Common and overall report with recommendations for future activities concerning the Strategic Research Areas at Linköping University and Region Östergötland.

The review committee would like to express its gratitude to the Linköping University and Region Östergötland for allowing us to review the Strategic Research Areas (SRA). Hereby, is our final report, where we have added our recommendations and comparisons, including thoughts for the future, followed by the individual subreports of the six SRAs. Our evaluation(s) are based on the written material submitted from the various SRAs as well as information and clarifications obtained during the interviews with the management of the individual SRAs.

The ***members of the review committee***:
Lars B. Dahlin, Lund University, Sweden (chair)
Dan Atar, Oslo University, Norway (Circulation and Metabolism - CircM),
Pertti Panula, University of Helsinki, Finland (Systems Neurobiology)
Kristian Linnet, University of Copenhagen, Denmark (Forensic Sciences - SoFo)
Tina Dalianis, Karolinska Institute, Sweden (LiU-Cancer)
Per Wändell, Karolinska Institute, Sweden (Healthcare & Welfare)
Alison Simmons, Oxford University, UK (Mucosa Infection and Inflammation - MIIC)

A. Summary

a. Performance on an absolute scale

The *following scale* has been used:

- Outstanding: Outstanding research, in a national and an international perspective, with great international interest with a wide impact, normally including publications in leading journals. The research has world leading qualities.
- Excellent: Research of excellent quality. Normally published so as to have great importance, also internationally. Without doubt, the research has a leading position in its field in Sweden.
- Very good: Research of very high quality. The research has such high quality that it attracts wide national and international attention.
- Good: Good research attracting mainly national attention but possessing international potential.
- Insufficient: The research is insufficient and reports have not gained wide circulation or do not receive national and international attention.
- Poor: The research is quite inadequate and lacks developmental potential. Research activities should be discontinued.

The review committee´s grading for the six SRAs of their performance on an **absolute scale** are**:**

Strategic Research Area	**Grading – absolute scale**
LiU-Cancer	Very good
Systems Neurobiology	Excellent
Healthcare & Welfare	Insufficient
Circulation & Metabolism (CircM)	Very good
Forensic Sciences (SoFo)	Excellent
Mucosa Infection and Inflammation (MIIC)	Very good

b. Performance according to their prerequisites and funding

The *following scale* has been used:

• Better than expected
• As expected
• Less good than expected

The review committee´s grading for the six SRAs of their performance according to their **prerequisites and funding** are**:**

Strategic Research Area	**Grading – prerequisites and funding**
LiU-Cancer	As expected
Systems Neurobiology	Better than expected
Healthcare & Welfare	Less good than expected
Circulation & Metabolism (CircM)	Better than expected
Forensic Sciences (SoFo)	Better than expected
Mucosa Infection and Inflammation (MIIC)	As expected

c. The review committee´s recommendations about the future for the SRAs to continue or discontinue (with specific comments below):

LiU-Cancer – ***Continue***, with ***improvements***, such as a better PhD and postgraduate education (e.g. collaboration with other SRAs), recruitment of a SAB, which would strengthen the internationality as well as other aspects, and a deeper economical presentation of the performed activities.

Systems Neurobiology – ***Continue***, but should consider the specific task and certain responsibility for PhD students that need extra care.

Healthcare & Welfare – ***Continue, but with substantial actions in the future.*** The committee interpret that the SRA´s goals and mission have been too broad and vague with a lack of identity. We recommend that the SRA should concentrate on a more narrow subject, e.g. aging with multi-morbidity and how the healthcare system should develop the access to care for such a group of patients. Major steps in that direction are, a) the recruitment of a new member with geriatric competence, aging with multi-morbidity, who would also be a new member of the steering committee to strengthen the committee and b) to search for a suitable, i.e. national and/or international, SAB. This could substantially improve the activities in the SRA. With a better management of the SRA the structure of the network will most probably also develop the activities in the SRA, including collaboration between the hospital and primary care.

Circulation & Metabolism (CircM) – ***Continue,*** with recommendation to be "upgraded" to a "full SRA", which will require a broader inclusiveness with a) strengthening of "Metabolism" and not only "Circulation" and b) development of the administration and organization in the SRA; e.g. a dedicated part-time research coordinator would be an asset for the SRA. Future ideas about additional modalities of comprehensive biobanking and establishment of longitudinal database seem to be relevant, but need to be planned and contemplated in more detail.

Forensic Sciences (SoFo) – ***Continue***, with further interaction and collaboration between Linköping University and the National Board of Forensic Medicine (Division of Drug Research, and Depts. of Forensic Genetics and Toxicology, respectively), also recommended to include the health care system, with additional development of the specific, but very important, research performed; being both clinically and laboratory related. The focus on the specific problems with postmortem analyses, genetic testing in sudden cardiac death and the area of toxicology should be continued. A balance of recruiting postdocs and send members with PhD on postdoc should further be considered.

Mucosa Infection and Inflammation (MIIC) – ***Continue***, but with a slight change in direction of research downloading the specific part "Mucosa" in the name and concentrate on "Infection and Inflammation". A physical allocation of the involved research groups is an interesting idea, but a compensation for a risk of physical separation and alienation should be considered. An extended collaboration with the other SRAs (and also other research groups) concerning inflammation, which is a crucial part in several of the other SRAs research, is recommended. The idea brought up by this specific SRA about development of a visiting professorship program is superb and relevant also for the other SRAs.

General comments regarding recommendations: The committee would like to emphasize that the activities and inclusion of members in the SRAs are all open, which may put some more demands on the activities compared to if an area would only include a few "top-ranked" researchers. However, our opinion is that the initiative with SRAs, and their open inclusion, is brilliant. We encourage continued investments, with described and suggested changes, since in our opinion it is of great benefit for Linköping University, the Region Östergötland and the National Board of Forensic Medicine. Some specific general points should be stressed (see also certain points below beneath B.):

- The interaction between clinical researchers and experimental researchers should further be developed and extended.
- A better communication and collaboration between the different SRAs is crucial to broaden the successful outcome of the initiative; examples are assistance with grant and manuscript reviewing and leadership courses.
- Chairs and vice-chairs of all SRAs should be brought together to learn from each other the best practice; e.g. how to wisely spend money to accomplish more visible results.
- Postgraduate training seems to be a difficult task for the SRAs, which may, however, be a general feature of current Swedish research policies. Even if "PhD production" is not a major goal for the SRA, PhD programs of high quality is still an important task for universities; an assignment of the SRA should be clearly defined in relation to the faculty.

B. Comparison between the six different strategic research areas – point by point:

1. ***Scientific goals and output (Not for CircM)***

In the mission for the SRA, eight specific points (for CircM only five) are highlighted with the first one refers to conducting internationally research with excellent publications and research grants, visibility in the international research arena and in long term leading to practical applicability in health care and care as well as business activity.

LiU-Cancer aimed to support collaborations among network PIs to obtain new grants of excellence and increase scientific impact with priority of innovative interdisciplinary projects difficult to fund with existing grants stressed through the described three principles. They also supported novel collaborations with participants from at least two out of the three areas molecular medicine, clinical medicine and technical faculty.

The Systems Neurobiology used an international advisory board to reach the goals, where the broad and clinically relevant research extends from basic studies on ion channels and experimental animals to complex behaviours and clinically relevant diagnostics of degenerative diseases.

In contrast, the SRA ***Healthcare & Welfare*** is broad and vaguely described as pointed out above, but they stress a number of successful subprojects with clinical utility.

The ***Forensic Sciences*** approached the goals with a three-doubling of involved researchers performing and strengthened projects with important clinical utility and relevant in a wider international perspective.

The SRA ***MIIC*** has achieved the goals by a strong translational focus through collaborations with clinical and basic teams and technology uptake as well as international recruitments, such as post docs and new PIs.

Even if the SRA ***CircM*** is exempted from assessment of this criteria, the committee notes that the SRA has achieved important scientific goals with generation of comprehensive scientific output.

Based on the description of goals and output by the SRAs, the idea to maintain broad basic and clinically relevant research, i.e. a strong translational focus, with a strong intention to introduce novel technologies is strongly supported. Focusing on a few (e.g. three) clear goals of each SRA may further improve output in the future. The goals can be achieved through the interactions between clinical and basic teams and with international recruitments.

2. Post doc program (Not for CircM or Forensic Sciences)

The intention in Systems Neurobiology was to maintain a post doc program with postdocs hired from other countries, and post docs were supported by microgrants. LiU-Cancer has post docs, but it is unclear if the post docs were internationally recruited. Many groups in LiU-Cancer used funds for post docs, but a specific post doc program was not suggested, since the SRA is small. In MIIC, successful recruitments, adding to the research environment and providing technological knowledge and experience, have been made contributing to the international links. Healthcare & Welfare has recruited some international post docs.

Post doc programs, with interactions between the SRAs, and with international recruitments of post docs who are placed in suitable research environments, are encouraged.

3. Competence platforms (Not for CircM)

A variety of platforms are available and used by researchers in the networks among the SRAs, where LiU-Cancer and MIIC use the well-equipped core facilities and other available resources open for all researchers at LiU/RÖ. In addition, researchers with equipment in the LiU-Cancer network generously offered to share them within the network. LiU-Cancer network has also supported the purchase of special equipment that was needed for a Wallenberg Center for Molecular Medicine (WCMM) fellow. However, the committee needs more insight as to what capabilities are available and where shortfalls exist as stressed for the SRA MIIC; an idea would be to designate an equipment committee for strategic priority investments, but such a committee should be synchronised with the overall steering group for the existing Core Facility, which has representatives from Region Östergötland, departments at Faculty of Medicine and Health Science, Faculty of Science and Engineering and chairs of the "usergroups". The Systems Neurobiology has four different systems of competence platforms with varying degrees of researchers using each platform; thus, some of them may be more urgent than others. The future plan with inclusion of optogenetics and miniaturized fluorescence microscopy is significant. Healthcare & Welfare describes a multidisciplinary project - "Proactive health care for frail elderly persons" - as a new platform for clinical research. The Forensic Sciences has access to high technology platforms and core facilities are available.

Competence platforms are crucial for the SRA activities, but the need for specific strategic platform investments should be synchronised with the generally available Core Facility platforms at the university and the health care sector.

4. Interactions, inclusiveness and collaboration

Generally, all the SRAs widely distributed information about the activities and opened up for any investigator with active, independent research or interest in the specific field to participate and with inclusion from Medical, Science and Technical faculties as well as from Region Östergötland. For Healthcare & Welfare also Faculty of Philosophy, county

council organizational developers and the Linneus University has been included. The Forensic Sciences naturally also embraced the National Board of Forensic Medicine. LiU-Cancer stressed the urge to include physicians in the network, which is a challenge due to their clinical work load.

The work performed by the SRAs with broad inclusiveness, interactions and collaborations is praised.

5. Postgraduate education

A variety of descriptions is provided by the SRAs. LiU-Cancer attempted to encourage a specific PhD-program, while Systems Neurobiology and Healthcare & Welfare do not specifically mention activities (see also other points). A course in interdisciplinary cancer was designed, but the numbers applying were limited and the course was cancelled. CircM planned to have a PhD student network plan, but took the decision to opt out such an activity in agreement with the target group and provided networking through seminars and courses. Forensic Sciences and MIIC promoted PhD studies with two and several, respectively, courses (and seminars) and for the latter SRA also a research school was run.

The activities in postgraduate education are diverse between the SRAs, and since this is still crucial for the university and health care, it is recommended that assignment of the SRA is clearly defined in relation to the faculty.

6. Annual retreats

Generally, a good attendance at the annual retreats, except for Healthcare & Welfare (only two retreats with lower attendance rate), was observed among the SRAs with a variable number of participants, including both internal lecturers and international expertise, with selected themes and also being catalyst for development of the research and network. For Systems Neurobiology, the retreats have been an integral part of the PhD education program. LiU Cancer has required attendance at the retreats to get seeding grants.

Annual retreats, with local, national and international expertise, are successful events that should continue as activities among the SRAs.

7. Series of regular seminars/lectures

All SRAs, except Healthcare & Welfare, have in various structures regularly organized an impressive numbers of seminars and lectures. These have extended from weekly/biweekly journal clubs and short seminars (Systems Neurobiology and MIIC) up to more extensive seminars with broad topics (Systems Neurobiology, MIIC, CircM, Forensic Sciences), also including international speakers. CircM has a spectrum of the covered topics - from molecules to populations, and from biology to computer modelling, in an excellent manner. LiU-Cancer has not established its own seminars, but has used the substantial number of seminars provided at the university.

A variety of specific and broader seminars/lectures with international speakers is crucial for development of the SRAs, but should be synchronised with the substantial number of other seminars/lectures at the university and the health care sector.

8. Recruitment of new faculty members

Several SRAs (LiU-Cancer, Systems Neurobiology, CircM and MIIC; latter unclear to what positions) have actively taken part in recruitments and searched for internationally

competent new faculty members and post docs, including recruitments to the new Wallenberg Center for Molecular Medicine (WCMM), to fill positions critical for success. For example, Systems Neurobiology has supported recruitments economically and helped with integration into a research environment. Forensic Sciences has organized a full time position as researcher in forensic toxicology with focus on NPS, which is most relevant in a national and international perspective. One SRA (Healthcare & Welfare) has very limited recruitment activities (only recruitment of a PhD student).

Participation in recruitments of new faculty members is important for the SRAs, where also an optimal integration into suitable research environments of such new members should be considered.

9. Network activities vs. research activities (Not for CircM)
This point is generally difficult to evaluate due to their interdependence, but seems to be well-balanced among the SRA, except for the Healthcare & Welfare, since retreat and seminar activities are lagging behind in that SRA, although substantial funding are available and research is published. All SRAs have focused on networking, which seems to be a key factor and generally being successful in various ways, e.g. interactions led to more funding and subsequent high research activities with good outcome. Networking and interactions have contributed to identify gaps in critical areas of science and need for recruitment (see above). The concept high-lighted by MIIC with development of a visiting professorship program is a good initiative. The use of seed- and microgrants to encourage projects, used by several SRAs, is relevant.

The balance between networking and research activities in the SRAs seems to be adequately balanced with networking and interactions being a key factor. A visiting professor program as well as use of seed- and microgrants are hailed.

10. Administration/organisation
The SRAs have organized their administration and organization in various ways (no details provided by Systems Neurobiology). Healthcare & Welfare has changed their management (chair) during the time period. Forensic Sciences and MIIC have a board, where appropriate representatives with basic and clinical background are represented. Furthermore, MIIC has also a SAB, which has been of clear relevance for the development of the SRA. An appropriate organization is also present in LiU-Cancer, but adding a SAB would certainly improve development and progress. Finally, the economic reports could have been more detailed (e.g. the LiU Cancer). In CircM, administrative and organizational duties were covered within described groups; thus, highlighting the need a research coordinator in the future.

A similar structure for administration/organisation in each SRA is recommended, such as use of a board/steering group, consisting of basic and clinical representatives, and a possible need for a research coordinator. It is strongly advocated that the SRA has a scientific advisory board (SAB). A detailed economic report should be made annually.

11. ***Overall performance in relation to prerequisites and funding (summarized in the point above) –*** please see the specific enclosed subreports (below).

EVALUATION OF SRA LIU-CANCER 2015-2018

Summary

The main goal of the LiU-Cancer network has been to create a high-profile cancer research environment at Linköping University (LiU) and Region Östergötland (RÖ) with an increasing number of high-quality publications and external grants-of-excellence. This has been achieved by: 1) Creating a joint cancer community at LiU and RÖ; 2) Strengthening interdisciplinary connections in cancer research; 3) Catalyzing collaborative projects in cancer research and care; and the building on existing strong research environments and strengthened collaborations.

As reported in more detail below, the strategy during the years 2015-2018, has been very successful in recruiting and in building up a faculty and network of dedicated PIs, with excellent interactions, with an increase in funding and several high impact publications.

A continuation of this SRA is recommended in parallel to some improvements for the coming years.

An scientific advisory board (SAB), would be recommended to this and all SRAs that do not have one so far. This could also strengthen the internationality and the PhD and postdoctoral programs, where also more interactions between the specific PhD programs in the different SRAs could be of use. Lastly, in the future, the economic report should be more specific. The reported presented by one of the SRIs (MIIC) was very clear and could e.g. be used as a model.

1. Scientific goals and output

LiU-Cancer funding was aimed to support collaborations among network PIs to obtain new grants of excellence and increase scientific impact. Innovational cancer research was prioritated with allocation of funding to innovative interdisciplinary projects difficult to fund with existing grants. Funding was also directed to existing strong research environments, requiring at least one applicant having an external grant regarded as excellent (e.g. VR and Cancerfonden).

Three main principles were used: 1) Increased scientific impact and quality to the LiU/RÖ environement; 2) Connecting strong research environments (at least one PI with excellence grants) and creating possibilities for less experienced scientists to join stronger constellations; and 3) Supporting novel collaborations with participants from at least two of the three areas, molecular medicine, clinical medicine and technical faculty.

Liu-Cancer has also funded several constellations and high-risk projects that have received new external funding highlighting the importance of LiU cancer startup funding strategy.

The above approaches have resulted in that funding has increased considerably from 2014 to 2019. Funding from Cancerfonden has increased from 13 to 21.6 million SEK (an increase from 3.5 to 5% of Cancerfondens budget) and the number of projects have increased from 15 to 23. For VR the corresponding increase was from 6.95 to 13.37 million SEK, and an increase of 7 to 13 projects. Around 70% of PI:s received such grants, which were around 140 over the years 2015-2019.

In addition, several high-quality publications in preclinical, translational and clinical research have been co-authored by LiU-cancer members during the same period. More specifically, 54 articles, with SRA PIs as first or last author with an impact factor >5 have been published 2015-2018. In addition, 80 articles with an impact factor >5 without SRA PIs as first/last authors have been published.

Clearly, SRA LiU-cancer has been a great success. Nonetheless, adding a SAB may improve the scientific goals and output even further.

Three cases

LiU Cancer PIs have in their report presented three cases as examples that have lead closer to the goals of clinical utility and strengthened university health care. These are: 1) Translating research into Breast Cancer Prevention studies (Charlotta Dabrosin), where ways to measure breast density, and inflammation/immune responses, miRNA, have together been used to initiate an explorative clinical trial including 50 postmenopausal women recruited with the intervention of low-dose acetylsalicylic acid; 2) Translational research for improving therapy of solid tumors (Stig Linder), where 3-D spheroids of e.g. colon cancer cells are used for screening, since they also contain hypoxic cells and an interesting compound VLX600 (inhibiting mitochondrial oxidative phosphorylation) was detected capable of penetrating the spheroids and inhibiting autophagy; 3) Optical Biopsy for Real-time Brain Tumour Diagnostics (Karin Wårdell, Neda Haj-Hosseini), where a new type of fluorescence diagnostics is used in order to detect tumors as well as to perform safer biopsies.

2. Post doc program

Thirteen post docs are listed, most at the Faculty of Medicine, with one recruited since 2015. From the excel sheet it is not possible to evaluate if post docs were internationally recruited. However, all PIs in the network met the first year of the contract period and concluded that it was most efficient to allocate the funds to get the most impact in the specific program. Many groups used funds for post docs, but a specific post doc program was not suggested, since Liu Cancer was small.

3. Competence platforms

Technical platforms are available. Well-equipped core facilities are open for all researchers at LiU/RÖ. During annual retreats sessions from the core facilities and other resources (animal facility, services of biobanking, protein facility, and regulatory support of research in humans etc) are included. Moreover, researchers with equipment, generously offered to share them within the network. The zebrafish facility was early on presented at a retreat resulting in several novel cancer projects. In addition, the LiU-Cancer network has supported the purchase of a special equipment that was needed for a Wallengren Center for Molecular Medicine (WCMM) fellow.

4. Interactions, inclusiveness and collaboration

LiU-Cancer was established as a network for researchers with interest in cancer research. The network is open to researchers in other areas who want to apply their knowledge, or infrastructure to address critical cancer research issues. It was found crucial to co-ordinate research efforts between the hospital, the medical and technical faculties to create a scientific niche unique for LiU.

Network membership was aimed for independent scientists, defined at the docent level for participants from molecular medicine and the technical faculty, whereas PhD was the level for clinical participants. The lower for the latter was motivated by the urge to include physicians in the network. However, post docs, fo-ass and PhD students of LiU-Cancer could join the network upon request, join retreats and apply for travel grants. Roughly, 110 members are listed, with 16 new ones since 2015.

The challenge has been to recruite physicians to the network due to their work load. LiU-Cancer therefore to opened the annual retreat for physicians with a research interest although the formal requirements were not met. This was an inspiration for younger physicians to participate in research.

5. Postgraduate education

SRA-LiU Cancer lists 22 PhD students, of which two have been recruited since 2015. Several efforts have been made to encourage a specific PhD-program. A course in interdisciplinary cancer was designed to suit clinical and basic scientists in-training, and in cancer care, lectures and practical excercises were included, to foster inter-disciplinary understanding. The course was approved, but the numbers applying were limited and the course cancelled. This is a problem. LiU-Cancer implies this is due to the declining number of PhD students, not only in Linköping, but the whole of Sweden.

The clinical research school Nation was established 2009, at KI-Uppsala. In 2014 LiU-Cancer teamed up with C Dabrosin as part of the steering group. A course of ethics of patients with serious diseases was designed and 22 students from KI-Uppsala, but none from Linköping participated. LiU withdrew its participation from Nation.

This was unfortunate, and it would be useful to again try to strengthen postgraduate education, with more collaborations between the PhD programs of the different SRAs.

6. Annual retreats

LiU-Cancer has annual retreats with 55-70 people from the network (different areas and faculties) attending per year. The main theme has been on interactions. Different approaches have been used to catalyze interactions. All participants have looked all posters and listened to two minute presentations, including speed-dating. This has led to that around 70 senior/junior researchers have given presentations and allowed participants to take part of research outside their main areas.

One requirement for receiving seeding grants has been attendance to the retreat. This has given high attendance rates and interactivity during the retreats with new interactions between researchers from different areas and extended personal networks. The interdisciplinary approach has also expanded the knowledge of know-how of different techniques and the awareness of difficulties when trying to apply theories in other systems.

The annual retreats have been a great success. Possibly adding a SAB, and inviting its members, as well as more international guests to the annual retreats may strengthen these retreats even further.

7. Series of regular seminars/lectures

At LiU a substantial number of seminar series are established and LiU-cancer has worked in them rather than establishing new ones. LiU-Cancer has advertised seminar speakers and events related to cancer within their network.

Again the challenge has been to involve clinicans, due to problems with the clinical work load. To facilitate interactions between clinical departments and technical and molecular medicine, short presentations were made at the department of clinical oncology within the frame of the weekly seminar time, established as part of the clinical activities. These meetings are appreciated and will be continued.

The Oncology Seminars, regular meetings every second week have also been supported, and almost 60 people are now invited to these seminars, both a presenters and attendees.

Also this approach seems to have been very fruitful.

8. Recruitment of new faculty members

During 2015-2018, LiU-Cancer has taken part in all recruitments within the cancer area, including recruitments to Wallenberg Center for Molecular Medicine (WCMM). All new recruitments have also been invited to join the LiU Cancer Network.

SRA-LiU Cancer lists around 40 priniciple investigators. Of these 11 have been recruited since 2015, and of these, two are professors, four are senior lecturers, two are adjunct professors, and three are research fellows. In addition, of the 11 WCMM fellows, six have been invited to the network and participated in the retreats regardless of their main research area.

9. Network activities vs. research activites

Both the network activities and funding have been successful. Furthermore, it seems that the networking has led to more interactions and led to much more funding. From the report, it does not feel adequate to stop the networking if aiming for longterm success.

10. Administration/organization

The network has been inclusive and many fruitful collaborations have bee initiated, therefore one would assume that the organization of the SRA has been appropriate.

Nonetheless, adding a SAB may improve the development and progress of SRA LiU cancer.
The economical report could be more detailed as mentioned above, and this may also be useful for SRA LiU cancer to get a better overview.

11. Overall performance in relation to prerequisites and funding

Given that 3 million SEK/year, i.e. 12 million SEK in total (of which so far around 8 million have been spent) and the fact that funding from Cancerfonden and VR almost doubled during the funding period, one could conclude that this strategy has been successful and that the invested money has paid off. Likewise, the number of high impact publications with SRA PIs as first or last authors have been published during this period. More specifically 18 in 2015; 18 in 2016; 10 in 2017; and 8 in 2018. In addition, many others were also published with PIs not as first or last authors.

EVALUATION OF SRA SYSTEMS NEUROBIOLOGY

Summary

The SRA in systems neurobiology has received the second highest support for networking and research. It has been active in recruiting new PIs to LiU, and complemented the competence of the SRA with new recruits at different levels. Networking activities have been well distributed throughout the funding period. Three kinds of meetings have been organized, and annual retreats have been very successful. The SRAs research and publication activity have been of very high quality.

The SRA emphasizes the need of integrated development of the neuroscience research at LiU, and need to further develop the program for continuing success. The postdoc periods are suggested to be longer, and new recruitments are planned in developmental mammalian neuroscience (basic sciences) and neurology (clinical sciences). Maintenance of infrastructures is considered critically important. During the past years, one infrastructure (behavior) has been discontinued, and another (proteomics) platform is about to be terminated. The reason for this is that these have not been extensively used. It would be useful to learn where these infrastructures would be available if and when needed. Instead, a transgenic animal facility and optogenetics platforms are planned. These are indeed critically important in many other similar centers, and the choice seems well motivated.

1. Scientific goals and output (Not for CircM)

An international advisory board has been nominated to help reach the goals. They have e.g. evaluated the postdoctoral applications and helped the steering group. Judged on the basis of excellence in research publications, excellent research grants (No 1 of all SRAs) and visibility internationally, this SRA has been very successful. The spectrum of research topics of high quality is broad and ranges from very basic studies ion channels and experimental animals to complex behaviors and clinically relevant diagnostics of degenerative diseases. As some commonly applied medications were shown to be ineffective, and new diagnostic methods were tested, the results have also clinical relevance. The number of papers with IF over 5 is also significant. The total amount of funding from excellent financiers is high and speaks for high quality of the program.

To evaluate: Has the performed research (i) led closer to the goals, (ii) led to clinical utility, (iii) strengthened university health care, and/or (iv) led to other form of utilization

To evaluate: The number of articles with impact factor >5 where the PI is the first or last author.

To evaluate: Total amount of funding from “excellent” financiers where the PI is main applicant.

2. Post doc program (Not for CircM or Forensic Sciences)

The intention was to maintain a postdoc program. Calls were made semiannually, advertised in e.g. Nature and Science. As a result, 16 postdocs were hired from other countries, and half of the cost for 2 yrs was covered with SRA funds. The postdocs’ research was also supported by microgrants. Although the search pressure is not given, the program seems professionally run and successful. It is not indicated how many postdocs in all participated in the program, or how many have obtained independent positions after the postdoc period.

To evaluate: The number of post docs and the number of internationally recruited post docs.

3. Competence platforms (Not for CircM)

The competence platforms (Methodology platforms) consist of 4 different systems, each led by a research engineer supervised by a SRA core faculty member with cutting edge expertise in the field. Costs are covered in part by the SRA and in part by users. The system seems very well organized, although technical details are not available. The number of groups (3-9) using each platform varies, suggesting that some of them are more urgent than others. Surprisingly, and differently from many other neuroscience programs, the behavioral phenotyping platform has been discontinued due to declining demand. It would be interesting to learn how phenotyping of rodents is currently done (in individual groups?). The future plans include optogenetics and miniaturized fluorescence microscopy. This sounds very relevant. Nevertheless, it is also mentioned that this technology can be combined with behavior.
To evaluate: Description and use of the competence platforms.

4. Interactions, inclusiveness and collaboration
Information has been distributed widely, and the SRA has been open for any investigator with active, independent research in the field of neuroscience. Many of the SRA participants hold appointments with both the university and Region Östergötland and many also with the Faculty of Science and Engineering. This is also evident in the list of publications.
To evaluate: Who has regularly received information and participated in activities? Publications, patents and impact case studies where participants from different organizations are included (i.e. RÖ, Medical Faculty, Technical faculty, and RMV (in the case of forensic sciences).

5. Postgraduate education
N/A in the report as a separate item. Retreats have served as courses for PhD students, and they have been very well attended.
To evaluate: Participation in local graduate courses or other activities in the field. PhD student network's activities.

6. Annual retreats
Retreats have been organized every year, with a large number of participants. Each has lasted 2-3 days. The program has been planned to accommodate internationally known speakers, and the program has consisted of selected themes, each with 3-4 presentations. The topics have been designed to fit the disciplines covered by the SRA. The retreat series has also been an integral part of the PhD education program. Participation in the retreats has been very good (76-96 participants).
To evaluation: Description of the retreats including number of participants, programs of the activities, and the number of international guests/lecturers.

7. Series of regular seminars/lectures
Two different kinds of lecture series were established: a monthly lunch seminar with SRA speakers, and a series of internationally known foreign speakers. In addition, a biweekly journal club has been arranged. The speakers are well known and the arrangements give an impression of well-planned activity.
To evaluate: Program of the seminars, and the number of international lecturers.

8. Recruitment of new faculty members

The SRA has actively searched internationally competent new faculty to fill positions that are critical for the success of the discipline. In addition to actively approaching promising candidates, the SRA has supported them economically and helped them integrate in the research environment. The new PIs have subsequently been very successful in e.g. obtaining funding from SRC and other

To evaluate: Recruitments where the SRA participated actively.

9. Network activities vs. research activities (Not for CircM)
This is a difficult point to estimate due to the interdependent nature of the two activities. It seems that the networking part has been very successful, and it has been a key factor that has contributed to the success of the research activities. Since the SRA has been very active in recruiting new PIs and even participated in their funding, the research part has to be evaluated also as highly successful.
To evaluate: Which part of the SRA has been most fruitful, networking or research? If reduced funding in the future, which part should continue?

10. Administration/organization
To evaluate: Has the organization of the SRA been appropriate. If not, what can be improved, in case to continued funding.

11. Overall performance in relation to prerequisites and funding

The SRA has received the second largest funding of all SRAs to support its activities. It has spent the money wisely and in a balanced manner in networking and research. Networking events have been distributed evenly throughout the funding period, and they have clearly supported the interactions between research groups. The SRA has been very active in identifying gaps in critical areas of science and contributed to recruiting needs. Investments on young scientists and those experiencing funding gaps have been well planned and successful. The new recruits have clearly contributed to the neuroscience profile of the SRA, which altogether appears very active. The quality of publications is excellent. The SRA has clearly reached or exceeded expectations
To evaluate: Has the SRA performed at the level of expectation, better or worse? Has the invested money paid off?

EVALUATION OF SRA HEALTHCARE & WELFARE

Summary

In general, the work has been successful, especially as regards scientific research. The invested money seems to have been paid off, even if some areas, especially retreats, seminars, and postgraduate education, could be strengthened. The area is broad, and is also vague described as the researchers point out. This of course means both great challenges but also possibilities. For instance the researchers are working on a project, "Change Fatigue", describing and explaining the reactions of clinicians working in care with many organizational changes, mostly based on non-evident-based assumptions. The challenges for the futures are also demanding, considering an aging population with increased multi-morbidity, as well as multi-pharmacy but also the risk of under-treatment, and an increased number of dementia patients. The increased number of mental unhealthy individuals among especially younger people is also alarming. Besides, Sweden has the lowest number of hospital beds and also of GPs compared to other OECD countries. An increased collaboration between hospital care and primary care is certainly needed, both as regards the clinical situation but also as regards research.

1. Scientific goals and output

To evaluate: Has the performed research

(i) led closer to the goals:

The researchers describe examples of this, i.e. on E-health solutions, e.g. "A Health Diary" for elderly, severe ill patients, distance tele medical yoga sessions, genetic counselling, internet-based physiotherapeutic intervention of whip-lash damages, and internet-based cognitive behavior therapy in patients with heart disease. Furthermore, other projects are mentioned, implementations of cancer patient pathways, "change fatigue" in health care individuals due to shortage of health care personnel and large turnover, a newly developed system of quantitative liver function analysis.

(ii) led to clinical utility:

The researchers describe examples of clinical use, i.e. the Health diary system, the computerized decision support system for pharmacological risk assessment in the elderly, cancer patient pathways, a cognitive group rehabilitation program for individuals, and partly also from the "predictive and personalized medicine for fragile older persons".

(iii) strengthened university health care:

The researchers mention that the research has the potential to strengthen the university care. One example is, that the research of primary care/family medicine and internal/geriatric medicine has created a new platform for clinical research in a broader concept, not only linked to single clinical conditions. The researchers also have a hope that the collaboration between researchers in the Research and Development Unit in Region Östergötland, the university and primary health care most probably will develop further.

(iv) led to other form of utilization:

The projects described in (ii) has also led to benefits from the SRA support, i.e. the digitalization of the health-care with development of E-health solutions, the area of genetics, the cancer patients pathways, and the prediction model in the "Predictive and personalized medicine for fragile older persons".

(v) Initiate and maintain research to solve the challenges of the future within healthcare and welfare, where the utility should be possible to evaluate within a time frame of 4-5 years?

The projects described in (ii) and (iv) also are expected to contribute to meet challenges of the future, with possible evaluation within the next 4-5 years. This includes E-health solutions, the area of genetics, cancer patient pathways with research collaboration in the Nordic countries, and prediction model in the "Predictive and personalized medicine for fragile older persons". The researchers mention different challenges for the future, e.g. access to care, effective care pathways, work models supporting what is called "nära vård", large patient groups, fragile care, primary care, and E-health. Research in close collaboration between RÖ and university should be promoted. Besides, they mention the importance of supporting PhD courses that connect to the SRA. They also mention that they have supported collaborative research networks, and at some occasions provided platforms for new research, even if this aim can be better addressed.

To evaluate: Totally 10 articles with impact factor >5 where the PI is the first or last author.
To evaluate: Total amount of funding from "excellent" financiers where the PI is main applicant 48,356,000 SEK (totally registered funding 54,819,500 SEK).

2. Post doc program

To evaluate: Totally 4 registered post docs at the sheet of members. Recruitment of 9 post-doc positions, out of whom two from the US, on from Australia and one from Norway.

3. Competence platforms

To evaluate: Description and use of the competence platforms.
The multidisciplinary project "Proactive health care for frail elderly persons" has created a new platform for clinical research, with scientific meetings 2-4 times/semester, and on work-shop per semester.

4. Interactions, inclusiveness and collaboration

To evaluate: Who has regularly received information and participated in activities? Publications, patents and impact case studies where participants from different organizations are included (i.e. RÖ, Medical Faculty, and Technical faculty):
The information about the workshop and the retreat has been directed broadly, with both personal invitations and to all research chiefs at RÖ for further distribution.
The researchers in the cancer patient pathways have become members of the Nordic collaboration on research on CCP.
The technical and medical faculties collaborate in several research projects, i.e. the cancer pathways, tele medical yoga sessions, health diary and change fatigue. The technical faculty was well represented at the SRA workshop. A large number of the publications from the PIs includes researchers from both LiU and RÖ.
The "Change fatigue" project represents collaboration between the medical and philosophical faculties, as well as collaboration between LiU and Linneus University, and between researchers and county council organizational developers. The LIFE research team is a collaboration between MR-physicists, radiologists, clinicians and health economists.

5. Postgraduate education

To evaluate: Participation in local graduate courses or other activities in the field. PhD student network's activities:

The researchers do not specifically mention such activities, but mention the retreats (point 6 below), and net-working. No seminars have been performed (point 7 below). Recruitment of 9 post-doc positions is also mentioned (point 2 above).

6. Annual retreats

To evaluation: Description of the retreats including number of participants, programs of the activities, and the number of international guests/lecturers:

The researches describe two meetings, in 2017 a full day workshop with 27 participants, with the themes patient/citizen, organization/technique/innovation and cooperation/patient involvement. The second meeting took place 2018, a lunch-to-lunch retreat, 27 participants on day one and 14 on day two, on proactive health care for frail elderly persons, including network discussions.

7. Series of regular seminars/lectures

To evaluate: Program of the seminars, and the number of international lecturers:

No seminars have been performed.

8. Recruitment of new faculty members

To evaluate: Recruitments where the SRA participated actively:

Only recruitment of PhD students.

9. Network activities vs. research activities

To evaluate: Which part of the SRA has been most fruitful, networking or research? If reduced funding in the future, which part should continue?:

Based on the reported information, the research part seem to have been more successful, even if networking as well has shown good results. The number of retreat and seminar activities could be increased in the future.

10. Administration/organization

To evaluate: Has the organization of the SRA been appropriate. If not, what can be improved, in case to continued funding:

As far as what is reported this seems to be appropriate.

11. Overall performance in relation to prerequisites and funding

To evaluate: Has the SRA performed at the level of expectation, better or worse? Has the invested money paid off?:

As the researchers mention, the SRA is broad and not clearly defined. Considering this rather vague concept the work in general must be regarded as successful, even if some areas need to be strengthened in the future. The researchers mention some challenges for the future, e.g. demands from an aging population (including multi-morbidity but also dementia), and access to care. The health gap in Sweden between groups with higher and lower socio-economic status tend to increase over time, rather than the opposite, and efforts to close this gap on different levels, including at the health care level, is important. Sweden also has an increasing proportion of foreign-born, with

increasing demands on some health care areas. As regards access to care, Sweden is an extreme country in relation to other, comparable OECD-countries, with a low rate of hospital beds as well as a low rate of GPs in primary care. Pending possible national reforms to strengthen the primary care sector, an increased collaboration between hospital care and primary care in RÖ is warranted, and also an increased research collaboration between different research branches, including primary care researcher.

As a general comment, the SRA seem to have been performed at the level of expectation, and thus the invested money seemingly have paid off.

EVALUATION OF SRA CIRCM

Summary
The SRA network of Circulation and Metabolism (in short SRA CircM) has received a substantially lower funding than the other SRAs. This must be taken into account when assessing their overall performance. The umbrella SRA has been focused onto 7 different topic areas, each of which has achieved a high degree of scientific productivity and relevance. The interactive and networking initiatives were comprehensive, successful, and of high quality. The outline of future CircM research directions is excellent and promises to further enhance the achieved results over the next years.

1. Scientific goals and output (Not for CircM)
To evaluate: Has the performed research (i) led closer to the goals, (ii) led to clinical utility, (iii) strengthened university health care, and/or (iv) led to other form of utilization? Note that Healthcare & Welfare has an additional point to evaluate here: "Initiate and maintain research to solve the challenges of the future within healthcare and welfare, where the utility should be possible to evaluate within a time frame of 4-5 years."
To evaluate: The number of articles with impact factor >5 where the PI is the first or last author.
To evaluate: Total amount of funding from "excellent" financiers where the PI is main applicant.

Although the CircM area is exempt from a complete assessment of the scientific output in the assessment period, it is noteworthy that important scientific goals have been achieved, and comprehensive scientific output has been generated. Just to mention the number of 173 original publications in peer-reviewed journals with either the first- or last-author being a representative from the SRA CircM, with additional 17 review publications. And not less impressive the number of 360 additional publications (original articles) in which a CircM author was a part of the authorship but placed outside first- or last-authorship.

All in all the publication list testifies to a high level of activity and many of the featured articles are highly referenced and scientifically innovative.

2. Post doc program (Not for CircM or Forensic Sciences)
To evaluate: The number of post docs and the number of internationally recruited post docs.

3. Competence platforms (Not for CircM)
To evaluate: Description and use of the competence platforms.

4. Interactions, inclusiveness and collaboration
To evaluate: Who has regularly received information and participated in activities? Publications, patents and impact case studies where participants from different organizations are included (i.e. RÖ, Medical Faculty, Technical faculty, and RMV (in the case of forensic sciences).

The SRA CircM has been reaching out to all researchers at the Faculty of Medicine and Health Sciences and the Faculty of Science and Engineering of Linköping University, as well as to researchers from the Östergötland Region. If expressed an interest, those researchers were included in all communications. This included invitations to meetings, initiatives and other activities.

The assessor deems the collaborative efforts and the degree of inclusiveness as very good.

5. Postgraduate education

To evaluate: Participation in local graduate courses or other activities in the field. PhD student network's activities.

Although a plan to create a network for PhD students within the CircM topic area was established and in place, there appears to have been little support for this initiative among the target group, i.e., the PhD students. Instead, the SRA CircM decided to offer seminars and courses together with senior faculty members, in which the PhD candidates were invited to present data as posters or as oral presentations. In addition, a post-graduate course in cardiovascular physiology was held in 2017 for the PhD students of the Science and Engineering curriculum.

In the assessors view, the explanation to opt out of the PhD-student network plan is credible, and taken in direct consultation with representatives of the target group. The alternative path to provide networking through seminars and courses is deemed to be good.

6. Annual retreats

To evaluation: Description of the retreats including number of participants, programs of the activities, and the number of international guests/lecturers.

The SRA CircM has comprehensively and timely organized and completed three annual retreats in the calendar-years 2016, 2017 and 2018, respectively. Participation has been very good, and the program featured both internal lecturers, discussion fora, and national as well as international capacities within the CircM topic area.

The undersigned would like to confer a very good mark to these achievements.

7. Series of regular seminars/lectures

To evaluate: Program of the seminars, and the number of international lecturers.

The SRA CircM can point to an impressive number of half-day seminars, workshops, courses and interactive gatherings which covered all of the prioritized topic areas and groups, and which turned out to be well-attended over the years. Importantly, these activities featured on one hand opportunities for own presentations stemming from members at all stages of the respective research groups, and on the other hand some of the most renowned top-experts in their fields. The spectrum of the covered topics, from molecules to populations, from biology to computer modelling, turned out to be excellent.

In the assessor's opinion, these activities deserve acclamation and encouragement for continuation.

8. Recruitment of new faculty members

To evaluate: Recruitments where the SRA participated actively.

The SRA CircM has been pro-active in searching candidates for faculty positions and in reaching out to experts who were flagging an interest. These were subsequently invited to site-visits of two days with a dedicated program including presentations and discussions. This strategy turned out to be successful, leading to a contractual appointment as well as subsequent successful competitive fund-raising.

The described activities and initiatives are highly valued by the undersigned assessor.

9. Network activities vs. research activites (Not for CircM)

To evaluate: Which part of the SRA has been most fruitful, networking or research? If reduced funding in the future, which part should continue?

10. Administration/organization

To evaluate: Has the organization of the SRA been appropriate. If not, what can be improved, in case to continued funding.

The only lack of information within the provided comprehensive documentation is pertaining to the administrative and organization solutions created within the SRA CircM. The undersigned strongly assumes that the administrative and organizational aspects were covered within and located at the 7 described working parties / topic groups. If this is the case, the harmonization, coordination and integration of the 7 groups into one CircM umbrella-initiative has been extremely well achieved.

This lack of the assessor's particular insight into the administration, although of minor significance in the overall assessment, might relay very well to the reason why the SRA strongly and convincingly points to the need of a research coordinator in the future.

11. Overall performance in relation to prerequisites and funding

To evaluate: Has the SRA performed at the level of expectation, better or worse? Has the invested money paid off?

As pointed out earlier, the funding to this particular SRA has been lower than to the other SRAs. According to the provided documentation, the CircM SRA has been aligned along 7 topic groups, each of which has achieved highly relevant teaching and research. Of importance, the networking, communication and recruitment approaches have been very professionally performed. Future directions are given and comprise a multidisciplinary framework which is absolutely relevant. Further, on top of the outlined 7 thematic topic areas, the recommended additional modalities of comprehensive bio-banking and of the establishment of a longitudinal database are to be highly praised.

In the view of the undersigned research assessor, the request for funding of state-of-the-art bio-banking facilities as well as support for a dedicated research coordinator is very adequate and undoubtedly an investment into the future of the institution.

EVALUATION OF the Strategic Research Area in Forensic Sciences (SoFo)

Summary

SoFo is based on a cooperation between the RMV, especially the Dept. of Forensic Genetics and Toxicology, Linkøping University, The Division of Drug Research, and the University Hospital, Dept. of Clinical Pharmacology. Overall, the research cooperation has been very successful. During a period of about 3 years, the number of participating researchers has increased from about 20 to 60.There has been extensive network activities, which have facilitated cooperation and funding, resulting in relevant and interesting research activities, boosting both research and practice at the involved institutions. Seed funding with focus on innovative projects, a full-time research position for a period and funding of ph.d.-studies have been important elements. Annual meetings, seminars and courses have all contributed to the activities and stimulated the overall development. A high output of research papers of high quality, scientific presentations and participation in the leading organizations within the field of forensics have provided an international impact and visibility.

1. Scientific goals and output

The Strategic Research Area in Forensic Sciences (SoFo) is a collaboration between Linköping University (LiU), the National Board of Forensic Medicine (Rättsmedicinalverket, RMV) and the university hospital that has existed for 2 ¾ years.

(i) Generally, there has been a high activity level within the period approaching the goals with a 3-doubling of involved researchers and a high research activity within the forensic, drug investigations and clinical pharmacology areas.

(ii-iii) As an example of clinical application, there has been implementation of genetic testing in sudden cardiac deaths which is important and novel in both a forensic and clinical context providing possible preventive actions and genetic counseling of the family of deceased subjects.

(iv) The area of toxicology has been strengthened. The focus on new psychoactive substances (NPS) has improved the capability of detecting these compounds, which have entered the drugs of abuse market in numbers of hundreds in recent years and provided a big analytical challenge. Reporting of the findings to national and international agencies as e.g. The Swedish Public Health Agency, WHO, and EMCDDA and others have been an important contribution in the fight against drug abuse. Other important activities are the Toxicolist project, which has provided reference ranges for postmortem drug levels based on the very large database present at RMV. The database is accessible internationally for toxicologists providing a high impact for forensic work and contributing to an international profiling of RMV. Other useful activities have been epidemiology projects with regard to drug abuse and alcohol and drugs in the traffic. These research activities have also contributed to the international profiling.

Publications

The number of publications with primary authorship by a PI within SOFO has amounted to about sixty over the period with about a further 50 with external primary authorship. The number of articles with impact factor >5, where the PI is the first or last author, amounts from 2016 to 24. It should here be remarked that the leading forensic journals generally have low impact factors, often about 3, because the field is rather limited.

To evaluate: Total amount of funding from "excellent" financiers where the PI is main applicant.

A little unclear, but appears to be cumulated to about 17 mill SEK over about 4 years. This is almost double the amount given by SoFo.

2. -

3. Competence platforms

The RMV has a large number of modern mass spectrometry instruments, which to some extent may be available for other researchers. Especially, high-resolution mass spectrometry instruments (4 instruments) are interesting, because they can be applied for other tasks than drug detection, e.g. in the field of metabolomics.

4. Interactions, inclusiveness and collaboration

There appears to have been good information to researchers at the university and RMV and others concerning SoFo and frequent meetings and seminars. All interested researchers have been invited, not just seniors, providing a high degree of inclusiveness. The many cooperative projects show the success of the activities. For example, there are frequently mixed authorships in publications, e.g. in drug related publications, where synthesis of drug standards (university) and measurement (RMV) have been combined, typically in relation to NPS substances.

5. Postgraduate education

SOFO has worked to promote ph.d.-studies and currently there are nine and further under planning.

There are currently two postgraduate courses that have been held: Opiate pharmacology and toxicology and method development/validation. A further one is planned. There are networking among the ph.d.-students.

6. Annual retreats

Annual retreats have been held. The numbers of participants have been 25-33. Mainly Swedish lecturers. The topics have been general considerations concerning the network, scientific points,

concrete project presentations and general ones on research policy and funding. There have been participation and presentation by international researchers also. Overall, the meetings appear to have been relevant for the network development and research.

7. Series of regular seminars/lectures

The programs of the seminars have been relevant and have comprised sudden deaths in infants, pharmacogenetics , and research at other institutions. A number of the presentations have been provided by international lecturers.

8. Recruitment of new faculty members

SRA has organized a temporary full time position as researcher in forensic toxicology with focus on NPS – metabolism, detection and toxicity which has resulted in a number of publications and cooperations in a short time and so has been very successful. Further recruitment of phds and postdocs are planned.

9. Network activities vs. research activities

Both networking and research have been successful. If funding is reduced, perhaps especially networking should still be continued because it is relatively cheap and can result in research based on synergy effects which still will be possible to some extent despite reduced funding. To improve funding, forensic projects with health care perspectives could be considered.

10. Administration/organization

The setup with a board, management group and reference group is very professional and appears to have been well-working and so can be recommended to continue.

11. Overall performance in relation to prerequisites and funding

Overall, the established network with associated activities and funding has resulted in a high scientific output which is impressive. The money appears to have been well-invested. The number of publications in the first quartile has been higher than corresponding to the average for the university. Also before the SRA was established, there was a good scientific output, and there has been an increasing trend during the SRA period. There has been outlined a plan for the future focusing on a more international approach with regard to funding, e.g. application for Horizon2020 EU grants and international recruitment which sounds promising.

EVALUATION OF SRA LIU-MUCOSAL INFECTION AND INFLAMMATION CENTER (MIIC) 2015-2018

Summary

1. Scientific goals and output

MIIC evolved from Linkoping's previous Diarrhoea Disease Research Centre following the research evaluation of 2014/15 and in 2015 MIIC commenced work to coalesce with other groups to drive on inflammation and infection research with a strong translational focus. At present MIIC consists of 30 PIs and 33 senior scientists which has grown considerably from the original 19 PIs. Strategic goals over the last 5 yr cycle have been to increase translation by forging collaborations with clinical and basic teams; enhance collaborative working among PIs and technology uptake; to increase the impact of publications; increase recruitment of international scientists to post-doc the program and to recruit new PIs. MIIC introduced several interventions over the 5 yr cycle to address these strategic aims including provision of seed funding to build collaborative enterprises and pump prime large grant applications. Furthermore, introduction of an international post-doc program directly benefited PIs with knowledge transfer. MIIC made great strides in building capacity in the program with the appointment of a significant number of new PIs over the cycle.

The board presented six impact case statements from the groups of Benson, Jenmalm, Svensson, Keitya, Soderholm and Myrelid.
Benson's involved use of multiparameter immune monitoring datasets to inform biomarker and drug discovery in disease. This is a very strong underpinning program and I would be interested in the site review as to whether this group has adequate access to desirable clinical datasets to enable them to grow this strong approach over the next few years. I would be interested to know whether local technologies are available to realize the vision for this work long term and if not how these might be instituted locally.
Jenmalm's impact statement involved study of microbiota exposure in early life and allergy development; Keita/Svensson explored the role of neurotropic factors in rotavirus and IBD. Both these areas are innovative and exciting and it will be interesting to understand this groups future plans to define how best they might be supported in developing these angles over the coming years.
The final 3 statements were very directly translational examining prevention of rota virus and norovirus with 5-HT3 antagonsits; use of PPAR gamma agonists in treatment of IBD and examining how cessation of smoking can prevent recurrence after resections for Crohns's.
Overall impacts described were impressive and demonstrate MIICs commitment to growth in translation and human immunology.

2. Post doc program

MIIC recruited 11 post-docs on the international post doc program. These have been reviewed and successful post-docs given an option for a 3rd year of funding. Five achieved this This program appears to have been very successful adding to the research environment and providing technological knowledge and experience and adding to international links within the campus. The MIIC board propose to continue the program over the ensuing 5 years and I agree this would be highly worthwhile.

3. Competence platforms

Technical platforms are shared across the institute. I would like to have a bit more insight as to what capabilities are available and where shortfalls exist. For MIIC, with an emphasis on translational research, the availability of state of the art facilities is critical for ongoing success of several of the programs. I would like to understand from the faculty which platforms they don't have that would be desirable and a strategic plan developed as to how support and maintain acquisition of those. I wondered whether the board might designate an equipment committee charged with exploring key options and leading on acquisition of strategic funding. As part of the next 5 yr cycle. In the previous cycle a lot of emphasis was placed on technical knowledge transfer via personal but I wondered whether it was worth growing some locally in areas critical for the research programs.

4. Interactions, inclusiveness and collaboration

MIIC has demonstrated a growth in collaborative working and interactions since the last review. Research groups in the autoimmunity and immune regulation unit are expected to relocate to where several MIIC groups are located which will assemble MIIC scientists in proximity. this strategic re-organisation will take place over the in the immediate term. This should enable the faculty to address more cross-organ questions and enhance knowledge transfer as well as on joint grant funding.

5. Postgraduate education

MIIC trained 48 PhD students. Students have access to several courses in molecular virology, advanced immunology, cytokine s and chemokines in inflammation, infectious biology-clinical perspectives. The faculty organise a research school of inflammation and infection for PhD students, how to present research and MIIC student and post doc seminars. I would have the hit in particular would be a valuable form for early feedback on project directions and critical appraisal from others in the faculty. The post-docs are encouraged to present at meetings with abstract and poster presentations.

6. Annual retreats

MIIC has annual retreats which have led on different themes year on year. These included a retreat focused on strategic discussions, one with invited national and international speakers and a retreat including SAB members. In all retreats PIs, post-docs and students had an opportunity to present their research. Retreats have been used to air viewpoints of Grants officers and the innovation office to maximize opportunities for the MIIC in funding success and innovation. Retreats include poster sessions to give young investigators opportunities to present their work for critical review. The retreats have acted as a catalyst for team building and enhancing internal collaborations and have been highly appreciated by the staff.

7. Series of regular seminars/lectures

MIIC holds weekly short seminars and has a minimum of 5 seminars per year in addition to their annual retreat. A broad range of topics are covered including MIIC research themes but also methodology and computational biology. Talks are from faculty or invited national and international speakers. In addition, student and postdoc seminars occur weekly enabling younger scientists to gain critical feedback for their work and to enhance presentations skills. Overall there seem to be a good balance of seminars for the size of the faculty.

8. Recruitment of new faculty members

SRA-LiU MIIC consist of 30 principal investigators. Of these 9 have been recruited since 2015-it was not clear as to whether these were junior or established PIs and it will be interesting to explore the rationale for new recruits taken on by the board. There were increases in PhD students and post-docs as well as a category "other" eg professor/senior lecturer to 33 from 9. I was interested in whether these members were affiliates or emeritus positions.

9. Network activities vs. research activities

The network activities are integral to success of any substantial research organization. Those carried out by MIIC have been fruitful and provided a stable foundation on which to build more ambitious efforts over the coming years including the development of the visiting professorship program. There appears to be a healthy ratio of network to research activities.

10. Administration/organization

MIIC is run by a board including representatives from basic and clinical background. The board has wide expertise including infection. Innate and adaptive immunity inflammation, neuro and reproductive immunology. The board together with the SAB are responsible for setting strategic goals and organizing delivery of those with the aid of strategic initiatives which use up 85% of the yearly budget. The administrative load of MIIC takes up a minor 15% budget and is clearly efficient. I wondered whether there were opportunities

11. Overall performance in relation to prerequisites and funding

MIIC has a budget of 3 million SeK per year. This has been used to fund seed grants, retreats, an international post-doc program, microgrants, assistance with grant and manuscript reviewing and leadership courses. These core activities consume up 85% percent of this funding. Overall performance is impressive as this seems a comparatively small sum to enable strategic initiatives for a department of 30 PIs. Performance as assessed by numbers and impact of publications and funding obtained appears strong.
Specifically, MIIC PIs have authorship on 227 with impact more that 3 and 104 with impact more than 5. PIs obtained competitive external funding from Swedish research council, cancer foundation, EU and Knut and Alice Wallenberg Foundation, for example. The outputs have therefore grown considerably over the last few years and these strategic initiatives have likely contributed to this success.

12. Suggested future directions of the strategic areas

Amalgamation of research groups to form MIIC appears to have been highly insightful as PIs have benefited from physical proximity and enhanced research environment achieved by co-location. Over the course of the next few years they propose to extend the research groups collaborations with the technical facility which I think will be very important going forwards for the inflammation theme and others. They propose to increase availability of clinical samples and cohorts by including selected Jonkoping and Kalmar PIs in the MIIC program. This will increase the catchment area for cohort building and throughput of translational medicine studies. They propose to continue with their international post-doc program and continue the microgrant funding to enable collaborations with international labs and encourage knowledge transfer. They have successfully built up some of the technical platforms and I imagine over the next few years with will be important to consolidate this aspect. Some activities will be de prioritized such as the seed grant program and MIIC organized PhD courses. I wondered whether funds diverted from here might be used to introduce new technologies of interest as matched funds for strategic grants although this may be out of the scope of the internal funds available. They also proposed to introduce a visiting professorship program which should enrich collaborations and knowledge exchange.