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

RC-Specific Evaluation of PDBD – Pharmacology of Degenerative Brain Diseases

Seppo Saari & Antti Moilanen (Eds.)
International Evaluation of Research and Doctoral Training at the University of Helsinki 2005–2010

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

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

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

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

RC-specific information:

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:
Tuominen, Raimo

Keywords:
Research Evaluation, Meta-evaluation, Doctoral Training, Bibliometric Analyses, Researcher Community

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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, MScSc 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 Odontontology
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.
MScSc Paula Ranne, Planning Officer, was responsible for organising the panel meetings and all the other practical issues like agreements and fees and editing a part the RC-specific reports. She worked in the evaluation office from March 2011 to January 2012.
Mr Antti 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-evaluation1 and traditional research assessment exercise and its focus is both on the research outcomes and procedures associated with research and doctoral training. The approach to the evaluation is enhancement-led where self-evaluation constituted the main information. The answers to the evaluation questions formed together with the information of publications and other scientific activities an entity that was to be reviewed as a whole.

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

1.2 Aims and objectives in the evaluation

The aims of the evaluation are as follows:

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

1.3 Evaluation method

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

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

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

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

**Five stages of the evaluation method were:**

1. Registration – Stage 1
2. Self-evaluation – Stage 2
3. TUHAT\(^3\) compilations on publications and other scientific activities\(^4\)
4. External evaluation
5. Public reporting

**1.4 Implementation of the external evaluation**

**Five Evaluation Panels**

Five evaluation panels consisted of independent, renowned and highly respected experts. The main domains of the panels are:

1. biological, agricultural and veterinary sciences
2. medicine, biomedicine and health sciences
3. natural sciences
4. humanities
5. social sciences

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

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

The panel meetings were held in Helsinki:

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

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

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

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

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

10
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.

---

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

PDBD consists of a total of 32 researches at the Division of Pharmacology and Toxicology, with roughly 40/60 financed by Helsinki University and external funds, respectively. The RC is characterized by a focused research profile on the pharmacology of neurodegenerative diseases particularly Parkinson’s disease (PD). The RC has a clear focus, groups are linked by numerous mutual connections in research and teaching.

The topic is an important one, in both basic and clinical terms, it is distinctively different from that of other units at Helsinki University, and the PIs have made significant contributions to the field. The overall publication output of PDBD is very good, given the size of the RC and the research field of pharmacological neuroscience. There is an average of around 25 publications/year, with a vast majority (>70%) in competitive and good journals of pharmacology/neuroscience, and a number (10-15%) in high-rank journals. One highlight is the identification of CDNF (cerebral dopamine neurotrophic factor), a novel neurotrophic factor with protective potential in experimental models of PD, published in Nature 2007. Overall, the scientific quality and significance are very good. The RC’s plans on extending their approaches towards more mechanistic studies on the one and systems-oriented studies on the other hand, indicate a valid and realistic strategy.

Overall, this RC marks a high standard at national rank, a convincingly focused and distinctive research strategy with an excellent potential for identification of clinically relevant mechanisms/substances, and thereby provides a promising basis for extension towards high international rank.

**Numeric evaluation:** 4 (Excellent)

2.2 Practises and quality of doctoral training

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

**ASPECTS:** Processes and good practices related to leadership and management

Doctoral training has been excellently organized at the **Graduate School in Pharmaceutical Research (GPSR),** funded by the Academy of Finland and Ministry of Education and Culture. This applies to recruitment (open international call) and selection (high quality criteria; GPSR board), systematic
organization of the training (structured, step-wise program), thesis committee, mobility (travel grants), and internationality of the doctoral students. The numbers are impressive (total of 150 students, steady increase in graduations), the quality is very high, and the RC should be congratulated for its maintained effort. Adding to this very positive overall scenario is the close career follow-up of the graduates, demonstrating a 100% employment rate in academia and/or industry.

One future challenge, as indicated, will be to merge the major Grad Schools in Pharmacology in Finland, and the RC should be encouraged to take the lead. Overall, the GPSR makes a most valuable contribution to the portfolio of Helsinki University, which might consider an increase in support of the RC (taking into consideration the heavy teaching load of the PIs).

Numeric evaluation: 5 (Outstanding)

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 most significant societal impact of PDBD results from the research relating to one of the most frequent neurodegenerative diseases, the identification of pathogenetic and pathophysiological mechanisms, and the potential of generating novel pharmacological items of potential therapeutic relevance. The research of PDBD is key to drug development and application, and therefore is of very high societal impact.

The RC has excellently exploited the possibilities to present these issues to the public, public authorities relating to drug development and legislation issues in the health sector. The RC should be encouraged to further use and better develop translational strategies, for instance by seeking interaction with pharmaceutical industries. The PIs certainly have the expertise, and a more offensive translational approach might further strengthen the role of PDBD at Helsinki University. The possibilities for therapy development or drug development should be worked out, may be by an interdisciplinary approach with other RCs. As universities have difficulties in taking care of the whole value chain in such development lines, some concepts and proof of concepts could give successful lines.

Numeric evaluation: 4 (Excellent)

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

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

ASPECTS: Scientific quality, national and international collaboration

The PDBD PIs are actively involved in two European collaborations (EraNet Neuron on CDNF and NeuroPro on POP), one US collaboration (MJFF), were part of the EU ProKInaseResearch consortium, and are particularly productive as part of EU NeuroPro. The GPSR Grad School is approached by international candidates on a regular basis. Overall, this is a very appreciable effort, complemented by numerous collaborations on a national basis. Actions planned for the future focus on ERC, NIH applications, which appears to be a feasible strategy.
With such a high standing of this RC it may be useful to approach other groups in the same or in other universities or local pharmaceutical industry for an increased interaction.

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 environment and technical infrastructure, including the excellent core facilities at Viikki and Meilahti campus, seem to be adequate, with one significant exception: lack of appropriate animal facilities. Helsinki University should undertake all necessary steps for improvement of the situation, finalize the central animal facility and provide adequate animal facilities/experimental labs for in vivo studies, in order to assure research of PDBD.

Teaching load seems particularly heavy (28% of the ECTS points, 27% masters, 13% PhD thesis of the Faculty of Pharmacy). Apparent is skilful organization of the teaching, and the willingness and “pride” to teach. The PIs should be congratulated on this spirit.

There seems a specific need of renewing a professor’s position after retirement, and funding of post-docs on a longer time scale (5 year period). It is recommended that Helsinki University evaluates the situations, if applicable, improves the conditions and generally prepares in advance where issues of sustainability arise for senior staff replacement so that research activities are minimally disrupted.

2.6 Leadership and management in the researcher community

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

ASPECTS: Processes and good practices related to leadership and management

The organizational structure goes along a traditional route (full professors in charge), and there seems to be no need for a change (see pt. 2.1, 2.2, 2.5).

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

Extra-mural funding amounts to a total of appr 3.5 Mill €. In view of the overall size of the RC, this marks an appreciable starting point.

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

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

ASPECTS: Scientific quality, scientific significance, societal impact, processes and good practices related to leadership and management, national and international collaboration, innovativeness, future significance

The RC’s action plan builds on the status quo, identifies current shortages (personnel, infrastructure, see pt. 2.5) and strengths (doctoral program, see pt. 2.2), and convincingly presents plans on more mechanistic and systemic approaches (see pt. 2.1), and on increasing extra-mural funding through translational efforts. This is overall convincing and apt to improve the distinctive role of PDBD at Helsinki University.

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 focused neuroscientific topic and the pharmacological expertise of PDBD bear a large potential of innovation and translation with great scientific and social impact. This is certainly evident at the national level, and the RC is on its way towards international excellence (for details see remarks above: pts 2.1, 2.2, 2.6, 2.8).

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 2: The basic structure of life

Overall, research of the PIs of PDBD is clearly part of UH’s focus on “Basic Structure of Life”.

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2.12 RC-specific main recommendations

The proposal for the RC to extend their research activities to approach both mechanistic and system orientated studies is seen as an appropriate and sound strategy, and supported by the Panel.

Attention should be given to a concerted effort to achieve publication of research outputs in high impact journals which will assist in enhancing the international standing and reputation of the RC.

It is recommended that the RC takes an active and leading role in the planned merger of the graduate schools in pharmacology.

Given the possibilities arising from drug development, consideration should be given to extending the 'value chain' by enhancing multidisciplinarity via collaborations with other RCs in the field. Such collaborations could add strength to future grant applications.

The Panel also wish to recommend that the issues arising from the retirement of a senior professorial PI are evaluated by UH, and succession planning addressed.

2.13 RC-specific conclusions

The Panel were pleased to note the clear and distinct areas of research of the RC and the focused nature of the work, as well as the contribution to knowledge in the field of Parkinson's disease. Especially impressive were the efforts and contributions made by the RC to the GSPR and the doctoral training programmes.

Plans to collaborate meaningfully with other RCs in the field should be considered in an attempt to extend the 'value chain' of the research within the UH.
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)
International evaluation of research and doctoral training at the University of Helsinki 2005-2010

RC-SPECIFIC MATERIAL FOR THE PEER REVIEW

NAME OF THE RESEARCHER COMMUNITY:
Pharmacology of Degenerative Brain Diseases (PDBD)

LEADER OF THE RESEARCHER COMMUNITY:
Professor Raimo Tuominen, Faculty of Pharmacy

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
- Web of Science(WoS)-based bibliometrics of the RC’s publications data 1.1.2005-31.12.2010 (analysis carried out by CWTS, Leiden University)

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

RC-SPECIFIC STAGE 1 MATERIAL (registration form)

<table>
<thead>
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<th>1 RESPONSIBLE PERSON</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name: Tuominen, Raimo</td>
</tr>
<tr>
<td>E-mail: <a href="mailto:raimo.tuominen@helsinki.fi">raimo.tuominen@helsinki.fi</a></td>
</tr>
<tr>
<td>Phone: +358-9-191-59469</td>
</tr>
<tr>
<td>Affiliation: Professor</td>
</tr>
<tr>
<td>Street address: Viikinkaari 5E, 00790 Helsinki</td>
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<tr>
<td>Acronym for the participating RC (max. 10 characters): PDBD</td>
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<tr>
<td>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): In practical means, the Research Community &quot;Pharmacology of Degenerative Brain Diseases (PDBD)&quot;, is mostly based on the work done at the Division of Pharmacology and Toxicology, Faculty of Pharmacy, but a significant part also with collaboration with other research units in Finland and abroad, including sites of the PI’s former professor affiliations. In Viikki Campus, the main collaborators have been the Neuroscience Center and Institute of Biotechnology whose excellent instruments have also been widely used. The RC evaluation is based on the work of 32 researchers of which 9 affiliations (2 professors, 3 university lecturers, 1 instructor and 3 doctoral candidates) are paid by the University of Helsinki. The rest of the staff (4 senior scientists and 16 doctoral candidates) are paid by external funding. In addition, the evaluation includes research done by 8 post-doctoral researchers who were graduated from the RC. The research done by the RC is basic pharmacology of major degenerative brain diseases, especially that of Parkinson’s disease, but also Alzheimer’s disease and addiction. In our opinion the RC has a research profile that distinct from other units of the Viikki Campus and the University of Helsinki. Within the frame work of Graduate School of Pharmaceutical Sciences the RC has a productive collaboration with the Pharmacology Unit of the University of Eastern Finland (formerly University of Kuopio). The results by the RC have been published in high impact international scientific peer reviewed journals, mostly in the fields of neuroscience and neuropharmacology. Doctoral training has been active, including continuous international collaboration. Several doctoral students have done short visits to laboratories abroad in order to learn new methods and to do collaborative research. These include several visits to USA, Russia and UK. In addition, we have hosted tens of international visitors in our unit.</td>
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<th>3 SCIENTIFIC FIELDS OF THE RC</th>
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<td>Main scientific field of the RC’s research: medicine, biomedicine and health sciences</td>
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<tr>
<td>RC’s scientific subfield 1: Pharmacology and Pharmacy</td>
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<tr>
<td>RC’s scientific subfield 2: Neurosciences</td>
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INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

RC-SPECIFIC STAGE 1 MATERIAL (registration form)

RC’s scientific subfield 3: Medicine, Research and Experimental
RC’s scientific subfield 4: Substance Abuse
Other, if not in the list: Neuropharmacology
Neurodegeneration
Behavioral neuroscience
Parkinson’s disease
Discovery of new drugs and drug targets

4 RC’S PARTICIPATION CATEGORY

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

Justification for the selected participation category (MAX. 2200 characters with spaces): The RC represents internationally acknowledged high level research, but in our own estimate we can still improve our actions. The results by the RC have been published in high impact international scientific peer reviewed journals, mostly in the fields of neuroscience and neuropharmacology. The PIs of the RC have been have been members of editorial boards and reviewers of international grant applications. They have been invited to review numerous manuscripts in peer reviewed journals. The researchers of the RC have given oral and poster presentations in international congresses. Although the PI’s have been invited to give lectures in international congresses, invitations to give plenary lectures have been scarce. Doctoral training has been active, including continuous international collaboration. Several doctoral students have done short visits to laboratories abroad in order to learn new methods and to do collaborative research. These include several visits to USA, Russia and UK. In addition, we have hosted tens of international visitors in our unit. The ongoing research show exciting results, but those cannot be included in this evaluation. The RC represents internationally acknowledged high level research, but in our own estimate the cutting edge in the area remains to be achieved. With this background information we decided to go for the category 2 in the evaluation.

5 DESCRIPTION OF THE RC’S RESEARCH AND DOCTORAL TRAINING

Public description of the RC’s research and doctoral training (MAX. 2200 characters with spaces): The research community Pharmacology of degenerative brain diseases focuses on diseases related to brain dopamine. In Parkinson’s disease specific dopamine neurons die while in addiction distinct dopamine neurons are overactive. In the body, dopamine and its precursor levodopa are metabolized by catechol-O-methyltransferase (COMT). We have obtained new evidence supporting beneficial effects of COMT-inhibitors as L-dopa adjuncts in the treatment of Parkinson’s disease. This treatment increases brain dopamine. An original finding is their analgesic effect in animal models of neuropathic pain which may open new therapeutic possibilities. COMT is the key modulator of dopaminergic activity in those brain areas that regulate pleasure and motivation. In COMT defective mice, addictive effects of alcohol and nicotine were enhanced. Neurotrophic factors are essential for well being of dopamine neurons in the brain and may be useful in Parkinson’s disease. A new factor, CDNF (cerebral dopamine neurotrophic factor) has been discovered in the University of Helsinki. In experimental Parkinson model degeneration of dopamine neurons was prevented by CDNF and other trophic factors, GDNF, MANF and VEGF. Gene modified mice
with constantly overactive receptor for GDNF have very high concentrations of dopamine in the brain. Our results indicate that prolyl oligopeptidase (POP) may have a role in Parkinson’s diseases and multiple sclerosis. POP is widely distributed in the body and it is involved in the processing of α-synuclein protein that is involved in pathology of Parkinson’s disease. Effects of specific POP-inhibitors on these harmful processes are being studied. Nicotine, one of the most addictive substances, sensitizes brain dopamine system, and it is also active in an animal model of Parkinson’s disease due to dopamine release in striatum. Chronic nicotine increased the number of its own intracellular receptors which may serve as reservoir pool. These projects have lured tens of doctoral students whose studies were organized according the rules of a well functioning Graduate School of Pharmaceutical Research.

Significance of the RC’s research and doctoral training for the University of Helsinki (MAX. 2200 characters with spaces): Research done at the RC’s laboratories helps to realize the strategy of the University of Helsinki to be the "most comprehensive research institution in Finland" and "confirm its position among the world’s best multi disciplinary research universities". Our research is internationally acknowledged and it adds to the basic knowledge of degenerative brain diseases and their future drug treatments. In the University of Helsinki, neuroscience among other biomedical sciences has been very successful and highly ranked in international evaluations. Our fund raising from external sources has been successful. We have received research support from European Union framework programs for studies on POP and protein kinase targeted drugs as well as studies on neurotrophic factors in Parkinson’s disease. The latter has been funded also by the Michael J Fox Foundation for Parkinson’s disease. Majority of funding has been from domestic sources including the Academy of Finland, Sigrid Juselius Foundation and the Jane and Aatos Erkko Foundation. Several of our doctoral students have been supported by the Finnish Parkinson Foundation. Our research has gained publicity in the form of TV- interviews, magazine - and news paper articles. We have close interaction with the Finnish patient organization for Parkinson’s disease and we write often articles to their journal. The RC has been active in doctoral training in the Graduate School of Pharmaceutical Research and in the frame work of FinPharmaNet, a network of Finnish graduate schools in the field of drug research, see http://finpharmanet.utu.fi/

Our doctoral graduates have been working as post-doctoral students in Switzerland, the Netherlands, and in the US. Some of the graduates are employed by the University of Helsinki, the Finnish Medicines Agency and pharmaceutical industry.

**Keywords:** Catechol-O-methyltransferase, COMT; Prolyl oligopeptidase, POP; Dopamine; Parkinson’s disease; Protein kinase C, PKC; Rat; Brain; Degenerative brain disease; Nicotine;
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

RC-SPECIFIC STAGE 1 MATERIAL (registration form)

Nicotinic acetylcholine receptor, nAChR;
Cerebral dopamine neurotrophic factor, CDNF;
Glial cell line derived neurotrophic factor, GDNF; Microdialysis;
Addiction

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<th>6 QUALITY OF RC’S RESEARCH AND DOCTORAL TRAINING</th>
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Justified estimate of the quality of the RC’s research and doctoral training at national and international level during 2005-2010 (MAX. 2200 characters with spaces): The results by the Pharmacology of Degenerative Brain Diseases (PDBD) RC have been published in journals with high impact factors mostly in the fields of neuroscience and neuropharmacology. The forums include Nature (IF 34.48), Journal of Neuroscience (7.178), Neurobiology of Aging (5.937), British Journal of Pharmacology (5.204), Journal of Medicinal Chemistry (4.802), Developmental biology (4.379), Journal of Neurochemistry (3.999), European Journal of Neuroscience (3.418), European Journal of Pharmacology (2.585) and European Journal of Pharmaceutical Sciences (2.608). Our research has also been strongly oriented to drug discovery, including pharmacology of novel compounds targeted to POP, COMT and protein kinase C (PKC). This is reflected by number of publications in the top ranking journal for new chemical entities. The RC has been involved in three European Union funded research projects, and in one of them (Pro-KinaseResearch, largest health project within the FP6) as the coordinator. In addition to this, there are other international and national collaborative research projects with laboratories in the US, Russia, Estonia and UK. The research has been funded by international (EU, MJFF) and national (e.g. the Academy of Finland, Sigrid Juselius Foundation, Finnish Parkinson Foundation) sources.

Doctoral training has been significant part of the RC’s activities. The PIs of the RC have been involved in total of 13 dissertations as supervisors or co-supervisors of which 8 have been done in the unit. One of the latter was awarded as the best thesis in pharmacology in Finland in the year 2009. One PI has supervised 6 dissertations that were finished and approved with distinction in his previous affiliation during the follow-up period. Two PIs of the RC have been appointed as the directors of the Graduate School of Pharmaceutical Research for total of 5 years during this period. The graduate school has been productive and has received top evaluations from the Academy of Finland.

Comments on how the RC’s scientific productivity and doctoral training should be evaluated (MAX. 2200 characters with spaces): The evaluation should estimate how the RC meets with the strategic aims of the University and the Faculty. Also, how does the research reflect the main focus of research done in the Faculty which is has been described as “Preclinical drug research and research on drug discovery and development tools”. The outcome should be compared to that of similar size units (9 researchers paid by the University and 12 paid by external research funds) and similar load of teaching. This would be appropriate and fair. The relevance of the research hypotheses and results in relation to societal impact and unmet needs in prevailing drug therapies should be taken into account. Research methods and research infrastructure should be evaluated.

The impacts of our scientific publications should be in general compared to the impact of the best journals in the field of pharmacology. In addition, we have published many papers in other journals especially in the field of neuroscience. As evaluation methods, we suggest the following: 1) number of full publications, 2)
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

RC-SPECIFIC STAGE 1 MATERIAL (registration form)

sum of IFs of the journals, 3) number of Ph.D. degrees per PI and number of years as responsible graduate school positions per PI. Since citation numbers accumulate slowly, we think that these are not valid for such a short period. If they are used, we recommend full-life citation numbers and H-indexes. External research funding during 1.1.2005 – 31.12.2010 should be evaluated.

Doctoral training can be evaluated based on published PhD theses within the RC own Unit and with collaborating Units in the University of Helsinki and in the University of Eastern Finland (formerly University of Kuopio). Another basis for evaluation would be the number of Graduate School courses organized by the graduate school. Finally, we want to emphasize that all doctors graduated from the program have been employed. The Graduate School of Pharmaceutical Research is based on the research groups of the Faculty of Pharmacy, University Of Helsinki, and Department of Pharmacy, Faculty of Health Sciences, University of Eastern Finland. Director of this graduate school has been from our RC for five years during the period of evaluation.
## LIST OF RC MEMBERS

**NAME OF THE RESEARCHER COMMUNITY:** Pharmacology of Degenerative Brain Diseases

**RC-LEADER:** R. Tuominen

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BACKGROUND INFORMATION

Name of the RC’s responsible person: Tuominen, Raimo
E-mail of the RC’s responsible person: raimo.tuominen@helsinki.fi
Name and acronym of the participating RC: Pharmacology of Degenerative Brain Diseases, PDBD
The RC’s research represents the following key focus area of UH: 2. Elämän perusrakenne – The basic structure of life
Comments for selecting/not selecting the key focus area: “The basic structure of life” represents best our research in neuroscience, - in more specific terms - pharmacology of degenerative brain diseases. Our research is internationally acknowledged and it adds to the basic knowledge of degenerative brain diseases and their future drug treatments. We employ sophisticated techniques such as basic molecular biology methods, gene modified animals, analysis of brain neurotransmitters (in conscious animals and in post mortem tissue) and animal models of diseases. Thus, our research aims at integrating knowledge on basic neuroscience to future treatments of degenerative brain diseases. In the University of Helsinki, neuroscience among other biomedical sciences has been very successful and highly ranked in international evaluations.

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).

Focus. Our RC has a distinct research profile among other units of the Viikki Campus and the University of Helsinki. Main focus is on basic pharmacology of major degenerative brain diseases, especially that of Parkinson’s disease (PD), Alzheimer’s disease (AD), multiple sclerosis (MS) and addiction. Our drug related targets are: neurotrophic factos (NTFs), catechol-O-methyltransferase (COMT), protein kinase C (PKC), prolyl oligopeptidase (POP) and nicotine. Dopamine is a connecting link in Parkinson’s and addiction. In PD dopamine neurons of the s. nigra degenerate while in addiction dopamine neurons of ventral tegmental area are overactive. Our RC has focused on brain dopamine related neuropharmacology but also other targets such as aberrant protein processing have been important.

Quality of the RC’s research. The quality of research is reflected by publication forums. These include top-journals such as Nature (IF 34.48) and PNAS (9,380) as well as high-ranking journals of neuroscience and neuropharmacology, like J. Neurosci (7.178), Neurobiology of Aging (5.937), Br.J. Pharmacol (5.204), J Med Chem (4.802), Mol. Pharmacol (4.531), Devel Biol (4.379), Biochem Pharmacol (4.25), J Neurochem (3.999), and Eur J Pharm Sci (2.608). RC has been involved in 3 EU-funded projects. There are international and national collaborative projects including those with laboratories in the USA, Russia, Estonia and UK.

NTFs are natural proteins that promote survival and differentiation and contacts of neurons. Cerebral dopamine neurotrophic factor (CDNF) has been discovered in Helsinki University. We have shown that both CDNF and mesencephalic astrocyte-derived neurotrophic factor (MANF) have significant neuroprotective and neurorestorative effects against 6-hydroxydopamine (6-OHDA) induced degeneration of dopamine neurons in rats. In the same animal model neurodegeneration was prevented also by other trophic factors, i.e. GDNF and VEGF-C. Thus, the NTFs show therapeutic potential in the treatment of PD. In our addiction studies, gene modified mice with constantly active
receptor for GDNF (MEN2B-mice) have very high concentrations of dopamine in the brain and show changes in addiction behaviour.

COMT is an important target in PD. One of our PI (PTM) is associated with a development of a clinically used drug, entacapone, the only widely used COMT-inhibitor in the treatment of PD. COMT inactivates L-dopa and dopamine. It is a strictly intracellular enzyme, mainly in the cytoplasm and nucleus. COMT has two forms, soluble (S-COMT) and membrane bound (MB-COMT). Their importance in dopamine metabolism has been thoroughly studied by this RC. We have developed and fully used a large battery of tools: COMT-overexpressing or COMT-KO mice and mice lacking only S-COMT; peripheral and centrally acting COMT inhibitors; COMT antibodies and recombinant COMT proteins. We have shown that COMT is the major dictator of dopaminergic activity in the prefrontal cortex, in contrast to the striatum. In S-COMT deficient mice, MB-COMT substitutes about 50% of S-COMT, even in the periphery. COMT inhibition sensitizes to painful stimuli with an exception of neuropathic pain where it acts as an analgesic. Several important polymorphisms of the human COMT gene give a solid background for clinical applications.

PKC regulates amyloid precursor protein (APP) processing leading to decreased production of Aβ and increased production of nontoxic secreted amyloid precursor protein. PKC activators have shown therapeutic potential in in vivo animal models of AD. We have developed a novel class of synthetic C1 domain ligands, which bind to PKCα and PKCβ in submicromolar concentrations. Some of the compounds are able to activate PKC in cellular environment, and thus they are interesting lead molecules for AD-related drug development. PKC is also widely recognized cancer drug target and some of our compounds have antiproliferative effects in human cervical cancer cells.

POP has multiple roles either by hydrolyzing <30-mer proline-containing peptides or by its newly discovered nonhydrolytic functions. Many novel physiological roles for POP have been uncovered by our RC. We have thoroughly characterized a distribution of POP protein inside the cells and in the body. Beneficial effects of our new POP inhibitors on memory, angiogenesis and α-synuclein aggregates were clarified. POP seems to be a regulator of cellular differentiation and embryonic development. Our results indicate that POP may have even causative role in Parkinson’s diseases via augmenting α-synuclein aggregation. POP is involved in the immune response with implications in autoimmune diseases such as MS and celiac disease. The specific POP-inhibitors, transgenic animals and disease models have been highly useful in the above studies.

Addiction research. Nicotine and neuronal nicotinic acetylcholine receptors (nAChRs) have been in focus in addiction studies. Nicotine is one of the most addictive substances and we have shown that it sensitizes brain dopamine system. In line with this it is also active in an animal model of PD due to dopamine release in striatum. Chronic nicotine increased the number of its own receptors which were mostly intracellular and may serve as reservoir pool. Thus, we have proved up-regulation and internalization of the nAChRs at molecular level and in vivo studies the effects of chronic nicotine exposure to behavioural and neurochemical effects of opioids. Currently we focus on nicotine-opioid interactions at the level of nAChRs. COMT is weakly and complicatedly associated with addiction. In COMT-KO-mice ethanol intake is increased but only in males. Heterozygous GDNF knockout mouse are more vulnerable to morphine-induced psychomotor sensitization than their wild-type littermates.

The scientific significance.

Our RC has shown that the NTFs (CDNF and MANF) have therapeutic potential in the treatment of PD. CDNF and MANF seem to possess a novel mechanism of action, which is different from that of GDNF. Our basic research on the role of GDNF in the regulation of midbrain dopaminergic neurons has
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RC-SPECIFIC STAGE 2 MATERIAL

discovered some highly interesting and significant findings, e.g. related to addiction. COMT is the major determinant of the dopaminergic activity in the prefrontal cortex while in the striatum and nucleus accumbens the uptake of dopamine into the presynaptic terminals is the major player. Centrally acting COMT-inhibitors that modify prefrontal dopamine may have significant therapeutic applications in the future. POP is widely distributed in the body, including the brain. POP seems to have other functions beyond its proteolytic activity. If this holds true, it will open a new avenue of research on angiogenesis, inflammation and neurogenesis. PKC C1-domain targeted compounds are unique in that they can activate PKC. This is a prerequisite for the future PKC-targeted drugs used in AD.

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

Our RC (“pharmacology of degenerative brain diseases”) has published major results in high impact international journals. After many original findings, like anti-parkinsonian effects of CDNF and MANF, they should focus on mechanistic studies, like on a role of various transmitters and intracellular messengers. The same holds true for POP project. After fundamental findings of general and developmental physiology and tissue, cellular and subcellular distribution of POP and its actions beyond hydrolysis, moving to animal models of PD and AD, MS and even cancer is warranted. Brain neurochemistry of gene modified mice using in vivo microdialysis of conscious animals to collect extracellular fluid in specific brain areas is a very strong method. Effects of drug treatments (e.g. CDNF- and POP-proteins and POP-inhibitors) and gene therapy of Parkinson’s disease (e.g. by AAV-CDNF) and gene-therapy induced CNS-damage (e.g. by AAV-α-synuclein) on brain function should be studied in detail. Correlation of neurochemistry and behaviour would be important.

2 PRATICES AND QUALITY OF DOCTORAL TRAINING (MAX. 8800 CHARACTERS WITH SPACES)

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

Doctoral training has been significant part of the RC’s activities. Doctoral studies have been mainly organized by Graduate School in Pharmaceutical Research (GSPR, http://www.uku.fi/farmasia/tutkijakoulu/english/) which is funded by Academy of Finland (operational fund) and Ministry of Education and Culture (MEC, salaries of graduate school positions). The activity of GSPR is based on the research done in both of the higher pharmaceutical education units in Finland, Faculty of Pharmacy in the University of Helsinki and School of Pharmacy, Faculty of Health Sciences in the University of Eastern Finland, UEF (Kuopio campus). In addition, GSPR has close cooperation with Neuroscience Center and Institute of Biotechnology in Helsinki and AIV Institute in the UEF, Kuopio. Research and educational collaboration is practised with drug industry, inter/national authorities and scientific societies. Altogether there are about 150 students performing full time research and about 100 students doing part-time doctoral training in GSPR. About 70 supervisors have at least docent degree.

PhD degrees by PDBD community. The PIs of the PDBD community have been involved in total of 13 PhD theses as supervisors or co-supervisors of which 9 have been done within the unit. One of the latter was awarded as the best thesis in pharmacology in Finland in the year 2009. During the evaluation period, one PI (PTM) has supervised 6 dissertations that were finished and approved with distinction in his previous affiliation. The graduate school has been productive and has received top evaluations from the Academy of Finland. Director of this graduate school has been from our RC during the whole period of evaluation.
Graduate School networks. Research groups have collaboration with several international and national networks (e.g. FinBioNet). The most important Finnish research training collaboration is FinPharmaNet network (started 2006-2007) which has additional 3 graduate schools focused in drug research. FinPharmaNet has two coordinators (also coordinating two graduate schools each) and a website (http://finpharmanet.utu.fi) which contains, for example, a detailed course calendar. At 2012, these graduate schools will merge as one Doctoral program.

Getting position at GSPR. MEC funded doctoral student positions are intended for four year full time research. GSPR has received increasing number of these positions from 11 (2005) up to 16 (2010). Doctoral students for MEC positions are recruited by open international call and about 20% of applicants have been accepted. The applications are evaluated by GSPR Board and positions are principally granted equally for each discipline and both universities. All doctoral students (also students paid by matching funds) who are registered in pharmacy units belong automatically to GSPR (unless they are members of other graduate schools), and they have similar benefits and duties as those paid by MEC. At registration, preliminary research plan, study plan, approval of the head of pharmaceutical discipline are necessary, and 2-3 supervisors are named for each doctoral student.

Postgraduate training. GSPR provides a training platform for all doctoral students, no matter where the salary originates, and controls their research training. The training is organized systematically, and several parts of it are obligatory. In the early phase of training, doctoral students have preliminary exam of their research discipline to make sure that students have enough background knowledge of the research field despite their basic academic degree. At about half-way of their doctoral training, students defend (without supervisor) their work and plan against 2-3 experts of the field. In these discussions the experts give constructive feedback to the student which increases the quality of the doctoral thesis and support students’ work.

GSPR organises postgraduate level, scientific training courses mainly in Finland but there has been international courses as well. For example, Behavioral studies in drug discovery course has been organized 3 times, twice in the University of Tartu, and in 2008 Finnish– Estonian-German cooperation brought together about 100 pharmacologist and neuroscientist of 11 nationalities. Course calendar is planned to cover several following years. Frequent courses are held at maximum 4 year intervals. Thus, students can compile their study plan already in the beginning of their doctoral training. GSPR organises, itself or as co-organiser, annually 10-25 courses. Almost all courses are in English and have international lecturers. Also experts from drug industry and authorities are used. All courses are free. Some courses have laboratory work or demonstrations. Doctoral students participate in transferable skills courses in their host universities.

FinPharmaNet network organises, in turn by each graduate school, an annual Joint meeting that contains lectures, student presentations, posters and social events for two days. In the meeting doctoral students have a possibility to get wide view of the whole drug research process.

GSPR provides travel grants for participation in congresses and visits in the laboratories abroad. Especially international travel has been encouraged. GSPR co-organised Finnish Pharmacological Society’s Spring meeting in 2008 entitled Doctoral training internationally and in Finland. This occasion showed that European doctoral training is still far from uniform and that Finnish graduate school model is a good for doctoral students.
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RC-SPECIFIC STAGE 2 MATERIAL

Annually altogether 20-30 PhD degrees from the GSPR are approved by the two Universities in Finland. All (= 100%) of doctors are employed after their graduation, most of them by universities in Finland and abroad, but quite many also by international or national drug industry.

Administration. GSPR Board has representatives from both universities and from several disciplines. GSPR administration has broad pharmaceutical background. Summaries of the GSPR Board decisions are published in the web site to inform and guarantee open decision-making and equal pharmaceutical research training in Finland. Preliminary examination, defense of research plan and close collaboration with pharmaceutical faculties guarantees doctoral student follow-up. Courses are planned several years ahead with budget and program to assist study planning. Feedback is collected of the GSPR courses to get participant and lecturer opinions.

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

We interpret that the doctoral training has been nearly optimally organized in GSPR, no matter how the students are financed. All enter the school, assuming that the registration requirements are filled, and after that all have similar duties and benefits. This has been a very wise policy since the number of students paid by Academy of Finland (16) is a fraction of other students (250). When selecting those 16, multidisciplinary nature of pharmacy has led to special approach where the main competition is inside each discipline. Initial examination and defence of the research plan are excellent obligatory requirements.

The main challenge will be merge of the four FinPharmaNet graduate schools to one doctoral program. A co-operation has been practised many years and the new leader of the Drug Research Doctoral Program will be from our RC (RKT), and the home of the program will be Helsinki University. However, selection of the students (paid by MEC) will be a major task. A quality handbook compilation for FPDP is in progress to harmonize variable practices of the previous 4 schools.

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).

The PIs of the RC have given expert opinions related to new drugs under development or under marketing authorisation process. These statements and opinions have been asked by private sector (pharmaceutical companies) as well as public authorities (Finnish Medicinal Agency, FIMEA). The RC has given statements and comments related to legislation issues in health sector. One of the PIs (RKT) of the RC has given a public presentation on the effect of nicotine to members of parliament in connection to availability of nicotine replacement products in retail trade, i.e. outside pharmacies. Another PI (PTM) has been in a board of directors of 2 small companies.

Research done in the RC is important for the society since ageing population with increased prevalence of degenerative brain diseases is one of the major challenges world-wide. Drug therapies of Alzheimer’s disease and Parkinson’s disease have not really developed much during the past ten years and there is a large unmet need for better therapies. Basic research is the key to new applications. Addictions represent a big health problem in the society. All addictions, i.e addiction to food, alcohol, gambling, drugs etc. share the same neurobiological basis. Although not all addictions may be cured by medicines, a big group of people would benefit from effective medicines.
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RC-SPECIFIC STAGE 2 MATERIAL

Doctors graduated from this RC have been employed by both private and public sectors. These include universities (n=5; one post-doc in the US, one in Europe, three in the University of Helsinki), research institutes (n=1; one post-doc in the US); pharmaceutical industry (n=2; one post doc in Europe, one senior researcher in Finland), civil service departments (n=2; two officers). Four of the total number (n=14) have been employed by pharmacies.

The PIs of the RC have been active towards the Finnish Parkinson Society by giving lectures in Movement Disorder Club meetings and writing article to the Journal of the Finnish Parkinson patient organization. Several interviews to various magazines have been given and there are a few appearances of the PI’s in TV.

• Ways to strengthen the societal impact of the RC’s research and doctoral training.

The RC should inform stakeholders and general public about their research, when it is reasonable. This would also increase level of knowledge on basic science among decision makers, which would be beneficial for the future funding of the research. Interaction with politicians even may be of significance. More interaction with pharmaceutical industry in drug research would be, in an optimal case, a win-win situation. Being a member of the board of directors of SMS companies would serve the social impact as well. In doctoral training the RC should take into account the need for a broader understanding of medicines which would give better prerequisite for the various positions where a pharmacologist will make his/her career.

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

International collaborations can be divided in two major categories (1) EU-projects within FP6 and FP7 and (2) other more bilateral collaborations between specific laboratories. The Pro-KinaseResearch Consortium (www.proteinkinase-research.org) was coordinated by the RC during 2004-2009. Altogether 25 Partners from 12 countries (Austria, Finland, France, Germany, Holland, Hungary, Israel, Italy, Norway, Switzerland, Russia and U.K.) were involved. The research focus was on new drug candidates targeting protein kinases. Research collaboration continues. NeuroPro consortium (www.neuropro.eu) is doing research on role of POP as drug target in neurodegeneration. In this FP7 project there are 7 (Belgium, U.K., Germany, Estonia, Hungary, Finland) partners. The scientific coordinator is from our RC (A. Garcia-Horsman). A related collaboration with University of Valencia, Spain (Dr. Felipo) as well as with the Paul-Flechsig-Institute for Brain Research (Dr. Rossner) in Leipzig has been setup. We have coordinated an Addiction Research Consortium funded by the Academy of Finland. Within this project collaboration with Pavlov Medical University in St. Petersburg (prof. E. Zvartau) was successful. In COMT-research a long-term collaboration with Rockefeller Center and subsequently Columbia University, College of Physicians & Surgeons, and with prof. Noburo Hiroi in Albert Einstein Institute, New York, USA, has continued. A new collaboration with Elizabeth Tunbridge and Trevor Sharp has started when Mikko Käenmäki (MSc) began his research visit to Oxford in the Fall of 2010.

National collaboration with the University of Eastern Finland (Kuopio), Department of Pharmacology and Toxicology, has been active particularly since it was the previous affiliation of one PI (PTM). These studies have mainly included POP and COMT research. Six PhD degrees have been finished and two are still ongoing. Our RC had collaboration with the University of Tampere within the ELVIRA program (coordinator prof. M. Mäki, Tampere) financed by the Academy of Finland during 2007-2010. The topic was celiac disease, its genetic background, degradation of gliadins in foods, before eating, and in the
body after eating. Also with Tampere University (prof. Moilanen) we had collaboration within the PKC-project.

Intersectoral collaboration with the National Institute for Health and Welfare, Helsinki (THL, prof. Kiijanmaa, doc. Hyytiä) in addiction research has continued for years.

Within our University the collaboration with Institute of Biotechnology, Brain Research Center and Biomedicum Helsinki have been instrumental. These cooperations have been substantiated with several common PhD projects.

Researcher mobility has been active in both pre- and post-doctoral level. Two of our PhD students spend more than one year in NIEHS, NIH, NC, USA studying effects of amantadine in animal models of PD and at the present time one doctoral student is working in the University of Oxford, U.K. Post-doctoral training has been done or is going on in several countries (n= 6): one in Switzerland, one in Belgium, one in the Netherlands, and three in the USA. We have hosted visitors from abroad: two from Spain, one from Germany, Italy and The Netherlands, and two short-term visitors from Russia.

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

The PDBD consortium has good connections to European and US scientists. At the present we are involved in two European collaborations (EraNet Neuron project on CDNF and NeuroPro project on POP) and in one US collaboration (MJFF funded project on CDNF coordinated by acad.prof. Saarma, University of Helsinki). Our RC has been the most productive group in the NEUROPRO consortium and the challenge is to further foster and expand the research. Accordingly, our strategy is to increase research collaboration in the frame of EU funded FPs and due to our good experiences in the past. Post-doctoral fellows have opened new contacts especially in the US and these should be used in the future to build up networks with scientists in the US. We are quite regularly contacted by foreign students who would like obtain a graduate school position in our RC. However, at the present time and probably also in the near future we have only limited resources for this. The practically only funding source is the Center for International Mobility (CIMO), but these grants are only for a limited period of time.

**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).

Research environment and infra. The overall research conditions have been good. During this period, we have been able to upgrade our experimental neurosurgery unit called Stereotaxic Center to meet very high standards. Within the Center we also have a permit to make gene transfers to mice and rats. This facility is available to other neuroscientists of the University as well. We have also upgraded our HPLC systems (n=5) used in the analysis of neurotransmitters and their metabolites in brain tissue and extracellular fluid. The latter samples are collected from conscious animals (rats and mice) by using microdialysis technique. We have appropriate cell culture facilities of safety level 2 (for viral transfections) and both standard light and fluorescence microscopes. In our molecular biology laboratory we are able to make cloning and expression of proteins and we also have a PCR and qPCR for RNA measurements. The behavioural pharmacology equipment have been partially renewed, especially the turning behaviour apparatus used in Parkinson research (two units with 8 chambers each).
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We have access to the core facilities of the Viikki Campus and Meilahti Campus. Biocentrum Helsinki and Biocentrum Finland provide many of these core-units and especially the Light Microscopy Unit and equipment within Brain Research Center here in Viikki have been of paramount importance for our research. Very recently a top-of-the-line SPECT/CT imaging system with resolution of less than one millimeter was purchased to our faculty and is at our disposal. This imaging system allows us to perform sophisticated visualization of drug effects in the brains of living animals.

Lack of appropriate animal facilities in our campus (Viikki) has been a major drawback. With the permission of the Chief Veterinarian of the County Administrative Board we have had the possibility to keep animals in specific rooms inside our Division. Also all surgical operations as well as experiments have been done at the Division. We have some shortage of office space and two laboratories have been converted to offices hosting six persons each.

During the last three years we have built a quality assurance system for research and teaching. We have adopted standard operation procedures (SOPs) for more than 15 processes and to about 25 instruments.

Teaching. Our teaching load is heavy. We teach 28% of the study points (ECTS) of the faculty of pharmacy. During 2005-2010 we supervised 27% (69 out of 258) of master thesis works done in the faculty. During the same period of time we produced 10 PhD thesis work, which is 13% of the production by the whole faculty. These figures reflect the position of pharmacology in the curriculum of the faculty of pharmacy. The RC is proud to tell about the willingness of all researchers and staff members to teach pharmacology. In addition to persons paid by university budget funding, also all researchers paid by external funding participate teaching with a certain work share (about 5% of their hours).

- RC’s strengths and challenges related to operational conditions, and the actions planned for their development.
  
  The ultimate strengths of our RC are: refined skills in major types of neuropharmacological tools, an up-to-date stereotaxic unit and access to sophisticated instruments in the core units and other units of Viikki Biocentrum.

  The major challenge is to get a new rodent house where all of the animal operations will be transferred. We support the building process in all possible ways, and fortunately the project is now in a planning phase and the renovated unit will be available at the end of 2012. A volume of teaching of toxicology by RC is very modest, and this should be improved by number of means, including a Swedish-speaking professorship in toxicology.

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.

In our RC we have 2 full professors, 3 university lecturers, 1 post doctoral and 3 doctoral students who are paid by the University. In addition we have 3 post-doctoral researchers, one graduate school coordinator and 9 doctoral student paid by external funding. Six out of the 9 senior scientists (including post-docs) have a principal investigator (PI) status. Leadership of the RC is divided into faculty
administration and research leadership. These two are partially overlapping. Head of the Division (RKT) is responsible for most of the faculty administration including hiring personnel, use of budget funds and organizing undergraduate teaching as well as studies related to doctoral studies. He is the leader of research on PKC, addiction studies and in collaboration with the other professor (PTM) leads the Neurotrophic factors in PD project. The other full professor (PTM) is the leader of COMT and POP projects and he also is leader of graduate school courses. The University lecturers have a rather heavy teaching load, but they also have a leadership role as thesis work supervisors or co-supervisors in projects mentioned above. Each of them has a primary role: one is doing nicotine pharmacology, one is specialist in brain neurochemistry and one is doing gene-delivery and apoptosis related research.

The post-doctoral researchers are responsible for their research projects and they also hire PhD students to be trained in their projects. They have appropriate lab space and all available infra structure at their disposal for executing their research. One of the post-docs has been working in a brain neurochemistry project and the three others are in the POP-project.

The two professors have been in charge for the most part of the large grant applications such as those submitted to Academy of Finland, Sigrid Juselius Foundation, Michael J. Fox foundation and EU. The University lecturers have been able to get external funding for their research and they are responsible for the research done by their grants. The post-doctoral researchers have their own grants (EU FP7, Finnish Cultural Foundation, Erkko Foundation, the Academy of Finland) and they are responsible for their research projects and use of the funds and reporting.

We focus on neuropharmacology and neuroscience. Therefore the methods used in the research projects are overlapping in most parts. This is strength as the researchers can share their expertise in the lab. Our quality assurance system forms a solid basis for the technical quality of research. The research projects have regular meetings and usually one or both of the professors participate. Once a week there is a research meeting of the whole Division and once a month we have a Division meeting (mostly administrative issues but also practical issues on laboratory work).

Our research management system supports academic leadership. Taking into account the fact that we have a rather heavy teaching load, the distribution of leadership and responsibilities among the senior scientists is the best way to accomplish high quality research. Together with common nominator of research, the neurodegenerative diseases, and shared methods and shared responsibilities this management structure supports the focus of research and know-how.

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

We cannot identify any major problems in administration of RC. All personnel are able to work together and there is nothing that could not be discussed. We have also obtained extra resources, although minor, for teaching, and we have excellent candidates who have applied for the newly established tenure tract. It is also very positive that there is time for research on which even about 50% of the resources can be used.

The major challenges are short-lasting recruitments owing to short financing terms of the private grants. Also, positions for Swedish-speaking teaching personnel are lacking and only basic skills can be used. Steps have been taken to support a new Swedish-speaking professorship in toxicology.
## 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: **1070000**

- **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: **0**

- **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: **1705000**

- **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: **0**

- **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: *Michael J. Fox Foundation for Parkinson’s disease, USA*
  - Sigrid Juselius Foundation, Finland
  - Finnish Cultural Foundation
  - Päivikki ja Sakari Sohlinbergs Foundation, Finland
  - Finnish Parkinson Foundation
  - Research Foundation of the University of Helsinki, Finland
  - Orion-Farmos Research Foundation, Finland
  - Ella and Georg Ehrnrooth Foundation, Finland
  - Emil Aaltonen Foundation, Finland
  - Finnish Pharmaceutical Association
  - total amount of funding (in euros) from the above-mentioned foundations: **866000**

- **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: *GGL Pharmaceutical Ltd., China*
  - total amount of funding (in euros) from the above-mentioned funding organizations: **87,000 euro**

- **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:
  - total amount of funding (in euros) from the above-mentioned funding organizations:
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RC-SPECIFIC STAGE 2 MATERIAL

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.

Personnel. Only 40% of RC staff is paid by Helsinki University (2 professors, 3 lecturers, 1 post-docs and 3 doctoral students). RC has 3 post-docs and 9 doctoral student paid by external funding.

During 2012, one professor will retire and it is essential to keep the position in our RC. Since the professor both teaches (see also Item 5, teaching) and studies, the person should have teaching experience and the area of research would preferably be neuroscience. Funding of 2 post-docs should be renewed depending on external funds (see strategy below). There is an enormous need to get post-doc positions be more solidly funded (e.g., 5-year terms). Our RC competes for 1 tenure track position in the faculty. We have 2 post-docs returning from the USA in 2011 – 2013. We can provide space and equipment to them if they are able get finances for their salaries and research.

The mainstay in our research strategy is pharmacology of degenerative brain diseases, especially research on neurotrophic factors (CDNF, MANF and GDNF), COMT and POP. We have a good knowledge and publication record in these subjects. Our expertise in animal models of brain diseases and the research infrastructure within our unit and the Viikki campus is strong and forms a solid basis for this strategy. Methods/infra include gene modified animals, disease models, Stereotaxic Center, brain neurochemistry, immunohistochemistry and SPECT/CT imaging. Research collaboration with Institute of Biotechnology and Neuroscience Center as well as “in-house” with the other units in our faculty will continue and find new forms. When a new animal facility has been built, the division-level problems concerning animal care and allergy problems should be resolved.

Two drug discovery projects, POP and PKC as novel drug targets, will be continued to animal studies. We have relevant novel molecules in the category “hit-to-lead” in both and proof-of-concept type experiments are needed. In both cases, drug targeting to the CNS is a challenge and collaboration with the CDR (Center for Drug Discovery) is needed. We will also need to expand collaboration with pharmaceutical industry within a few years. Our RC is not planning to start spin-off companies.

Funding. The PDBD RC has been successful in fund raising, and also in the future we are crucially dependent on competitive research funding. Our strategy is to apply grants from all national and international funding bodies. The quality of research done in RC has been at a high international level, and the same standard should be kept. The social impact of neuroscience is prominent as such. The funding sources include Academy of Finland and many foundations like Sigrid Juselius foundation and international sources such as EU FP7 and the forthcoming FPs. These applications will be based on our former and prevailing research networks, but applications will be sent also to ERC, Wellcome Trust and NIH. Partners are available from familiar European networks. International sources are very competitive but necessary since the Finnish research funding may collapse due to the new full cost model. This system has been implemented with no increase in budgets of the funding bodies. In the case our strategy relying on international funding fails, it would cause serious problems.

Doctoral training. Starting from 2012, Graduate School of Pharmaceutical Research (GSPR) will be one of the 4 sections of a new doctoral program, FDPD, that covers all areas of drug research. The disciplines include molecular, modelling of syntheses and pharmacokinetic, virtual screening, synthesis of organic compounds, analytical methods, new drug research methods, pharmaceutical technology, pharmacology, clinical pharmacology and toxicology. University of Helsinki will host the program and the head of the RC (RKT) will be the first director. GSPR has now 16 graduate school positions and in the
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RC-SPECIFIC STAGE 2 MATERIAL

new program the number should remain the same or even increase. Within our RC, we have had 1-2 paid graduate school positions from the GSPR. However, all our PhD students (now 12) are affiliated to the program and implement the structure of GSPR in their studies. During the period 2011-2013 we expect that in our RC will generate at least 9 PhD degrees.

How RC members contributed?

RKT and PTM collected the material from all PI’s and wrote the initial draft of Stage 2 evaluation report. All PI’s commented, proofread, and amended the draft. RKT wrote the final version with all PI’s approval.

Abbreviations:

RKT: prof. Raimo K. Tuominen, MD, PhD, Head of the Division of Pharmacology and Toxicology and Coordinator and PI of the PDBD Research Community

PTM: prof. Pekka T. Männistö, MD, PhD, Professor of Pharmacology and Drug Discovery, Division of Pharmacology and Toxicology, PI of the PDBD Research Community.

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

How RC members contributed?

RKT and PTM collected the material from all PI’s and wrote the initial draft of Stage 2 evaluation report. All PI’s commented, proofread, and amended the draft. RKT wrote the final version with all PI’s approval.

Abbreviations:

RKT: prof. Raimo K. Tuominen, MD, PhD, Head of the Division of Pharmacology and Toxicology and Coordinator and PI of the PDBD Research Community

PTM: prof. Pekka T. Männistö, MD, PhD, Professor of Pharmacology and Drug Discovery, Division of Pharmacology and Toxicology, PI of the PDBD Research Community.
1 Analysis of publications

- Associated person is one of Pekka Männistö, pekka.mannisto@helsinki.fi, Raimo Tuominen, Raimo.Tuominen@helsinki.fi, Timo Petteri Piepponen, Petteri.Piepponen@helsinki.fi, Aiko Rasamaja, aiko.rasamaja@helsinki.fi, Outi Sahminen, Outi.Sahminen@helsinki.fi, Tanja Kirinnummi, Tanja.Kirinnumi@helsinki.fi, Elina Ekokoski, Elina.Ekokoski@helsinki.fi, Juan Arturo Garcia Horrén, arturo.garcia@helsinki.fi, Timo Tapio Myöhänen, timo.myohanen@helsinki.fi, Ilkka Raesäni, Ilkka.Raesani@helsinki.fi, Mikko Airavaara, Mikko.Airavaara@helsinki.fi, Sanna Janhunen, sanna.janhunen@helsinki.fi, Ilkka Reenilä, Ilkka.Reenila@helsinki.fi, Mikko Käenmäki, mikko.kaenmaki@helsinki.fi, Bernardino Ossola, bernardino.ossola@helsinki.fi, Isla Peitonen, isla.peitonen@helsinki.fi, Marija Hannieke Pihlonen, marija.pihlonen@helsinki.fi, Lauriina Porokokka, lauriina.porokokka@helsinki.fi, Neida Schendzielorz, neida.schendzielorz@helsinki.fi, Rieka Taka, rieka.taka@helsinki.fi, Virpi Talman, virpi.talman@helsinki.fi, Merja Vuolainen, merja.vuolainen@helsinki.fi

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2 Listing of publications

A1 Refereed journal article

2005


2006
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI
RC-SPECIFIC TUHAT COMPILATIONS OF PUBLICATIONS DATA 2005-2010

PDBD/Tuominen


2007


2009


2010


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RC-SPECIFIC TUYHAT COMPILATIONS OF PUBLICATIONS DATA 2005-2010

PDB/Tuominen
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RC-SPECIFIC TUHAT COMPILATIONS OF PUBLICATIONS DATA 2005-2010

PDBD/Tuominen


Myöhänen, TT, Schendzielorz, N, Mannistö, P 2010, 'Distribution of catechol-O-methyltransferase (COMT) proteins and enzymatic activities in wild-type and soluble COMT deficient mice', Journal of Neurochemistry, vol 113, no. 6, pp. 1632-1643.


A2 Review in scientific journal

2009


2010


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RC-SPECIFIC TUHAT COMPILATIONS OF PUBLICATIONS DATA 2005-2010

PDBD/Tuominen


A3 Contribution to book/other compilations (refereed)

2007

2008

2009

A4 Article in conference publication (refereed)

2007

2008

B1 Unrefereed journal article

2005


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

RC-SPECIFIC TUHAT COMPILATIONS OF PUBLICATIONS DATA 2005-2010

PDBD/Tuominen


2007


2008


2009


B3 Unrefered article in conference proceedings

2008


D1 Article in professional journal

2010


D3 Article in professional conference proceedings

2010


D4 Published development or research report

2009

Tuominen, R 2009, Developing drug design through protein kinases, Insight Publishers, Bristol, UK.
E1 Popular article, newspaper article

2005


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

PDBD/Tuominen

1 Analysis of activities 2005-2010

- Associated person is one of Pekka Männistö, pekka.mannisto@helsinki.fi, Raimo Tuominen, Raimo.Tuominen@helsinki.fi, Timo-Petteri Pipponen, Petteri.Pipponen@helsinki.fi, Aku Rasanen, aatu.rasanen@helsinki.fi, Olli Salminen, Olli.Salminen@helsinki.fi, Tanja Kivinummi, Tanja.Kivinummi@helsinki.fi, Elina Esko, elina.esko@helsinki.fi, Juan Arturo Garcia Horsman, arturo.garcia@helsinki.fi, Timo Tapio Myöhänen, timo.myohanen@helsinki.fi, Ilkka Reenilä, ilkka.reenila@helsinki.fi, Mikko Airavaara, mikko.airavaara@helsinki.fi, Susanne Back, susanne.back@helsinki.fi, Ilkka Reenilä, Ilkka.Reenila@helsinki.fi, Mikko Käenmäki, mikko.kainenmaki@helsinki.fi, Sanna Janhunen, Sanna.Janhunen@helsinki.fi, Lauriina Porokuokka, lauriina.porokuokka@helsinki.fi, Jukka Kopra, jaakko.kopra@helsinki.fi, Jukka S.Parkkari, jukka.s.parkkari@helsinki.fi, Jukka S.Parkkari, jukka.s.parkkari@helsinki.fi, Reeta Talka, reeta.talka@helsinki.fi, Jukka Pakkanen, jukka.pakkanen@helsinki.fi, Jukka Pakkanen, jukka.pakkanen@helsinki.fi, Aapo Tekke, aapo.tekke@helsinki.fi.

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<td>Membership or other role in research network</td>
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INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

PDBD/Tuominen

2 Listing of activities 2005-2010

Supervisor or co-supervisor of doctoral thesis

**Pekka Männistö, pekka.mannisto@helsinki.fi**

- Supervision of Ph.D. Thesis project (Katja Puttonen), Pekka Männistö, 2005 ...
- Supervision of Ph.D. Thesis project (Markus Forsberg), Pekka Männistö, 01.04.2005 → ..., Finland
- Supervision of Ph.D. Thesis project (Bernardino Ossola), Pekka Männistö, 2006 → ..., Italy
- Supervision of Ph.D. Thesis project (Marjo Pitkanen), Pekka Männistö, 2006 → ..., Finland
- Supervisor of Ph.D. Thesis project (Aaro Jalkanen), Pekka Männistö, 2007 → ...
- Supervisor of Ph.D. Thesis project (Iida Peltonen), Pekka Männistö, 2007 → ..., Finland
- Supervisor of Ph.D. Thesis project (Jarkko Venäläinen), Pekka Männistö, 2007 → ..., Germany
- Supervisor of Ph.D. Thesis project (Oleg Kambur), Pekka Männistö, 2007 → ..., Finland
- Supervision of Ph.D. Thesis project (Timo Myöhänen), Pekka Männistö, 06.06.2008 → 31.12.2008, Finland
- Supervisor of Ph.D. Thesis project (Sanna Janhunen), University of Helsinki: Different responses of the nigrostriatal and mesolimbic dopaminergic pathways to nicotinic receptor agonists, Raimo Tuominen, 2004
- Supervisor of Ph.D. Thesis project by Virpi Talman: Pharmacological characterization of novel compounds targeted to the C1 domain of protein kinase C, Raimo Tuominen, 2004 → ..., Finland
- Supervisor of doctoral studies by Sanna Janhunen, University of Helsinki: Different responses of the nigrostriatal and mesolimbic dopaminergic pathways to nicotinic receptor agonists, Raimo Tuominen, 06.2005, Finland
- Supervisor of doctoral study by Reeta Talca: Nicotine opioid interactions at cellular level, Raimo Tuominen, 2005 → ..., Finland
- Supervisor of doctoral thesis by Susanne Bäck: Novel neurotrophic factors in experimental rat models of Parkinson's disease, Raimo Tuominen, 2005 → ..., Finland
- Supervisor of doctoral thesis by Jarkko Venäläinen, University of Helsinki: Different responses of the nigrostriatal and mesolimbic dopaminergic pathways to nicotinic receptor agonists, Raimo Tuominen, 28.04.2006, Finland
- Supervisor of doctoral thesis by Tomi Rantamäki, University of Helsinki: Brain TrkB neurotrophin receptor as a target for antidepressant treatments, Raimo Tuominen, 28.10.2006, Finland
- Supervisor of doctoral studies by Milla Paalanen: Llama heavy chain antibodies (VHHs) as activators and inhibitors of PKC epsilon, Raimo Tuominen, 2007 → ..., Netherlands
- Supervisor of doctoral studies by Reeta Talca: Nicotine opioid interactions at cellular level, Raimo Tuominen, 2007 → ..., Finland
- Supervisor of doctoral studies by Susanne Bäck: Novel neurotrophic factors in experimental rat models of Parkinson's disease, Raimo Tuominen, 2007 → ..., Finland
- Supervisor of doctoral thesis by Saara Nuutinen, University of Helsinki: The effects of nicotine on the regulation of neuronal alpha7 nicotinic acetylcholine receptors and intracellular signaling pathways, Raimo Tuominen, 28.04.2006, Finland
- Supervisor of doctoral thesis by Tanja Kivinummi (née Vihavainen), University of Helsinki: Effects of chronic nicotine on behavioural and neurochemical responses to morphine, Raimo Tuominen, 06.02.2009, Finland
- Supervisor of doctoral thesis by Tiina M. Leppänen, University of Tampere, Finland: Protein kinase C in the Regulation of Inflammatory Genes iNOS and TTP, Raimo Tuominen, 20.08.2010, Finland
- **Raimo Tuominen, Raimo.Tuominen@helsinki.fi**

**Timo Petteri Piepponen, Petteri.Piepponen@helsinki.fi**

- Supervision of the Ph.D. Thesis of Mikko Airavaara, Timo Petteri Piepponen, 2001 → 2006, Finland
- Supervision of the Ph.D. Thesis of Kristiina Kaste, Timo Petteri Piepponen, 2002 → 2009, Finland
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RC-SPECIFIC TUHAT COMPILATIONS OF OTHER SCIENTIFIC ACTIVITIES 2005-2010

PDBD/Tuominen

Atso Raasmaja, atso.raasmaja@helsinki.fi
Supervision of doctoral thesis of Martina Hanzlikova, Atso Raasmaja, 01.09.2004 → ...
Supervision of doctoral thesis of Bernardino Ossola, Atso Raasmaja, 01.01.2006 → ...
Supervision of doctoral thesis of Nadia Schendzielorz, Atso Raasmaja, 01.01.2006 → ...
Supervision of doctoral thesis of Tiiu Lantto, Atso Raasmaja, 01.01.2007 → ...
Supervision of doctoral thesis of Susanne Bäck, Atso Raasmaja, 01.01.2008 → ...
Supervisor of doctoral thesis by Merja Voutilainen, Atso Raasmaja, 02.06.2009

Juan Arturo Garcia Horsman, arturo.garcia@helsinki.fi
Doctoral Thesis Supervisor Maria José Moreno Baylach, Juan Arturo Garcia Horsman, 2004 → 2010, Spain
Doctoral Thesis Supervisor, Jofre Tenorio Laranga, Juan Arturo Garcia Horsman, 2008, Spain

Ilkka Reenilä, Ilkka.Reenila@helsinki.fi
Väitöskirjan ohjaus, Ilkka Reenilä, 2007 → ...

Prizes and awards
Pekka Männistö, pekka.mannisto@helsinki.fi
Honorary Doctor of Tartu University, Estonia, Pekka Männistö, 2010 → ..., Estonia
Honorary Member of Estonian Pharmacological Society, Pekka Männistö, 30.11.2010 → ..., Estonia

Timo Petteri Piepponen, Petteri.Piepponen@helsinki.fi
The Orion Pharma Recognition Prize, Timo Petteri Piepponen, 04.04.2008, Finland

Juan Arturo Garcia Horsman, arturo.garcia@helsinki.fi
Ramón y Cajal Fellow, Juan Arturo Garcia Horsman, 2004 → 2008

Editor of research journal
Pekka Männistö, pekka.mannisto@helsinki.fi
Pharmacogenetics, Pekka Männistö, 01.01.2006 → 31.12.2006
Editor of Open Enzyme Inhibition Journal, Pekka Männistö, 2007 → ...
European Journal of Pharmaceutical Sciences, section editor, Pekka Männistö, 01.01.2007 → 31.12.2007
Section editor of European Journal of Pharmaceutical Science, Pekka Männistö, 2007 → 2009

Raimo Tuominen, Raimo.Tuominen@helsinki.fi
Duodecim, Raimo Tuominen, 01.01.2005 → 31.12.2005, Finland
Human and Experimental Toxicology, Raimo Tuominen, 01.01.2005 → 31.12.2005, United Kingdom
Duodecim, Raimo Tuominen, 01.01.2006 → 31.12.2006, Finland
Synapse, Raimo Tuominen, 01.01.2006 → 31.12.2006, United States
Basic & Clinical Pharmacology and Toxicology, Raimo Tuominen, 01.08.2007 → 31.12.2007, Denmark
Behavioural Brain Research, Raimo Tuominen, 01.09.2007 → 30.09.2007, Netherlands
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**PDBD/Tuominen**

European Journal of Pharmaceutical Sciences, Raimo Tuominen, 01.05.2007 → 30.11.2007, Sweden
Pharmacological Research, Raimo Tuominen, 01.08.2007 → 31.08.2007, Italy
Basic & Clinical Pharmacology and Toxicology, Raimo Tuominen, 01.03.2008 → 31.03.2008, Denmark
Brain Research, Raimo Tuominen, 01.08.2008 → 31.08.2008, Netherlands
European Journal of Endocrinology, Raimo Tuominen, 01.03.2008 → 30.11.2008, United Kingdom
European Journal of Pharmaceutical Sciences, Raimo Tuominen, 01.03.2008 → 30.11.2008, Sweden

**Timo Petteri Piepponen**, Petteri.Piepponen@helsinki.fi

European Journal of Pharmaceutical Sciences, Timo Petteri Piepponen, 28.03.2007 → 31.12.2007, Netherlands

**Juan Arturo Garcia Horsman**, arturo.garcia@helsinki.fi

Frontiers in Aging Neuroscience, Review Editor, Juan Arturo Garcia Horsman, 2009 → 2010, United Kingdom

**Anne Emilia Tammimäki**, Anne.Tammimaki@helsinki.fi


**Peer review of manuscripts**

**Pekka Männistö**, pekka.mannisto@helsinki.fi

Brain Research, Pekka Männistö, 01.01.2005 → 31.12.2005
Life Sciences, Pekka Männistö, 01.01.2005 → 31.12.2005
Referee of 9 scientific journals, Pekka Männistö, 2006 → 2010
Brain Research, Pekka Männistö, 01.01.2006 → 31.12.2006
Life Sciences, Pekka Männistö, 01.01.2006 → 31.12.2006
Behavioral Brain Research, Pekka Männistö, 01.01.2007 → 31.12.2007
Biochemistry Behavior & Pharmacology, Pekka Männistö, 01.01.2007 → 31.12.2007
Brain Research, Pekka Männistö, 01.01.2007 → 31.12.2007
European Journal of Pharmaceutical Sciences, Pekka Männistö, 01.01.2007 → 31.12.2007
European Journal of Pharmacology, Pekka Männistö, 01.01.2007 → 31.12.2007
Pharmacogenetics, Pekka Männistö, 01.01.2007 → 31.12.2007
Behavioral Brain Research, Pekka Männistö, 01.01.2008 → 31.12.2008
Brain Research, Pekka Männistö, 01.01.2008 → 31.12.2008
Pharmacogenetics, Pekka Männistö, 01.01.2008 → 31.12.2008

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**PDBD/Tuominen**

Peer Review Duodecim Medical Publications, Raimo Tuominen, 02.02.2010, Finland
Peer Review International Journal of Molecular Sciences, Raimo Tuominen, 10.10.2010, Switzerland

**Timo Petteri Piepponen , petteri.piepponen@helsinki.fi**

Referee of 6 scientific journals, Timo Petteri Piepponen, 01.01.2005 → 31.12.2010
Journal of Chromatography B, Timo Petteri Piepponen, 17.03.2006 → 31.12.2006, Netherlands

**Atso Raasmaja , atso.raasmaja@helsinki.fi**

Peer review of Journal of Enzyme Inhibition, Atso Raasmaja, 01.01.1998 → ...
Peer review of Biomaterials, Atso Raasmaja, 01.01.2004 → ...
Peer review of Journal of Human & Environmental Toxicology, Atso Raasmaja, 01.01.2004 → ...
Peer review of European Journal of Pharmaceutical Sciences, Atso Raasmaja, 01.01.2008 → ...
Peer Review of Current Drug Safety, Atso Raasmaja, 01.01.2007 → ...
Peer Review of Food Chemistry, Atso Raasmaja, 01.01.2009 → ...
Peer Review of Acta Biomaterialia, Atso Raasmaja, 01.01.2010 → ...

**Outi Salminen , outi.salminen@helsinki.fi**

Basic & Clinical Pharmacology & Toxicology, Outi Salminen, 01.09.2006 → 30.11.2006
Neuroscience, Outi Salminen, 01.08.2006 → 30.08.2006, United States
The Journal of Physiological Sciences, Outi Salminen, 01.10.2006 → 31.10.2006, Japan
Neuroscience, Outi Salminen, 01.09.2007 → 30.09.2007, United States
Neuroscience Letters, Outi Salminen, 01.04.2008 → 30.04.2008, United States
Käsikirjoituksen vertaisarviointi, Outi Salminen, 27.04.2010
Käsikirjoituksen vertaisarviointi, Outi Salminen, 2010

**Juan Arturo Garcia Horsman , arturo.garcia@helsinki.fi**

BBA-Proteins and Proteomics, Reviewer, Juan Arturo Garcia Horsman, 10.2007 → 2011
Biochemical Pharmacology, Reviewer, Juan Arturo Garcia Horsman, 2007 → ...
Toxicology Letters, Reviewer, Juan Arturo Garcia Horsman, 2007 → ...
ChemMedChem, Reviewer, Juan Arturo Garcia Horsman, 2008 → ...
Gene, Reviewer, Juan Arturo Garcia Horsman, 2008 → ...
Aging Cell, Reviewer, Juan Arturo Garcia Horsman, 2009 → ...
European Journal of Pharmaceutical Sciences, Reviewer, Juan Arturo Garcia Horsman, 2009 → ...
FEBS Letters, Reviewer, Juan Arturo Garcia Horsman, 03.2009 → 04.2009
Expert Opinion on Therapeutic Patents, Reviewer, Juan Arturo Garcia Horsman, 2010 → ...

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Brain Research, Timo Tapio Myöhänen, 2009
CNS & Neurological Disorders – Drug Targets, Timo Tapio Myöhänen, 2010
Regulatory Peptides, Timo Tapio Myöhänen, 2010

**Editor of special theme number**

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Co-Quest-editor Current Topics in Medicinal Chemistry, Raimo Tuominen, 2010 → ..., Switzerland

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PDBD/Tuominen

Special Issue Editor CNS Neurological Disorders - Drug Targets, Juan Arturo Garcia Horsman, 05.2010 → 04.2011, United Kingdom

Assessment of candidates for academic posts

Pekka Männistö, pekka.mannisto@helsinki.fi
Evaluator of Professorship, Pekka Männistö, 2010 → ...

Raimo Tuominen, Raimo.Tuominen@helsinki.fi
Assessment of professor of Physiological Genomics, University of Tartu, Tartu, Estonia, Dr. Sulev Kõks, MD, PhD, Raimo Tuominen, 2008, Estonia
Steering Group for Tenure Track position in Faculty of Pharmacy, Raimo Tuominen, 01.08.2010 → ..., Finland

Membership or other role in review committee

Raimo Tuominen, Raimo.Tuominen@helsinki.fi
Grant Review Wellcome Trust, Raimo Tuominen, 09.09.2010, United Kingdom
Grant Review, Instrumentarium Science Foundation, Raimo Tuominen, 30.11.2010, Finland
Grant review Helsinki University Research Council, Raimo Tuominen, 06.06.2010, Finland

Membership or other role in research network

Atso Raasmaja, atso.raasmaja@helsinki.fi
Finnish Society for Pharmacology (Suomen Farmakologiyhdistys), Atso Raasmaja, 01.01.1996 → ...
Finnish Society for Gene Therapy (Suomen Geeniterapiayhdistys), Atso Raasmaja, 01.01.1998 → ...

Juan Arturo Garcia Horsman, arturo.garcia@helsinki.fi
Member of Viikki Research Group Organization, Juan Arturo Garcia Horsman, 2010 → ..., Finland

Membership or other role in national/international committee, council, board

Pekka Männistö, pekka.mannisto@helsinki.fi
Evaluator of a Wellcome Trust grant, Pekka Männistö, 01.01.2006 → 31.12.2006
Evaluation Board of the Strategic Funds of Norway Research Council, Pekka Männistö, 20.05.2009 → ..., Norway
Evaluator of Wellcome Trust Funds, Pekka Männistö, 2009 → ..., United Kingdom
Evaluator of the Millennium Prize candidates, Pekka Männistö, 2009 → ...
Board member or vice member of 5 Helsinki University bodies, Pekka Männistö, 2010 → ..., Finland
Evaluation of Docentship (Mikko Unkila), Pekka Männistö, 2010 → ...
Evaluator of the British Medical Research Council (MRC), Pekka Männistö, 2010 → ...

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Member of the Board, Biocentrum Helsinki, University of Helsinki, Finland, Raimo Tuominen, 01.01.2002 → 31.12.2010, Finland
Head of the Graduate School of Pharmaceutical Sciences, Raimo Tuominen, 01.01.2004 → 31.12.2005, Finland
Grant Review, Wellcome Trust, Raimo Tuominen, 28.02.2006 → 31.12.2006, United Kingdom
Grant reviewer for Instrumentarium Science Foundation, Helsinki, Finland, Raimo Tuominen, 01.12.2008 → 31.12.2010, Finland
Viikki Campus research ethics committee, Raimo Tuominen, 01.01.2010 → 31.12.2010, Finland

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Lääketutkimuslaadint, Timo Petteri Piepponen, 01.01.2008 → 31.12.2008, Finland
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Suomen farmakologiyhdistys (Finnish Pharmacological Society), Timo Petteri Pappinen, 01.01.2008 → 31.12.2008, Finland

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Chair of the board of NEUROPRO consortium, Juan Arturo Garcia Horsman, 01.10.2008 → 30.09.2012
Evaluating Committee for Parkinson's UK, Juan Arturo Garcia Horsman, 2010, United Kingdom

FP7 Expert Evaluator, Juan Arturo Garcia Horsman, 2010 → 2012, Belgium

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Raimo Tuominen, Raimo.Tuominen@helsinki.fi
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Lääketutkimus, Quality Audit of Non-Clinical and Clinical Assessment Report, Raimo Tuominen, 01.03.2005 → 31.03.2005, Finland
Kliiniset lääketutkimukset seminaarin järjestelytoimikunta, Raimo Tuominen, 10.05.2006 → 11.05.2006, Finland
Lausunto uudesta lääkaineesta Orion-Pharmalle, Raimo Tuominen, 22.09.2006 → 31.12.2006, Finland
Lausunto uudesta lääkärineestä Lääkäritieteelliselle, Raimo Tuominen, 28.06.2006 → 31.12.2006, Finland
Lääketutkimus Oy, Rekisteröity lääke-esittelijä koulutus, Raimo Tuominen, 01.01.2006 → 31.12.2006, Finland
Lääketutkimus, Raimo Tuominen, 01.05.2007 → 31.10.2007, Finland
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Chairperson of Quality assurance group / Division of Pharmacology and Toxicology, University of Helsinki, Ilkka Reenilä, 2007 → ...
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Farenta oy, Mikko Kärenmäki, 01.01.2008 → 31.12.2008, Finland
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Membership or other role of body in private company/organisation

**Pekka Männistö**, pekka.mannisto@helsinki.fi
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Yliopiston farmasiakunta, talousvaliokunta, Mikko Käenmäki, 01.01.2005 → 31.12.2005
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Yliopiston farmasiakunta, talousvaliokunta, Mikko Käenmäki, 01.01.2007 → 31.12.2007, Finland
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**Marjo Hannele Piltonen**, marjo.piltonen@helsinki.fi
Farmasian opettajien ja tutkijoiden yhdistys, Marjo Hannele Piltonen, 01.01.2007 → 31.12.2007, Sweden

Other tasks of an expert in private sector

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Pharmacology Expert, Raimo Tuominen, 01.01.2000 → 31.12.2010, Finland
Lectures in Pharmacology, Raimo Tuominen, 01.01.2010 → 31.12.2010, Finland

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Farmakologian asiantuntija, Mikko Käenmäki, 01.08.2007 → …

Participation in interview for written media

**Pekka Männistö**, pekka.mannisto@helsinki.fi
Interview for a newspaper (Haastattelut, joiden perusteella lehtiartikkeli), Savon Sanomat, Pekka Männistö, 01.01.2007 → 31.12.2011, Finland
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**Raimo Tuominen**, Raimo.Tuominen@helsinki.fi
Interview for a newspaper (Haastattelut, joiden perusteella lehtiartikkeli), Savon Sanomat, Raimo Tuominen, 01.01.2003 → 31.12.2011, Finland
Tieteen päivitys, Raimo Tuominen, 15.11.2003 → 31.12.2011, Finland
Mielikeskuksen julkaisuja, Raimo Tuominen, 11.01.2003 → 31.12.2011, Finland
Tiedote syksyllä, Raimo Tuominen, 01.01.2004 → 31.12.2011, Finland
Tiedote tietokirjastosta, Raimo Tuominen, 11.11.2004 → 31.12.2011, Finland
Kliinisen kemian tunnukset, Raimo Tuominen, 06.04.2005 → 31.12.2011, Finland
Mielikeskuksen julkaisuja, Raimo Tuominen, 12.09.2005 → 31.12.2011, Finland
Kliinisen kemian tunnukset, Raimo Tuominen, 17.02.2005 → 31.12.2011, Finland
Kliinisen kemian tunnukset seminaari, Raimo Tuominen, 18.11.2007, Finland
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Suomen Kuvalehti 27/2007, Raimo Tuominen, 01.07.2007 → 31.12.2011, Finland
Farmasian päivitys, Raimo Tuominen, 16.11.2008 → 31.12.2011, Finland
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PDBD/Tuominen

Kliniset Lääketutkimukset seminaari, Raimo Tuominen, 09.04.2008 → 31.12.2011, Finland
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Kätilöliiton koulutuspäivä "Edessä hyvä elämä", Outi Salminen, 20.10.2006, Finland
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Participation in radio programme
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Radiohaastattelu ohjelmassa Radioattori, Raimo Tuominen, 23.08.2006 → 31.12.2011, Finland

Participation in TV programme
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Tutkiva Juttu - jän kouluun, Timo Petteri Piepponen, 08.04.2008, Finland
Research Group: Tuominen R

**Basic statistics**

- Number of publications (P): 111
- Number of citations (TCS): 742
- Number of citations per publication (MCS): 6.69
- Percentage of uncited publications: 23%
- Field-normalized number of citations per publication (MNCS): 0.94
- Field-normalized average journal impact (MNJS): 1.09
- Field-normalized proportion highly cited publications (top 10%): 0.76
- Internal coverage: 0.92

**Trend analyses**

![Graphs showing trend analyses](image)

**Collaboration**

![Collaboration chart](image)

Performance (MNCS) by collaboration type
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AT THE UNIVERSITY OF HELSINKI

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Research profile

Categories:
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