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to The Board of CARIM  
Attn Prof.dr. M.J.A.P. Daemen  
The Board of the University of  
Maastricht  
Attn Prof.dr. H.F.P. Hillen

our reference TRA/ML/07.038  
your reference  
date May 1, 2007  
subject

Dear colleagues,

On behalf of the external review committee of CARIM 2007 it is my pleasure to submit our evaluation report. The report has been approved by the members of the ERC.

It was a pleasure to have been able to review the excellent science of your institute.

On behalf of the ERC,

Prof.dr. T.J. Rabelink  
Chairman





CONFIDENTIAL

*Report of the External Review Committee for the 2007  
Evaluation of the Cardiovascular Research Institute Maastricht*

Date of submission: 2007-04-03



### Scope and context of this review

This assessment covers the research, the Research Master program and the PhD training program as carried out in, or in collaboration with and under responsibility of the Cardiovascular Research Institute Maastricht (CARIM), respectively the Cardiovascular Research School. CARIM has a strong position in the international cardiovascular research arena and aspires to be one of the leading cardiovascular research centres in Europe. The assessment is executed by an external review committee (ERC) at the request of the management of CARIM and of the Dean of the Faculty of Health, Medicine and Life Sciences. The assessment of the institute is according to the rules described in the Standard Evaluation Protocol 2003-2009 for Public Research Organisations in the Netherlands, and approved by the Royal Netherlands Academy of Arts and Sciences (KNAW), the Netherlands Foundation for Scientific Research (NWO) and the Association of Co-operating Dutch Universities (VSNU). This *periodic review* is part of the requirement for certification of the Graduate School by the KNAW. In this case it concerns the 3rd approval of the Research School.

**The terms of reference** of the ERC are defined as a major tool “to advise the Board and Management of CARIM to sustain and improve quality of their research and education programs and to give foundation to strategic decision-making procedures. The focus of the assessment should be on the educational programs and on the scientific research program, which should include judgment of CARIM’s scientific productivity, the relevance of the research and the institute’s viability.”

**The mission of CARIM** is summarized as to:

- Improve the current knowledge of the processes underlying cardiovascular diseases by carrying out pioneering and excellent scientific research extending from ‘molecule’ to ‘patient’;
- Stimulate and facilitate the collaboration between basic and clinical scientists, as an essential factor in ultimately improving health care;
- Develop into an internationally recognized centre of excellence in cardiovascular medicine;
- Train Master students, PhD students and MD students to independent researchers and post-docs to leading scientists who are capable to function on multi-disciplinary research programs at universities and companies;
- Evaluate new findings, products and techniques for applicability in health care, often in collaboration with private companies;
- Publish the results of the scientific program in international highly ranked journals.

**The strategic goals** for 2007-2011 are:

- To maintain a strong and coherent research program;
- To develop a centre of international excellence for cardiovascular medicine in Maastricht with strong translational programs between CARIM and the Cardiovascular Centre in the Hospital;
- To establish an excellent research Master - and PhD program;
- To build strategic alliances at the (inter-) national and (Eu-) regional level.

CARIM has the *ambition* to belong to the top 3 biological research institutes in the Netherlands, and to be the number 1 in the cardiovascular field. It aspires to belong to the top 3 cardiovascular research institutes in Europe and join the top 10 internationally.

### **The External Review Committee and the mode of operation**

The External Peer Review Committee consisted of 6 internationally recognized leading scientists and a scientific secretary (see annex 1). Several weeks before the review, members of the ERC received recent annual reports of CARIM and a Self Evaluation report to prepare the committee for the assessment. The program of the review, which took place from 4 to 6 March 2007 in Maastricht (see annex 2) included presentations on the various research themes, poster presentations and demonstrations by respectively staff members and PhD students. The ERC had presentations of the Master Program and the PhD program, and discussions with (graduate) students to discuss the training programs. The ERC also had meetings with the Dean of the Faculty of Health, Medicine and Life Sciences, with the Chairman of the Board of the Academic Hospital Maastricht, and with the Director of the Cardiovascular Centre Academic Hospital Maastricht.

## *Evaluation*

### **Overall impression**

The ERC was impressed by the Self Evaluation Report that was prepared in advance of the site visit. CARIM is overall of high quality, and compared to the last ERC evaluation in 1999 the quality has further improved.

CARIM is currently in a process of extensive renewal at both the institutional level (new scientific director, 2 new theme leaders, refocusing of the research program) and the university level (merging of the Faculty of Medicine and the Faculty of Health into one Faculty of Health, Medicine and Life Sciences in January 2007, the prospect of a University Medical Centre Maastricht in January 2008, and novel alliances at the national and Euregional level). Moreover, there is a change of generation in the leadership in the research projects. The ERC considered this as a sign of vitality and further future potential of CARIM. However, the further development of CARIM into an international top institute then also critically depends upon the success of these transformations.

### **Evaluation of the research themes**

#### *Theme I: Thrombosis and Haemostasis*

The strength in this theme is the established group with a strong basis and tradition. It was apparent that the Theme Thrombosis and Haemostasis has invested in translational platforms and excellent biochemistry, particularly peptide synthesis. There are many talented young scientists, and although the impact score of publications (above world average; see later) seems less than in the other themes, this research line has a very good vitality and potential. The group is also well recognized internationally. The program is generally cohesive and very important for the mission of CARIM. Particularly, the research

on structure and function of coagulation factors in the more physiological reaction setting of plasma (thrombin generation assays), and the experimental studies of platelet function, in combination with investigations of clinical aspects of haemostatic and thrombotic processes, are important for improvement of diagnosis and therapy of venous and arterial thrombosis. The other research line in this theme that is important for the mission of CARIM, is the molecular imaging work currently centred on annexin V that has many cross links within CARIM. Therefore, the advice is to maintain the theme at this level or even to invest further in it. The ERC strongly recommends organising better access to the clinical setting to facilitate translation. Merging the institutes into a university medical centre will constitute an excellent opportunity for such organisation. The number of sub themes is ample in relation to the number of investigators.

#### *Theme II: Cardiac Function and Failure*

The second Theme Cardiac Function and Failure currently undergoes extensive remodelling. The traditional focus on electrophysiology is narrowed down to Atrial Fibrillation, and a new line of research in heart failure has been established. Under supervision of the enthusiastic new theme leader interesting innovative themes are being explored. The ERC recommends developing also clinical excellence in these areas to be able to translate this line of science to the clinical arena. A problem for the choice of this theme may be in the lack of a heart transplantation program, which would lead to top referral in clinical heart failure. The Euregion ambitions of the hospital may provide opportunities in this respect. The ERC also sees opportunities for some of the traditional physiological functional platforms to be revitalized within this theme. This would also help to build cohesiveness within this theme, where good to excellent groups work on heterogeneous subjects. In the context of clinical priorities the arrhythmia research is very important and deserves continuing support. This will also be critical for integration of this theme into the new UMC. The impact factor of publications is impressive but is also in part generated through strategic alliances.

#### *Theme III: Vascular Biology*

The Theme Vascular Biology has a strong and internationally well-recognized position. The pathology expertise serves as an important nucleus that has enabled to achieve this position of the theme. The output is excellent; the group is unique in mass and in multidisciplinary, including MD's. The theme is clinically oriented and research is disease driven. Also here new groups have recently been introduced, with diabetes and metabolic syndrome as emerging themes. The ERC recommends developing a good integration of these new groups, as they may serve as cohesive and essential elements, particularly for future clinical alignment. The imaging platform is recognized as vital and connecting existing and future elements in CARIM. It is important to take this into consideration when appointing new clinical positions and to look for strong academic leadership in these clinical imaging.

### **Funding**

In general, there has been an improvement in attracting competitive money in comparison to the last ERC evaluation. This trend to attract competitive money, especially in a scientific environment with such ambition, should be strongly improved. The ERC would advise the management of CARIM to create a more competitive environment and approach to funding. It should demand more return from investigators and principal investigators from its generous investment in salaries, PhD students and infrastructure. The position of

Maastricht in the recent public-private initiatives should be used as a strong stimulus for this development.

### Challenges

One of the big challenges will be the alignment of activities and the translation of the science into clinical innovation. The collaboration between CARIM and the Cardiovascular Centre of the Academic Hospital Maastricht offers strong opportunities and the ERC has great confidence in the present combined leadership. However, the embedding within the overall AZM decision-making process should be further improved by e.g. an integral strategic plan at the level of the board of the AZM. Furthermore, the role/ mandate of the second level of leadership within the fused cardiovascular centre, i.e. the theme leaders, should be more clearly and recognizably defined.

### Strategic alliances

The ERC briefly discussed the relation with ICaR-VU (Institute for Cardiovascular Research Vrije Universiteit Amsterdam), that is apparently non existing, while the former ERC recommended optimising collaboration to profit from the clinically directed research. Essential expertise from ICaR-VU (diabetes, vascular and genetics) has moved in the last years. In the light of the merger with the Cardiovascular Research Centre of the Academic Hospital Maastricht, and the growing collaboration in the field of vascular surgery with the University Hospital Klinikum in Aachen, intensified collaboration in research with ICaR-VU is no longer very essential for CARIM.

Strategic alliances with the Faculty of Biomedical Engineering from the Technical University Eindhoven (educational programs and research in the field of biomedical and tissue engineering, and imaging) and with COEUR/thoraxcenter of the Erasmus University Medical Centre Rotterdam (interventional cardiology) should be intensified. Especially cooperation with Aachen and Rotterdam is important to bridge the gap between preclinical and clinical research.

### Valorisation and infrastructure

There is for the Dutch situation an excellent valorisation, particularly from Theme I where several small start-up companies have emerged. There has been more professional attention for this spin-off in the last years. The infrastructure offers excellent facilities, both basically and clinically.

### The educational program

The University of Maastricht has a long history of educational innovations, good facilities and a spectrum of activities that are attractive to the students. The Research Master Program Cardiovascular Biology and Medicine (the only cardiovascular master in the Netherlands) is an excellent tool to line up young researchers for a CARIM career and puts Maastricht at the front of the Bachelor/Master development. However, attention should be paid not to limit career opportunities of the students, especially those students that are not able to stay for a career within CARIM.



With regard to the PhD training program the ERC was strongly concerned about the increasing standards of PhD theses that lead to sometimes excessive study time and loss of career potential of students. The ERC recommends more flexibility in the standards (e.g. relaxing the demand of four peer reviewed publications). The ERC also recommends more monitoring of the quality of supervision to control this process. Finally, given the fact that there is substantial money from faculty and in the future fused CARIM/AZM organization, it would be desirable to have female role models for the PhD students in the form of successful principal investigators. Furthermore, the ambition of CARIM would benefit from more MD's in the program, i.e. the development of a strong MD-PhD program.

### Conclusions in assessment ratings

QUALITY	<i>Very good</i>	Within each theme there are excellent as well as less good areas. On the theme level there is strong leadership. Excellence is present in the field of MRI/imaging in general and this seems critical for the majority of projects. Also in plaque instability and in some areas of thrombosis, excellence is present.
PRODUCTIVITY	<i>Very good</i>	It is felt that to achieve the next level there should be more emphasis on quality rather than on volume.
RELEVANCE	<i>Excellent</i>	
PROSPECTS	<i>Potentially excellent</i>	Here the transition process plays a role in future potential.

**OVERALL      VERY GOOD TO EXCELLENT**



*Annex 1*



## Members of the External Review Committee CARIM-UM, March 2007

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## *Annex 2*



## Program ERC CARIM 2007

date Sunday March 4 – Tuesday March 6, 2007

### Sunday March 4

*Location: Château Neercanne, Cannerweg 800,  
6213 ND Maastricht Phone: 043-3251359*

- Afternoon** Arrival ERC members in Maastricht
- 17:00 - 17:30** Closed meeting ERC members
- 17:30 - 18:30** Installation of the External Review Committee by the Dean of the Faculty of Health, Medicine and Life Sciences Prof. Dr. H. Hillen
- Introduction Research School by Prof. Dr. M. Daemen
  - Overview Dutch research system
  - Overview program ERC
- 18:30** Drinks and dinner with Dean FHML, Director and Board Members School

### Monday March 5

*Location: Groene Zaal, Universiteitssingel 50*

- 9:00 - 9:15** Introduction CARIM program by Prof. Dr. M. Daemen, Scientific Director of CARIM  
In depth presentation CARIM themes I, II and III by Theme leaders (one hour each, including discussion):
- 9:15 - 9:45** Presentation theme I 'Thrombosis and Haemostasis' by Prof. Dr. J. Rosing
- 9:45 - 10:15** Discussion
- 10:15 - 10:45** Presentation theme II 'Cardiac Function and Failure' by Prof. Dr. Y. Pinto
- 10:45 - 11:15** Discussion
- 11:15 - 11:30** Coffee Break
- 11:30 - 12:00** Presentation theme III 'Vascular Biology' by Prof. Dr. M. Post
- 12:00 - 12:30** Discussion
- 12:30 - 13:30** Lunch and closed meeting ERC
- 13:30 - 16:00** Viewing CARIM posters including guided tour CARIM facilities
- 16:00 - 17:00** Meeting with Drs G. Peeters, Chairman of the Board of the Academic Hospital Maastricht
- Evening** Informal (buffet) dinner with CARIM scientific staff, technical staff and PhD-students
- Location: Rester, Minderbroedersberg 4-6*

### Tuesday March 6

*Location: Oxfordlaan 70*

- 8:30 - 10:00** Presentation Research Master Cardiovascular Biology and Medicine by Dr. A. Duijvestijn  
Presentation Ph.D. training program by Prof Dr. C. Bruggeman, vice chairman CARIM PhD-Committee (including discussion with PhD's)
- 10:00 - 10:45** Site visits upon individual request members ERC
- 11:00 - 12:00** Meeting 1 with Prof Dr. M. Jacobs, Director of the Cardiovascular Center Academic Hospital Maastricht
- 12:00 - 13:00** Meeting 2 with Prof. Dr. H. Hillen, Dean Faculty of Health Medicine and Life Sciences
- 13:00 - 16:00** Lunch and closed meeting ERC
- 16:00 - 16.30** Feedback to Board and Director Research School
- 16.30** End



