Laine, mika.laine@helsinki.fi, Pasi Matti Finckenberg, Pasi.Finckenberg@helsinki.fi, Marjut Amnel Louhelainen, Marjut.Louhelainen@helsinki.fi, Agnieszka Biala, agnieszka.biala@helsinki.fi, Juha Katonen, Juha.Katonen@helsinki.fi, Jukka Vuollo, Jukka.Vuollo@helsinki.fi, Erik Valtonen, Erik.Valtonen@helsinki.fi, Evelina Taupilanen, Evelina.Taupilanen@helsinki.fi, Jari Shu, j.shu@helsinki.fi, Pauliina Haver, pauliina.haver@helsinki.fi, Päivi Lakiotio, pauli.lakiotio@helsinki.fi, Jere Paavola, Jere.Paavola@helsinki.fi, Antti Markus Siltanen, antti.siltanen@helsinki.fi, Kristo Nousi, kristo.nousi@helsinki.fi, Matti Peura, mati.peura@helsinki.fi

<table>
<thead>
<tr>
<th>Activity type</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supervisor or co-supervisor of doctoral thesis</td>
<td>97</td>
</tr>
<tr>
<td>Prizes and awards</td>
<td>7</td>
</tr>
<tr>
<td>Editor of research journal</td>
<td>17</td>
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<tr>
<td>Editor of research anthology/collection/conference proceedings</td>
<td>1</td>
</tr>
<tr>
<td>Peer review of manuscripts</td>
<td>2</td>
</tr>
<tr>
<td>Assessment of candidates for academic posts</td>
<td>3</td>
</tr>
<tr>
<td>Membership or other role in review committee</td>
<td>1</td>
</tr>
<tr>
<td>Membership or other role in research network</td>
<td>6</td>
</tr>
<tr>
<td>Membership or other role in national/international committee, council, board</td>
<td>44</td>
</tr>
<tr>
<td>Membership or other role in public Finnish or international organization</td>
<td>4</td>
</tr>
<tr>
<td>Membership or other role of body in private company/organisation</td>
<td>4</td>
</tr>
<tr>
<td>Other tasks of an expert in private sector</td>
<td>6</td>
</tr>
<tr>
<td>Participation in interview for written media</td>
<td>5</td>
</tr>
</tbody>
</table>
2 Listing of activities 2005-2010

Supervisor or co-supervisor of doctoral thesis

Eero Mervaala, Eero.Mervaala@helsinki.fi
Supervisor of PhD thesis (Teemu Heikkinen 2007), Eero Mervaala, 2005 → 07.09.2007, Finland
Supervisor of PhD thesis (Juha Ketonen 2010), Eero Mervaala, 2003 → 22.10.2010, Finland
Supervisor of PhD thesis (Marjut Louhela 2010), Eero Mervaala, 2005 → 29.01.2010, Finland
Supervisor of PhD thesis (Evelina Tauriainen 2011), Eero Mervaala, 2007 → 2011, Finland
Supervisor of PhD thesis (Jin Shi 2011), Eero Mervaala, 2008 → 2011, Finland
Supervisor of PhD thesis (Petri Kahonen 2009), Eero Mervaala, 2009 → 13.11.2009, Finland
Supervisor of PhD thesis (Alyona Inzhutova), Eero Mervaala, 2010 → 2014, Finland
Supervisor of PhD thesis (Ingvar Söderlund), Eero Mervaala, 2010 → 2014, Finland
Supervisor of PhD thesis (Juha Lempäälä), Eero Mervaala, 2010 → 2013, Finland

Riitta Anneli Korpela, Riitta.Korpela@helsinki.fi
Supervision of PhD thesis of Laura Paajanen, Riitta Anneli Korpela, 2005
Supervision of PhD thesis of Evelina Myllyluoma, Riitta Anneli Korpela, 2007
Supervision of PhD thesis of Katja Hatakka, Riitta Anneli Korpela, 2007
Supervision of PhD thesis of Tiina Jauhianen, Riitta Anneli Korpela, 2007
Supervision of PhD thesis of Kajsa Kajander, Riitta Anneli Korpela, 2008
Supervision of PhD thesis of Riina Keikonen, Riitta Anneli Korpela, 2008
Supervision of PhD thesis of Hanna Keränen, Riitta Anneli Korpela, 03.12.2009 → ...
Supervision of PhD thesis of Lisa Lehtoranta, Riitta Anneli Korpela, 2009 → ...
Supervision of PhD thesis of Taru Pirilä, Riitta Anneli Korpela, 2009
Supervision of PhD thesis of Anne Kivimäki, Riitta Anneli Korpela, 2010 → ...
Supervision of PhD thesis of Elin Tikkanen, Riitta Anneli Korpela, 2010 → ...
Supervision of PhD thesis of Lotta Stamman, Riitta Anneli Korpela, 2010 → ...
Supervision of PhD thesis of Paulina Ehlers, Riitta Anneli Korpela, 2010

Heikki Vapaatalo, Heikki.Vapaatalo@helsinki.fi
Välitskirjatytöön ohjaus, Heikki Vapaatalo, 1974 → ...
Välitskirjatytöön ohjaus, Heikki Vapaatalo, 1976 → ...
Välitskirjatytöön ohjaus, Heikki Vapaatalo, 1976 → ...
Välitskirjatytöön ohjaus, Heikki Vapaatalo, 1978 → ...
Välitskirjatytöön ohjaus, Heikki Vapaatalo, 1980 → ...
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Välitskirjatytöön ohjaus, Heikki Vapaatalo, 1982 → ...
Välitskirjatytöön ohjaus, Heikki Vapaatalo, 1982 → ...
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

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

CardioMed/Mervaala

vältäskirjatöön ohjaus Karin Samuel 1983, Heikki Vapaatalo, 1983 → ...
Vältäs kirjatöön ohjaus, Heikki Vapaatalo, 1984 → ...
Vältäskirjatöön ohjaus, Heikki Vapaatalo, 1984 → ...
Vältäskirjatöön ohjaus, Heikki Vapaatalo, 1984 → ...
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Vältäskirjatöön ohjaus, Heikki Vapaatalo, 1988 → ...
Vältäskirjatöön ohjaus, Heikki Vapaatalo, 1989 → ... Nigelia
Vältäskirjatöön ohjaus, Heikki Vapaatalo, 1991 → ...
Vältäskirjatöön ohjaus, Heikki Vapaatalo, 1991 → ...
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Vältäskirjatöön ohjaus, Heikki Vapaatalo, 1998 → ...
Vältäskirjatöön ohjaus, Heikki Vapaatalo, 1999 → ...

Supervisor of PhD thesis (Kari Peuhkurin 2000), Heikki Vapaatalo, 2000 → ...
Supervisor of PhD thesis (Tuula Lähteenväki 2000), Heikki Vapaatalo, 2000 → ...
Supervisor of PhD thesis (Virpi Saarens 2001), Heikki Vapaatalo, 2000 → ...
Supervisor of PhD thesis (Rikka Nevala 2001), Heikki Vapaatalo, 2001 → ...
Supervisor of PhD thesis (Esa Mattilas 2002), Heikki Vapaatalo, 2002 → ...
Supervisor of PhD thesis (Elke Kankurin 2002), Heikki Vapaatalo, 2002 → ...
Supervisor of PhD thesis (Markku Lipola 2002), Heikki Vapaatalo, 2002 → ...
Supervisor of PhD thesis (Kari Lassila 2002), Heikki Vapaatalo, 2002 → ...
Supervisor of PhD thesis (Reeta Holma 2002), Heikki Vapaatalo, 2002 → ...
Supervisor of PhD thesis (Hannu Kallio 2003), Heikki Vapaatalo, 2003 → ...
Supervisor of PhD thesis (Tuomo Karik 2003), Heikki Vapaatalo, 2003 → ...
Supervisor of PhD thesis (Mikko Nerval 2004), Heikki Vapaatalo, 2004 → ...
Supervisor of PhD thesis (Evelina Myllyjärvi 2007), Heikki Vapaatalo, 2007 → ...
Supervisor of PhD thesis (Tina Jauhalainen 2007), Heikki Vapaatalo, 2007 → ...
Supervisor of PhD thesis (Kaisa Kajander 2009), Heikki Vapaatalo, 2008 → ...
Supervisor of PhD thesis (Riina Kaikkonen 2008), Heikki Vapaatalo, 2008 → ...
Supervisor of PhD thesis (Anu Vaajainen 2009), Heikki Vapaatalo, 2009 → ...
Supervisor of PhD thesis (Juha Laakso 2009), Heikki Vapaatalo, 2009 → ...
Supervisor of PhD thesis (Marjo Voutilainen 2010), Heikki Vapaatalo, 2010 → ...
Supervisor of PhD thesis (Pauliina Ehlers 2010), Heikki Vapaatalo, 2010

Ari Harjula, ari.harjula@helsinki.fi
Advisor in academic dissertation, Ari Harjula, 1985 → ...
Advisor in academic dissertation, Ari Harjula, 1985 → ...
Advisor in academic dissertation, Ari Harjula, 1988 → ...
Advisor in academic dissertation, Ari Harjula, 1996 → ...
Advisor in academic dissertation, Ari Harjula, 1999 → ...
Advisor in academic dissertation, Ari Harjula, 2000 → ...
Advisor in academic dissertation, Ari Harjula, 2004 → ...
Advisor in academic dissertation, Ari Harjula, 2005 → ...
Advisor in academic dissertation, Ari Harjula, 2009 → ...

Ilkka Tikkanen, Ilkka.Tikkanen@helsinki.fi
Supervisor of PhD thesis (Tom Bäcklund), Ilkka Tikkanen, 2003 → ...
Supervisor of PhD thesis (Tina Grönholt), Ilkka Tikkanen, 2004 → ...
Supervisor of PhD thesis (Henna Forsäter), Ilkka Tikkanen, 2007 → ...
Supervisor of PhD thesis (Heli Segersvärd), Ilkka Tikkanen, 2008 → ...
Supervisor of PhD thesis (Juuso Siren), Ilkka Tikkanen, 2009 → ...

Prizes and awards
Eero Mervaala, Eero.Mervaala@helsinki.fi
Finnish Pharmacological Society Award Winner (2006), Eero Mervaala, 2006
Heikki Vapaatalo, Heikki.Vapaatalo@helsinki.fi
Award of the Medical Society of Puriyrya (Bronz Medal), Heikki Vapaatalo, 1979 → ..., Czech Republic
Honorary Member of Medical Students at Tampere University, Heikki Vapaatalo, 1982 → ...
Krjigl, First Class of the Order White Rose of Finland, Heikki Vapaatalo, 1989 → ...
Maud Kuistila Award for Work as Postgraduate Trainer, Heikki Vapaatalo, 1997 → ..., Finland
Honorary Member of the Medical Society of Tampere District, Heikki Vapaatalo, 2003 → ...
Honorary Member of the Finnish Pharmacological Society, Heikki Vapaatalo, 2005 → ...

Editor of research journal
Eero Mervaala, Eero.Mervaala@helsinki.fi
Member of Editorial Board (Hypertension 2003-2008), Eero Mervaala, 2003 → 2008
Member of Editorial Board (Current Hypertension Reviews 2004-), Eero Mervaala, 01.01.2008 → ...
Member of Editorial Board (Open Hypertension Journal 2008-), Eero Mervaala, 2008 → ...
Member of Editorial Board (ISRN Cardiology 2010-), Eero Mervaala, 10.12.2010 → ...
Member of Editorial Board (ISRN Pharmacology 2010-), Eero Mervaala, 01.10.2010 → ...
Member of Editorial Board (World Journal of Hypertension 2010-), Eero Mervaala, 2010 → ...
Riitta Anneli Korpela , Riitta.Korpela@helsinki.fi
Ari Harjula , ari.harjula@helsinki.fi
Langenbeck's Archives of Surgery, Ari Harjula, 01.01.2005 → 31.12.2005
Medical Principles and Practice, Ari Harjula, 01.01.2005 → 31.12.2005
The Journal of Heart and Lung Transplantation, Ari Harjula, 01.01.2005 → 31.12.2005
Langenbeck's Archives of Surgery, Ari Harjula, 01.01.2006 → 31.12.2006
Medical Principles and Practice, Ari Harjula, 01.01.2006 → 31.12.2006
The Journal of Heart and Lung Transplantation, Ari Harjula, 01.01.2006 → 31.12.2006

Editor of research anthology/collection/conference proceedings
Eero Mervaala , Eero.Mervaala@helsinki.fi
Textbook of Pharmacology and Toxicology, 8th edition (in Finnish), Editor, Eero Mervaala, 2010 → ...

Peer review of manuscripts
Eero Mervaala , Eero.Mervaala@helsinki.fi
Peer review of scientific manuscripts in pharmacology and cardiovascular medicine (10-30 times annually between 2005-2010), Eero Mervaala, 2005 → 2010
Ilkka Tikkanen , Ilkka.Tikkanen@helsinki.fi
Peer review of scientific manuscript in hypertension, cardiovascular medicine, and nephrology (5-10 annually 2005-2010), Ilkka Tikkanen, 2005 → 2010

Assessment of candidates for academic posts
Eero Mervaala , Eero.Mervaala@helsinki.fi
Nomination of docent (Erika Savontaus 2008), Eero Mervaala, 2008, Finland
Nomination of docent (Jaana Rysä 2008), Eero Mervaala, 2008, Finland
Riitta Anneli Korpela , Riitta.Korpela@helsinki.fi
Pharmacogenetikian professorin viranvälitysnäyttävä, Riitta Anneli Korpela, 2009

Membership or other role in review committee
Eero Mervaala , Eero.Mervaala@helsinki.fi
Helsinki Biomedical Graduate School (HBGS), member of selection committee (2010), Eero Mervaala, 2010

Membership or other role in research network
Eero Mervaala , Eero.Mervaala@helsinki.fi
BioCenter Kuopio (BCK), Finland, Member (2007-2008), Eero Mervaala, 2007 → 2008
Riitta Anneli Korpela , Riitta.Korpela@helsinki.fi
Member of Board, Riitta Anneli Korpela, 1999 → 2008
Member of Centre of Excellence in Hypertension, Riitta Anneli Korpela, 2009 → ...

Riitta Anneli Korpela , Riitta.Korpela@helsinki.fi
Ilkka Tikkanen, Ilkka.Tikkanen@helsinki.fi
Head, Unit of Cardiovascular Research, Minerva Institute for Medical Research, Helsinki (07/1997 - continued, Ilkka Tikkanen, 1997 → ... 
Hypertension Group Director and Member in the Cardiovascular Risk Factors Research Program 2001-2006, Faculty of Medicine, University of Helsinki, Ilkka Tikkanen, 2001 → 2006 
Head, Helsinki Hypertension Centre of Excellence, European Society of Hypertension (17.06.2008 - continued), Ilkka Tikkanen, 2008 → ... 

Eero Mervaala, Eero.Mervaala@helsinki.fi 
Finnish Cardiac Society, Member of the Council of Cardiovascular Drug Therapy (2003-), Eero Mervaala, 2003 → ... 
Finnish Cardiac Society, Secretary of Council of Cardiovascular Drug Therapy (2003-2005), Eero Mervaala, 2003 → 2005 
Finnish Hypertension Society, Board Member (2005-), Eero Mervaala, 2005 → ... 
University of Kuopio, Post-graduate Training Committee, member (2006-2008), Eero Mervaala, 2006 → 2008 
Finnish Hypertension Society, Vice President (2007-2009), Eero Mervaala, 2007 → 2009 
Kuopio University Hospital, Member of Ethical Committee (2007-2008), Eero Mervaala, 2007 → 2008 
Finnish Cardiac Society, Chairman of Council of Cardiovascular Drug Therapy (2008-), Eero Mervaala, 2008 → ... 
Finnish Pharmacological Society (SFY), Board Member (2008-), Eero Mervaala, 2008 → ... 
President of the Finnish Hypertension Society, Eero Mervaala, 01.05.2009 → 06.05.2011, Finland 
Foundation for Drug Research, Chairman of the Board, Eero Mervaala, 2010 → ... 
Institute of Biomedicine, Council Member (2010-2013), Eero Mervaala, 2010 → 2013 

Riitta Anneli Korpela, Riitta.Korpela@helsinki.fi 
Scientific secretary, EDA International Dairy Association Nutrition Committee, Riitta Anneli Korpela, 01.01.2005 → 31.12.2005 
EDA International Dairy Association Nutrition Committee, Riitta Anneli Korpela, 01.01.2005 → 31.12.2005 
EDA International Dairy Association Nutrition Committee, Riitta Anneli Korpela, 01.01.2005 → 31.12.2005 
Fysiopedia International Life Science Institute, Riitta Anneli Korpela, 01.01.2005 → 31.12.2005 
Member of Scientific Advisory Board, Riitta Anneli Korpela, 2007 → ... 
Member of Editorial Board, Riitta Anneli Korpela, 2008 → ... 
President of, Riitta Anneli Korpela, 2008 → ... 
Scientific Advisory Board of the European Joint Initiative, Riitta Anneli Korpela, 11.2010 → ... 

Ari Harjula, ari.harjula@helsinki.fi
American Association for Thoracic Surgery, Ari Harjula, 01.09.1987 → 31.12.2011, United States 
Finnish Club of Cardiac Surgery, Ari Harjula, 01.01.2005 → 31.12.2005 
Finnish Society of Cardiology, Ari Harjula, 01.01.2005 → 31.12.2005 
Finnish Society of Medicine, Ari Harjula, 01.01.2005 → 31.12.2005 
Finnish Club of Cardiac Surgery, Arki Harjula, 01.01.2006 → 31.12.2006
Finnish Society of Cardiology, Arki Harjula, 01.01.2006 → 31.12.2006
Finnish Society of Medicine (DUODECIM), Arki Harjula, 01.01.2006 → 31.12.2006
European Association for Cardio-Thoracic Surgery, Arki Harjula, 01.01.2007 → 31.12.2011
Ilkka Tikkanen, Ilkka.Tikkanen@helsinki.fi
Finnish Hypertension Society, Board Member (1999-), Ilkka Tikkanen, 1999 → ...
Writing member in the Board of the Finnish Hypertension Guidelines Committee (2002-2009), Ilkka Tikkanen, 2002 → 2009

**Membership or other role in public Finnish or international organization**

Riitta Anneli Korpela, Riitta.Korpela@helsinki.fi
Deputy member of HUCIA Area Board, Riitta Anneli Korpela, 2006 → ...
Chairman of Board, Riitta Anneli Korpela, 2009 → 2010
Heikki Vapaatalo, Heikki.Vapaatalo@helsinki.fi
Ravitsemuksen tutkimusäätiö, Heikki Vapaatalo, 1982 → 2010, Finland
Member of Scientific Advisor Board Valio Ltd (2005-2010), Heikki Vapaatalo, 01.01.2005 → 31.12.2005, Finland

**Membership or other role of body in private company/organisation**

Eero Mervaala, Eero.Mervaala@helsinki.fi
Representative of the Medical Research Foundation, Finland (2001-2005), Eero Mervaala, 2001 → 2005
University Pharmacy of Kuopio, Board Member (2007-2008), Eero Mervaala, 2007 → 2008
Pharmaceutical Information Centre, Medical Advisor (2008-), Eero Mervaala, 2008 → ...
Ari Harjula, ari.harjula@helsinki.fi
Urheilutilakeitten tutkimuslaitos, Ari Harjula, 01.01.2006 → 31.12.2006, Finland

**Other tasks of an expert in private sector**

Eero Mervaala, Eero.Mervaala@helsinki.fi
Medical Advisor in Clinical Pharmacology (United Medix Laboratories, Ltd, Helsinki, Finland), Eero Mervaala, 1999 → ..., Finland
Medicinal Accident Committee (Lääkevahinkolautakunta), vice member (2005-), Eero Mervaala, 2005 → ...
Riitta Anneli Korpela, Riitta.Korpela@helsinki.fi
Private consultation practice, Riitta Anneli Korpela, 1980 → 2006
Member of Nutrition Science Board, Riitta Anneli Korpela, 2005 → 2008
Chairman, Riitta Anneli Korpela, 2008 → 2010
Member of Research Committee, Riitta Anneli Korpela, 2009 → ...

**Participation in interview for written media**

Riitta Anneli Korpela, Riitta.Korpela@helsinki.fi
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

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

CardioMed/Mervaala

Heikki Vapaatalo, 01.01.2005 → 31.12.2010, Finland

Heikki Vapaatalo, Heikki.Vapaatalo@helsinki.fi

lehti: Pharmacia & Upjohn Now -uutislehti, Heikki Vapaatalo, 2006, Finland

Taru Kyllikki Pilvi, taru.pilvi@helsinki.fi

Kauneus ja terveys, Taru Kyllikki Pilvi, 01.12.2006, Finland

Kemia-lehti, Taru Kyllikki Pilvi, 01.03.2006, Finland

Yliopisto-lehti, Taru Kyllikki Pilvi, 01.12.2006, Finland
Research Group: Mervaala E

**Basic statistics**

- Number of publications (P): 173
- Number of citations (TCS): 1,643
- Number of citations per publication (MCS): 9.67
- Percentage of uncited publications: 23%
- Field-normalized number of citations per publication (MNCS): 1.30
- Field-normalized average journal impact (MNJS): 1.00
- Field-normalized proportion highly cited publications (top 10%): 1.35
- Internal coverage: .93

**Trend analyses**

- MNCS
- THCP10
- MNJS

**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