Strategic plan of the Department of Medicine
2014-2024
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1. Summary

The Department of Medicine (DepMed) of the Faculty of Sciences has significantly evolved in recent years. New curricula were successfully introduced, in particular the Bachelor in Medicine with the implementation of the 3rd year of medical studies, the Bachelor in Biomedical Sciences and the Bachelor and Master in Movement Sciences. Novel partnerships were established with the Cantonal Hospital (HFR), the Fribourg Network for Mental Health (RFSM), the Haute Ecole de Santé de Fribourg (HEdS) and the Haute Ecole fédérale de Sport de Macolin (HEFSM). The number of students has tripled over the past ten years. Eleven new professors were recruited in the last five years for teaching the 3rd year of Medicine and the curriculum in Movement Sciences.

In the wake of this evolution and in order to successfully face emerging challenges and take new directions in a nationally and internationally evolving context, the DepMed has reassessed its current situation, defined a vision and proposed new developments which are summarized in this document.

The emerging vision is to secure the future of medical teaching and research in Fribourg by building on our tradition of excellence and to develop new ways of educating of medical doctors and scientists.

In this strategic plan we define the approaches and steps envisaged for implementing this vision. It addresses the three principal pillars of the Department: teaching, research and structure. Here are the highlights:

• **Teaching.** We plan to introduce novel Master curricula in Experimental Medicine and Clinical Medicine, as well as a Graduate School in Life Sciences. The HFR, RFSM, HEdS and the Faculty of Sciences will be essential partners for these developments. The implementation of a Master curriculum in Medicine with emphasis on general medicine will be our leading project.

• **Research.** We propose to create thematic clusters and to integrate them in the planned Life Sciences Center. Novel Faculty and independent junior investigators will be recruited to reinforce the three clusters. The consolidation of common core facilities will be pursued.

• **Structure.** We will restructure the DepMed in horizontal entities supporting the thematic clusters in teaching and research, and we will reorganize the leadership and management of the Department. We will actively pursue the construction of novel infrastructures to accommodate the growing needs for teaching and research, including clinical education. Further, we will increase public visibility of the DepMed.

*Through the actions proposed in this strategic plan, we are committed to pursuing the successful development of the DepMed. We have a historical opportunity to open new ways of educating medical doctors and scientists, with profound and far-reaching implications for our University.*
2. Context and general considerations

2.1. Introduction

Unlike other Swiss universities (Geneva, Lausanne, Bern, Basel and Zurich), the University of Fribourg has no Faculty of Medicine. There is a Department of Medicine (DepMed), within the Faculty of Science, offering the first three years of medical education leading to a Bachelor degree (BMed).

The embedding of the DepMed within the Faculty of Science has several advantages, but also some disadvantages. Among the main benefit is the proximity to other scientific disciplines (in particular biology, physics, chemistry, mathematics, and nanotechnologies), which offers great potential for synergies in teaching and research. Among the disadvantages there is an obvious lack of financial, structural and administrative autonomy compared to Faculties of Medicine at other Universities.

The process of accreditation of the Bachelor program by the Organe d’accréditation et d’assurance qualité des hautes écoles suisses (OAQ) resulted in a positive decision of the Conférence universitaire suisse (CUS) communicated on December 1st 2011. This decision was subjected to 5 conditions and 20 recommendations. Among the conditions, the CUS requested that the DepMed becomes autonomous within the Faculty of Science (Condition 1a) and formulates a specific strategic plan (Condition 1b), included in the context of the creation of a Life Sciences Center (Condition 4).

The members of the DepMed appreciated the positive evaluation and see the request of developing a strategic plan as a stimulating opportunity to consider the future of teaching, research and organization of the Department, as well as its interactions with other Departments, the Faculty of Science, the State Hospital (Hopital Fribourgeois - HFR), the Fribourg Network for Mental Health (Reseau Fribourgeois de santé mentale - RFSM), the Haute Ecole de Santé (HEdS) of Fribourg and the Haute Ecole fédérale de Sport de Macolin (HEFSM).

Several of the proposed strategic goals below are in line with the strategic objectives of the University of Fribourg and consistent with the existing five Swiss faculties of medicine and the ongoing developments in medical education in Switzerland.

This strategic plan was conceived and discussed by an ad hoc working group of the Department coordinating the response to the conditions and recommendations of the OAQ, by the professors, teaching staff (maîtres d’enseignement et de recherche) and teaching assistants (adjoints pédagogiques) of the department, by the members of the Presidential office and by the leadership of the HFR at a retreat of the Department on June 27-28th 2013. It was approved by the Council of the DepMed on September 23rd, 2013.

2.2. Recent developments in the DepMed

The DepMed is devoted to teaching and research in the fields of Medicine, Biomedical Sciences, Movement Sciences and Pharmacy. In recent years it has experienced several major developments highlighted below.

2.2.1 Introduction of the Bachelor in Medicine (BMed)

- The introduction of the Bachelor in Human Medicine (BMed) in 2009 has called for the introduction of a 3rd year of teaching in clinical disciplines. Eight new chairs (Cardiology, Endocrinology, Medicine and Society, Microbiology, Neurology, Pathology, Pharmacology and Psychiatry) were created and nine professors (2 part-time) were appointed between 2009 and 2012.
2.2.4 Closure of pharmaceutical studies

This program was made possible thanks to a successful collaboration with the HFR and RFMS, which are providing a significant number of highly qualified instructors. In turn, the University of Fribourg has recognized the competences of many instructors by appointing them to Titular Professors and by introducing a new academic title: Maitre d’Enseignement Clinique (MEC). A further collaboration was established with the HEFS.

A Center for Clinical Skills was newly created at St Justin, the University facility in which the 3rd year teaching is concentrated.

The newly appointed professors have brought many new teaching and research competences to the Department.

The agreements which regulated the continuation of studies in the 3rd year in five Swiss medical faculties were adapted for entry into the fourth year (at master level). These agreements guarantee that students completing their Bachelor of Medicine in Fribourg (currently 96 students) can pursue their Master studies at another Swiss University.

2.2.2 Introduction of the Bachelor in Biomedical Sciences (BMS)

- The Bachelor in Biomedical Sciences (BMS) was created in 2006 in cooperation with the University of Bern as part of a Bachelor-Master program in Biomedical Sciences. This program has a steadily increasing numbers of students and has strengthened teaching and research in neurosciences, metabolism and cardiovascular medicine.
- It is the only Bachelor program in BMS in Switzerland and responds to the growing demand for training in clinically-oriented biomedical research.
- Most students pursue their training by enrolling in Master programs at other Universities, most notably Bern, the partner institution for this program at master level.

2.2.3 Introduction of the Bachelor and Master in Movement Sciences

The Bachelor studies including a Bachelor in Education and a Bachelor in Health, Performance and Research were introduced in 2007 and were extended by a Master in Movement and Sport Sciences in 2010, in collaboration with the Haute école fédérale de sport Macolin (HEFMS). The master option “Education” was introduced first, training students to become sport teachers. One year later, a second master option “Health and Research” was established. Importantly, the Banque Cantonale de Fribourg has sponsored an additional professorship in this domain to further encourage this development. The master studies that are offered in cooperation with the HEFMS are very successful and are attracting a rapidly growing number of students. These curricula reinforce research on human subjects, which is one of the expertises of the DepMed. They allow the flexibility of exchanging students with the BMS program between year 1 and 2 and enable the training of future PhD students. To date, two former master students in movement sciences have started a PhD program within the DepMed.

2.2.4 Closure of pharmaceutical studies

The first two years of pharmaceutical studies have traditionally been taught to a cohort of 20 to 30 students. The program was accredited by the OAQ and CUS in 2012, in conjunction with the accreditation of the Pharmacy studies at the University of Basel. Maintaining pharmacy teaching in Fribourg would however require significant investments in personnel in order to keep up with the growing number of
students. In a context of limited resources, the Rectorate of UniFr has decided in June 2013 to shut down pharmaceutical studies in order to implement other projects, in particular the Master in Experimental Medicine (see below). If this decision is maintained, the last cohort of students in pharmacy will enroll in fall 2013 and the curriculum will be closed in 2015.

2.2.5 Increasing numbers of students

Since 2004, the DepMed has experienced a steady growth in the number of students mainly due to the introduction of the curricula in Biomedical Sciences (BSc), Movement Sciences (BSc and MSc) and the third year of Medicine (BMed) (Figure 1). This increase has translated into a higher teaching load for professors and assistants, as well as to an overload of teaching rooms for lectures and practical courses.

![Figure 1. Evolution of key indicators in the DepMed](image)

The number of students has tripled in the last 10 years. This includes students in BMed, BMS (BSc) and Movement Sciences (BSc and MSc) as well as Pharmacy. The number of professors slightly increased with the introduction of the 3rd year. However the sum allotted by the Canton for supporting teaching and research stagnates.

The numbers of students for the year 2012-2013 is listed here:

<table>
<thead>
<tr>
<th>Course</th>
<th>Year</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biomedical Sciences</td>
<td>BSc</td>
<td>185</td>
</tr>
<tr>
<td>Movement Sciences</td>
<td>BSc</td>
<td>155</td>
</tr>
<tr>
<td>Movement Sciences</td>
<td>MSc</td>
<td>75</td>
</tr>
<tr>
<td>Medicine</td>
<td>BMed</td>
<td>328</td>
</tr>
<tr>
<td>Dental medicine</td>
<td>1 year</td>
<td>35</td>
</tr>
<tr>
<td>Pharmacy</td>
<td>2 years</td>
<td>54</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>832</strong></td>
</tr>
</tbody>
</table>
2.2.6 Transfer of biochemistry to the Department of Biology

In spite of the strong reservations expressed by the DepMed, the unit of Biochemistry with its 5 professors was transferred from the DepMed to the Department of Biology in 2011. The reasons put forward for this transfer were the better integration with the research in the Department of Biology and an equilibration of forces in the Faculty of Sciences after the recruitments of 8 new professors to the DepMed for the 3rd year of medicine. Teaching of biochemistry to medical students is for the present maintained and guaranteed by a service contract (see point 5.2.1.7).

2.2.7 Recruitments of new professors

In 2014, of the 20 professors of the DepMed, 13 have been recruited during the past 5 years (Figure 2). Additional retirements (at least 3 full professors) are planned within the next few years. This represents a formidable rejuvenation of the DepMed and a unique opportunity to redefine themes of research and the profile of the Department.

Figure 2: Professors in the DepMed. Inner circle (green): Professors appointed before 2008. Outer circle (blue): Professors appointed between 2008 and today (Situation as of September, 2013).

The changes that have occurred since 2008 can be summarized as following:

- 2 new professors in Movement Science
- 2 new professors in Anatomy
- 1 new professor in Neurophysiology
- 9 new professors for the 8 chairs in Clinical Medicine (Med-3)
- 1 new professor will be recruited in Anatomy (Neuroanatomy) in 2014
- 5 professors of Biochemistry moved to the Department of Biology
3. The DepMed vision

To secure the future of medical teaching and research in Fribourg by building on our tradition of excellence and to develop new ways of educating medical doctors and scientists.

The changes in the Department and the ongoing developments represent a major challenge but also a unique opportunity to reflect on the future of the DepMed, both in its research and teaching duties and in its organization and management.

To this end we have defined a common vision that not only addresses the requirements and ambitions of the Department, but which also takes into account the strategic planning of the University as a whole and integrates our partners, in particular the HFR and RFSM.

In this strategic plan we define the approaches and steps envisaged in order to implement this vision. The plan addresses the three principal elements of the Department: teaching, research and its own structure and management.

• **Teaching.** We aim at reorganizing the current teaching programs, to implement novel teaching modalities and to introduce Master curricula in Experimental Medicine and Clinical Medicine, as well as a Graduate School in Life Sciences. The HFR, RFSM and the HEdS will be essential partners for these developments. The implementation of a Master curriculum in Medicine with emphasis on General Medicine is the leading project of the future DepMed.

• **Research.** We aim to consolidate research activities in thematic clusters and to integrate these developments into the future Life Sciences Center. Future Faculty members will be recruited based on these thematic clusters. We will actively pursue the recruitment of junior independent investigators and Fellows, and the creation of tenure track positions. The implementation of core facilities will be pursued.

• **Organization.** We will restructure the DepMed in horizontal thematic entities better suited to the developments in teaching and research and will reinforce management and administration. An increase in human and financial resources will be necessary. We will support the construction of novel infrastructures to accommodate growing needs for teaching (auditoria and labs for practical courses) and research (new laboratories and core facilities). Efforts will also be invested in increasing public visibility.

We plan to translate this vision and strategy into reality over the next decade. As different requirements and projects have specific priorities and constraints, the DepMed will approach and develop them in different phases. We will consider:

• Needs and projects that requires immediate action (i.e. within 3 years from now):
  - For instance, Life Sciences Core facility – Microscopy, Life Sciences Graduate school, Master in Experimental Medicine (MExpMed).

• Needs and projects that requires mid-term action (3-6 years):
  - For instance, Master in Human Medicine (MMed).

• Long-term developments (6-10 years):
  - For instance, construction of the Life Science Tower.
4. Integration with the strategic plans of the University and of the Faculty of Science

4.1. Strategy plan 2020 of the University

On December 9th, 2009, the Senate of the University approved the development plan “Stratégie Horizon 2020” of the University of Fribourg. In this plan, developed by the leadership of the University in collaboration with faculties and academic bodies, seven goals of transversal developments are elaborated. The presented vision is to “do better what we already do well” and to take new initiatives to further develop the strengths of the University.

Here we briefly review the seven goals of the strategic plan of the University and take into account the specific prospects of the Faculty of Sciences to emphasize elements of our strategic plan that are in line with them.

4.1.1. Develop flagship projects or key themes

Flagship projects can be centers of competences or excellence in research or education.

Two flagship projects with national and international visibility have been identified at the Faculty of Sciences. The first one is a center of competences in nanomaterials (Fribourg Center for Nanomaterials). This is made possible by the presence of numerous excellent research groups at the newly created Adolf Merkle Institute (AMI) and at the departments of physics, chemistry, mathematics and geosciences working on different aspects of nanomaterials. The DepMed is an active member of this center with several projects in the field of cancer, immunity, neuro- and cardiovascular biology.

The DepMed also contributed to the elaboration of a multidisciplinary project for the creation a National Center of Competences (NCCR) on “Bio-inspired, stimuli-responsive materials” submitted to the SNSF (the project has been retained by the SNSF among 10 fundable projects and a final decision by the Federal Council is expected in December 2013) (see 5.2.9.3. Adolphe Merkle Institute). To underscore the commitment of the DepMed, several professors of the Department contribute to research and training within this flagship project and the Deputy director of this program is member of the DepMed (Prof. C. Rüegg).

A second flagship theme of the Faculty of Sciences is Life Sciences. This is a joint venture between the Departments of Medicine and Biology which includes both research and educational aspects. The introduction by the DepMed of the Bachelor in Biomedical Sciences, of the third year medical education and the curriculum in Movement Sciences has greatly strengthened research in Life Sciences. The recruitment of new professors for these curricula has brought to the University new competences with high national and international visibility in research and teaching. The creation of a Life Sciences Center aims to foster synergies between established and novel research groups in order to optimize resources, improve teaching and scientific output and increase the visibility and attractiveness of Life Sciences at our University (see 5.2.1. Life Science Center).

4.1.2. Encourage young scientists and strengthen research by creating opportunities at the intermediate level

One major contribution of our Department to this aim is the recruitment of junior independent investigators through programs of the SNSF: Professeurs boursiers, Marie-Heim Voegtlin (MHV) and Ambizione fellows. We will pursue our efforts towards the creation of tenure-track positions for the best qualified of these investigators (see 5.2.6. Hosting junior research groups and fellows).
In addition we plan to support the creation of assistant teacher (*maître assistant, MA*) positions, particularly in clinical medicine, where these positions currently do not exist. We believe that these are important positions for our Department as they open the possibility of junior researchers to become more independent in view of developing their career, and at the same time supporting Professors in their teaching and student supervision duties (see 5.3.3. Resources).

### 4.1.3. Strengthen and expand the international network of the University

International collaborations and networks are initiated and developed by individual investigators of the Department, on the basis of personal contacts or driven by thematic interests. The newly recruited professors, several coming from abroad, have brought new networks of international contacts and collaborations that directly benefit the DepMed and the University. The Department, together with the Research Promotion Service, supports these initiatives and encourages the participation to international programs of the FNS (SCOPES, Sciex) or the EU (Initial training Networks, Integrated projects). During the past five years, 9 EU-funded projects (Framework Program 7) were acquired by members of the DepMed in the field of cancer, vascular biology and microbiology.

In collaboration with the Research Promotion Service we will continue to encourage and support the participation to international research networks and European programs.

### 4.1.4. Encourage and support quality in all activities of the University, in particular research, education and services

In addition to an existing doctoral school in Neurosciences, a second doctoral school was recently introduced in Cancer and Immunology, supported by the SNSF and the Rectors’ Conference of the Swiss Universities (CRUS). We plan to merge efforts with the Department of Biology to build a common doctoral school in Life Sciences with the aim to create the best possible environment to train students towards a PhD in life sciences.

To improve the research infrastructure available to scientists in our Department, an Animal Welfare Officer (AWO), now under the responsibility of the Dean’s office, was recruited. The AWO is a trained veterinary doctor, who assists researchers in all aspects of animal experimentation. She is also directly involved in optimizing human and structural resources for the hosting of animals at our department.

We have already restructured the way we share and manage common equipment and facilities at the Department in order to facilitate use by all members of the department. This initiative will be extended to the local Life Sciences community.

As part of a continuous effort to improve research quality and visibility of our Department, we plan to create a Scientific Advisory Board (SAB) consisting of external peer experts in our thematic clusters of research. We expect the SAB to assist the DepMed in making strategic decisions for our lines of research and planning for future developments. SABs are usually mandated by the financial bodies supporting a research institution; this is not the case here as the SAB is not mandated by the University or the Canton. As a consequence the role of the proposed SAB is purely scientific.

### 4.1.5. Boosting the allocation of financial resources by a transparent system based on reliable indicators to encourage excellence in scientific research and academic education

The department has already implemented a strategy to allocate financial resources based on objective parameters of scientific merit to encourage excellence. A portion of the department budget is distributed according to two main criteria: (i) scientific output measured by publications during the last five years and taking into account impact factors;
(ii) number of collaborators in each research group with incentives for collaborators paid by external funds. This system of allocation will have to be revised at the time of the merge between the budgets of Med1-2 and Med-3 (in 1-2 years from now), but the principle of allocation by merit will be maintained.

4.1.6. Focus infrastructure on the Miséricorde-Beauregard-Pérolles axis and develop existing and new buildings to provide an attractive working environment

A detailed analysis on the current and future needs for laboratory space, offices and teaching rooms at the Faculty of Sciences has been performed in 2011. The lack of space is particularly dramatic for the DepMed as a consequence of the increase in students and research groups following the implementation of the 3rd year in medical studies and of the teaching domain in Movement Sciences. A plan for the development of infrastructures was elaborated by the University.

- First, the construction of a new modular building to host four groups of Med-3, GPS and presidency, the group of bioinformatics from the Department of Biology and rooms for seminars and practical teaching (see 5.3.5. New buildings). This building will be accessible by the end of 2015. Space freed by groups in Per09 moving to this building will be made available to junior independent investigators (e.g. Ambizione, SNSF Professors).
- Second, the construction of a larger building as part of the 2030 planning of the University. This building (currently called “Science Tower”) will host the DepMed and groups of the Department of Biology to give a physical center to the Life Sciences. A central animal facility and auditoria will be incorporated in this building.
- A new building for the HEdS of the Canton of Fribourg hosting a Center of Clinical Competence will be built near the Pérolles campus (Route des Arsenaux). The University of Fribourg is partner in this project and the DepMed will have dedicated rooms to host medical Skill Labs. This will replace the current skill laboratories located at St.-Justin. This building will be accessible in 2017.

4.1.7. Improve visibility of internal services for students, researchers and teachers

This is mainly a task of the leadership (Rectorate) of the University. We have already improved internal communication through the installation of digital screens and an upgraded departmental web site (see 5.3.4. Visibility).

4.2. Life Science plan of the Faculty of Sciences

The DepMed will collaborate with the Department of Biology to create a Life Science Center. A first plan was elaborated in 2009. As the structures of the two departments have considerably evolved since, the Dean is coordinating working groups that will take into account these changes and the most acute needs to elaborate a new strategy. The Life Science Center will incorporate and consolidate teaching programs, research topics and common infrastructures, in particular core facilities. The goal is to improve research output and teaching excellence and increase the visibility and attractiveness of the University in the domain of Life Sciences. The proposed structure of the Life Sciences Center is described in detail further below (see 5.2.1. Life Science Center).
5. Future developments

Following the accreditation process we have initiated discussions on how to address and implement the requested conditions and recommendations, including the requirement for a strategic plan of the DepMed. Discussions on the latter were started within the Presidium of the Department (President and two Vice-Presidents), extended to other professors and members of the Department and discussed in detail during an extramural retreat of the Department that took place at Schwarzelee on June 27-28th 2013. All professors of the Department, MER, Teaching Assistants (adjoints pédagogiques), representatives of the HFR, including the medical director, as well as the Rector of the University were present and provided views and considerations and contributed to productive discussions. The Council of the DepMed approved the strategic plan proposed here on September 23rd, 2013.

5.1. Teaching

The DepMed offers Bachelor programs in Medicine, Biomedical Sciences and Movement Sciences. At master level, the curriculum of the DepMed is presently limited to a program in Movement Sciences. Our aim is therefore to extend our offer at master level with the two following programs: (i) a Master in Experimental (non-clinical) Medicine (MExpMed); (ii) a Master in Clinical Medicine (MMed). A further development will be to offer optional courses, both at bachelor and master levels.

We will also reassess the teaching programs of the BMed in order to better integrate courses throughout the 3 years. We also plan to implement new teaching technologies.

Compared to other Swiss Universities, DepMed Professors, MER, MA and assistants have extensive teaching commitments. Therefore, when positions are renewed, potential candidates need to be able to cover the required courses as well as to integrate and complement with existing research clusters.

5.1.1. Studies in Medicine

Fribourg has a strong tradition in teaching in basic disciplines, in particular in macroscopic and microscopic anatomy, physiology and biochemistry. The recently established 3rd year in Medicine (Med-3, 2009) has significantly extended the teaching competences and orientations of the Department, as the newly recruited Med-3 professors are largely clinically oriented and teach clinical specialties (Cardiology, Endocrinology, Medicine and Society, Microbiology, Neurology, Pathology, Pharmacology and Psychiatry). The introduction of clinical specialties has given the opportunity to reorganize the entire teaching curriculum in a more integrative manner.

5.1.1.1. Restructuring of teaching programs

The preclinical 3rd year in the Bachelor of Medicine has recently been introduced in Fribourg and still needs consolidation. In this respect, vertical integration between the first, second and third year of medical studies will be improved, in particular to reorganize teaching in systems of thematic clusters. For example, collaboration in teaching between anatomy and the surgical domains will be increased, as well as collaboration between physiology and the different domains of internal medicine, and between neuroscience-oriented basic teaching and the domains of neurology/psychiatry. This will allow the introduction of clinical concepts at an early stage of the medical education, but also the revision and expansion of basic science concepts at the preclinical and clinical level of the medical curriculum.

One way of reducing the teaching load of academic teaching and research staff is to hire lecturers, who take on a heavier teaching load and contribute little to research in the
Department. There is a first trial to employ a lecturer in neuro-anatomy in the context of the succession of Prof. Kretz, to cover teaching in the areas of macro-anatomy and in dissection courses. However, increasing the number of teaching-only staff without an increase in the total number of academic positions weakens the research portfolio of the Department and should thus be restricted only to specific cases where teaching duties cannot be covered by staff with research activities.

5.1.1.2. Elective courses

A recommendation of the accreditation report is that a certain number of courses for medical students be offered as electives, so that students can select the content in line with their personal interests. Since a minimum of two options needs to be offered as electives, the overall teaching load for the Department is expected to rise by 5 to 10%. As there are currently no elective courses, this requirement necessitates the mobilization of substantial additional resources both in terms of administration and teaching. The DepMed is making every effort to use synergies in the existing curricula to liberate resources for the elective modules. However, it is clear that for such additional teaching, human resources are needed to cover the substantial increase in teaching load. We estimate that at least 200 hours per year of additional teaching capacities need to flow to the DepMed to allow the introduction of elective modules as requested in the accreditation report.

5.2.1.3. Master in Medicine

The problem of shortage of physicians in general and of general practitioner (GP) or primary care physicians in particular has been the subject of several studies at the federal level and many bodies and groups are working on different aspects of this problem. In response to the motion of the Federal Parliament "Strategy to fight against the shortage of doctors and encourage primary care medicine," the Federal Council published a report in which it was proposed to increase the annual number of physicians educated in our Universities from the current 800 to about 1200-1300. In this context, Swiss Universities were invited to submit proposals to increase their training capacity.

Solving this problem is likely to require two approaches: first, the increase in the total number of physicians trained in Switzerland and second, the implementation of a strategy rendering the training and activity of GP financially, practically and socially more attractive. Over the past decades, the image of the GP has lost much of its value, which can be explained both by the difficulty of finding a balance between work and private life and by the lower personal income compared to specialists. In fact, the current organization of the health system promotes the training of specialists.

In November 2012, a General Councilor (R.A. Schmid, Dr. med.) of the Canton of Fribourg submitted a motion to the State Council asking to immediately analyze the means and the time required for the completion of a master’s degree in human medicine (MMed) at the University of Fribourg and to initiate the process leading to its realization. In April 2012, the State Council responded by rejecting the motion but at the same time proposing to launch a feasibility study on the establishment of a master program in human medicine in Fribourg oriented toward primary care medicine. The Rectorate of the University has received the mandate to lead this study and to give a response by May 2014. This mandate will be delegated to a working group that includes representatives of the DepMed. Input of a specialist in such issues will be necessary.

The DepMed, the HFR and the RFSP view very favorably the possibility of extending the curriculum in Human Medicine in Fribourg with a Master program. We see the establishment of a Master in Medicine (MMed) in Fribourg as one of the main strategic goals for the next decade to reposition the DepMed, the University and the Canton in the Swiss context of medical training.
While the feasibility study will precisely define the advantages, limitations, requirements and options of such a project, we briefly mention here key relevant considerations:

- The project would be a unique opportunity for the University of Fribourg to propose an innovative approach to educate and train GP in Switzerland, which could become a Swiss (or even international) standard. This project should initiate a general discussion on how to reorganize medical education and training in Switzerland.

- The project will require a full collaboration between the University, the DepMed, the HFR and the RFSM. Other Swiss Universities will also need to be consulted in order to achieve a national coordination. Financial and structural support (instructor positions, premises, administrative support) to the University, the DepMed, the HFR and the RFSM needs to be allocated, including a common building for teaching (see 5.3.5. New buildings).

- The project would allow the University, and the DepMed in particular, the HFR and the RFSM to find a profile distinct from those of the other Swiss medical Universities which is more oriented toward specialized medicine and clinical research. In this perspective we foresee a MMed in Fribourg that would be complementary to existing programs at national level.

- As the University would not be able to ensure Master education to the full cohorts of students finishing the Bachelor in Fribourg, many students (about 50%) will still pursue their MMed elsewhere. This raises the possibility of developing a Master in cooperation with a partner University or with one of the other cantons considering the creation of a Master school (Ticino, Lucerne, St. Gallen).

- In the mid-term, the clinically-oriented profile of the teaching and research activities, the close involvement of partner institutions (HFR and RFSM) and the necessity to be equally represented among other Swiss Faculties of Medicine would require converting the current DepMed into a Faculty of Medicine.

In short, the implementation of a Master curriculum in Medicine with emphasis on General Medicine favoring the education of general practitioners would be a historical opportunity for Fribourg to take over a leading role in promoting the education and training of GP. Measures at national level and modification of the health care system to value GP will however be a prerequisite.

5.1.1.4. New teaching technologies (e-learning)

The DepMed still has traditional structures and methods in teaching. For some areas of teaching, especially laboratory-based practical and skills teaching, this is certainly beneficial to the students, including the laboratory courses in anatomy, histology, physiology and pathology. Plenary lectures still play a crucial role in medical teaching, which will certainly continue, as all students are on campus and able to attend lectures and laboratory sessions. Nevertheless, teaching domains of the Department have been pioneering and innovative in the area of e-learning (e.g. www.embryology.ch). New faculty members have recently brought additional e-learning expertise into the Department (Filgueira, Bourquin) and new ways are being explored in the context of 3rd year medical teaching (for instance in clinical skills, pathology, and pharmacology). The DepMed will collaborate with the Unifr NTE center (Nouvelles Technologies d’Enseignement) for developing E-learning strategies and programs.

The main goal of e-learning is to provide additional learning experiences to the students which cannot be provided by traditional teaching methods, as well as to enhance and complement traditional ways of teaching. Furthermore, e-learning shall allow more self-directed learning, independent of timetable and teaching staff constraints. However, e-learning will be fully integrated in the curricular program to avoid overloading of teaching
content and learning hours. For example, the online anatomy learning program ([http://130.60.57.53/anatomy/Anatomy.html](http://130.60.57.53/anatomy/Anatomy.html)) is mainly used by the students for the preparation for the practical anatomy courses and for revision before the exams.

The DepMed will provide substantial support for future development of own new e-learning programs. But it will also support acquisition of e-learning programs developed by the teaching industry, as well as by other academic institutions or non-profit organizations (e.g. HSet). In that respect, exchanges of e-learning material between Fribourg, Bern, Lausanne and Zurich already took place.

### 5.1.1.5 Lecturers

To relieve professors from teaching duties, the DepMed may create lecturer positions in selected situations, particularly to contribute to teaching at the undergraduate level. The creation of new lecturer positions can however take place only if additional funding is specifically provided in the future. The DepMed does not endorse the conversion of “maître assistant” positions, covering both research and teaching activities, to lecturers that contribute largely only to teaching. The DepMed considers an active research activity as an important element for teaching staff at the University level.

### 5.1.1.6 Teaching Clinical Skills

With the creation of the 3rd year of medical studies in Fribourg, a Competence Center for Clinical Skills was set up under the supervision of a Medical Educator. In close collaboration with the Fribourg Hospital (HFR) and the Fribourg Health College (HEdS), this Center provides state-of-the-art teaching and evaluation of clinical competencies by simulating clinical situations. The complex infrastructure includes simulation rooms and equipment (resuscitation models, suture and injection material), simulated and standardized patients trained individually to specific clinical situations, a training course for tutors, and an evaluation system based on objective structured clinical examination (OSCE).

This Competence Center was set up in St. Justin on the Miséricorde campus in 2009. The Center is under expansion as an additional floor in St. Justin is currently being renovated to provide more simulation and tutoring rooms. A move to new rooms on the campus of Pérolles is planned in 2017.

The DepMed is furthermore participating in the development of a learning center for Clinical Competence of the Canton of Fribourg, « Centre fribourgeois d’apprentissage et d’évaluation des compétences cliniques en Sciences de la Santé », mandated by the Canton that should provide services to different entities within the canton. A commission including six Fribourg institutions and presided by the DepMed is working on a project that will be presented to the authorities in December 2013.

In order to improve and diversify the pedagogical approaches to clinical skills, the DepMed is introducing online resources as a complement to face-to-face teaching. A balance between these two teaching modalities will need to be defined. A new web page containing different types of information and educational resources for both students and teachers on learning and assessment of clinical skills will already be available for the academic year 2013/2014.

### 5.1.1.7 Teaching of Medical Biochemistry

In 2010, five professors of Biochemistry left the DepMed to join the Department of Biology (DepBiol). Although these colleagues still contribute to DepMed teaching (according to a gentleman agreement signed at the time of the separation), we are concerned about the sustainability of their contribution on the long term. This concerns particularly the teaching in medical biochemistry, which is currently provided by Prof. Andreas Conzelmann (a physician by education), who will retire in the near future. Biochemistry is a key element of
the medicine curriculum, and therefore depending on the choice in the profile of Prof. Conzelmann’s successor, the DepBiol and the DepMed will have to collaborate on the maintenance of a training in medical biochemistry of high quality offered to the medical students. The DepMed is willing to collaborate with the Department of Biology in order to find an optimal compromise for the different aspects involved (research, teaching).

5.1.1.8. Doctoral Theses in Medicine (M.D.)

Every year, an important number of graduate and postgraduate students complete a doctoral thesis in Medicine under the supervision of DepMed faculty members, many of whom are themselves physicians and medical doctors (M.D.). At present, the DepMed and the Faculty of Science are not entitled to deliver a Doctorate in Medicine, so that all M.D. titles are delivered by another University through individually set up collaborations. The current situation is disadvantageous for the DepMed and the University, as it prevents public recognition of research work performed in Fribourg by M.D. candidates. The DepMed has asked the Rectorate to assess the possibility to introduce the title of Doctor in Medicine (MD) and the combined title MD-PhD at the University of Fribourg.

5.1.2. Studies in Biomedical Sciences (BMS)

Studies in BMS (launched in 2006) are a highly successful study program for the education of scientists with a close connection to medical applications. The curriculum consists of a 3 years Bachelor program, conducted at UniFR, and a consecutive Master (18 months) that follows at the partner institution, the University of Bern. Student numbers have shown an increasing trend over recent years (Figure 3). To maintain teaching quality, the DepMed has made efforts to limit the access to this program (with a request to implement an entry test), which have so far not been approved by the political authorities. We are concerned that we may not be able to maintain the high quality of this program without such limitations, and will therefore intensify our efforts in this matter in order to convince the cantonal authorities of the necessity of this measure. A limitation of the number of students in the Biomedical Sciences would be adequate in order to possibly increase the number of students in medicine.
Figure 3: Evolution of BMS students since 2006. Note the large number of students in the first year (BMS1; due in part to the enrollment of students who failed the entry test in medicine and spend a year in BMS before re-trying the entry test in medicine after a year). The number of students in the second year (BMS2) is appropriate, with a nearly comparable number in third year (about 35 students in BMS3 on average). The dashed line represents the financial resources calibrated to a cohort of 60 students in BMS1 (increased from 20 to 60 in 2010-2011).

5.1.3. Specialized Master in Experimental Medicine (MExpMed)

The lack in Fribourg of a Master program to educate students issued from the BMS program but also to attract students who have completed their Bachelor in other Universities is perceived by the DepMed as a serious disadvantage for the possibility to train highly motivated students further and to identify promising candidates for a PhD training (see 5.1.5. Graduate School in Life Sciences). To fill this gap, the DepMed is currently planning a specialized, non-clinical Master program in experimental medicine (MExpMed), with emphasis on models of human diseases. It will provide education and training for a limited number of selected students in highly relevant topics of basic and applied biomedical research, in particular neurosciences, cardiovascular and cancer biology. In this Master Program theoretical courses are given during the first semester (common and specific modules). During semesters 2 and 3 students will work in the laboratory and take complementary courses (Figure 4). This is a non-consecutive Master that does not substitute for the consecutive Master for BMS students in Bern.

A main aim of this specialized Master program (MExpMed) is to provide extended practical laboratory training during the MSc thesis work. The location of the DepMed, which is situated in close physical proximity to other departments of the Faculty of Science on the same campus, is an advantage because close connections exist to research carried out in adjacent basic science disciplines such as physics, chemistry, biology or nanosciences. For the new MSc program, we aim to recruit students with BSc degrees in biology or related disciplines, as well as students who have completed a Bachelor in Medicine but wish to embark on a research-oriented career. This project has received positive evaluations from the Faculty of Sciences and the Rectorate, but is currently “on ice” because of the lack of funding. The Rectorate proposed that the resources freed by the closure of Pharmacy would be used to launch this new program. If funding can be secured, we are aiming to start with
the first cohort of students for the academic year 2014-2015. This program could be later integrated into the Life Science Center (see 5.2.1. Life Science Center).

5.1.4. Movement Sciences

After its creation and implementation, the consolidation of the Master studies in Movement Sciences is now taking place. This includes also adaptations of the Bachelor courses in order to provide a coordinated and harmonized education. Furthermore, the option “Health and Research” will be enriched by additional courses.

In addition, in the future we plan to establish a chair in “Sports Medicine”. This would not only link the Movement and Sport Sciences better with the rest of the DepMed but would also provide an opportunity to work more closely with the Department of Psychology. The main focus of this new chair should be on health-related aspects of movement and sport, for instance the primary and secondary prevention of diseases such as obesity, or in pediatrics. This new development will offer the possibility to implement in the MMed an exposure of the medical students to the domain of Sports Medicine.

Within the Master “Health and Research”, we plan to incorporate further courses that are specific to health promotion so that students have better options to choose courses they are interested in. Furthermore, it is planned to increase the visibility for these options and extend the exchange between curricula within the Department (e.g. between the BMS program and the master option “Health and Research”).

5.1.5. Graduate School in Life Sciences

Students enrolling for a PhD thesis at the Faculty of Sciences and carrying on their work in a laboratory of the DepMed are hosted in individual laboratories. Two PhD programs offer training of Ph.D. students with theoretical (i.e. dedicated seminars, structured journal clubs) and practical courses were established:

- A well-established interuniversity program in Neurobiology between the Universities of Berne, Neuchatel and Fribourg, that functions very well.
- A recently introduced SNSF-sponsored ProDoc program in Cell Migration in Immunology and Cancer between the Universities of Berne and Fribourg and the Institute of Biomedical Research (IRB) in Bellinzona. The SNSF support will end in 2015. A complementary support for 2014 has been already obtained from the Rectors’ Conference of Swiss Universities (CRUS). A proposal to secure funding and continue this program beyond the SNSF support phase is under consideration by the Rectorate.

These two programs currently host approximately 50 students and provide seminars, teaching and training modules that are open to all PhD students.

We propose to build on these two programs and to join efforts with the Department of Biology to launch a Graduate School in Life Sciences spanning across the two Departments. This graduate school should be part of the future Center of Life Sciences and federate all students enrolled for PhD theses in Life Sciences (see 5.2.1. Life Science Center). Current doctoral programs of the Department of Biology, such as the program in Population Genetics, would also be included in the graduate school. Additional Ph.D. programs related to life sciences from the same or other departments (Adolphe Merkle Institute, Department of Psychology) may be included in the future (Figure 5).

The funds necessary to run such a program include secretarial support (30% position) and a budget to organize seminars and practical courses. An administrator with scientific background will be needed, as well as travel funds.
5.2. Research

In the past, research at the DepMed has suffered from limited resources, a heavy teaching load and the overall small size of the Department compared to other Swiss and international institutions, hampering the recruitment of talented students and postdocs. In spite of the above limitations, research output in the fields of neurosciences, cardiovascular research and metabolism and biochemistry was nevertheless remarkable over the years.

The transfer of Biochemistry to the Department of Biology, the replacement of leaving professors and the arrival of novel competences in Clinical Medicine and Movement Sciences have considerably changed the balance of available expertise and opened a unique opportunity to redefine the research profile of the Department. We aim at making biomedical research in Fribourg more productive, attractive and visible in order to strengthen its integration and recognition in the national and international scientific landscape and to competitively recruit the best researchers. To reach these goals we propose the following measures.

5.2.1. Life Science Center

In 2009, in two documents named “Strategic Vision 2015”, the Departments of Medicine and Biology expressed a common interest in establishing a new research cluster in the area of Life Sciences called the Life Science Center.

The long-term purpose of the Life Science Center is to develop synergies between research clusters, to optimize resources, improve research and teaching and increase the visibility and attractiveness of Life Sciences at our University. Considering the small size of research in Life Sciences in Fribourg, compared to research at Faculties of Sciences and Medicine at other
Swiss Universities, it is for us important to reach a critical mass in order to position Fribourg in the Swiss and international academic landscape.

It should be emphasized that this would not be the only cluster involving multiple departments. An interfaculty Fribourg Center for Cognition was established in 2011 to coordinate research and teaching in cognitive neuroscience between the faculties of Science and Letters (see 5.2.9.2. Fribourg Cognition Center).

Within the Life Science Center we are considering cooperation at three levels:

A. Teaching

**Bachelor programs.** We aim at improving integration and coordination of teaching at the Bachelor level (Biology, Biochemistry, BMS, BMed and Movement Sciences). By integrating courses we will eliminate redundancies and decrease teaching load as well as optimize the engagement of competencies in specific topics (e.g. cancer, immunity, developmental biology, etc).

**Master programs.** Besides the existing masters in Biochemistry and Movement Sciences, the DepMed proposed the creation of a Master in Experimental Medicine (MExpMed). The Department of Biology has expressed interest in joining forces in this program and this possibility is being discussed in a working group (see 5.1.3. Specialized Master in Experimental Medicine).

**Graduate School in Life Sciences.** The Department of Biology has also expressed interest in joining forces to create a common graduate school. This will offer one single portal to students interested in doing a PhD thesis in Life Sciences in Fribourg, thereby increasing visibility and broadening the offer of host laboratories (See 5.1.5. Graduate School in Life Sciences).

B. Research

**Research clusters.** We will establish clusters of common topics of research to create novel synergies and opportunities. Clusters considered are: Neurobiology, Cardiovascular and Metabolism, Cancer, Immunity and Microbiology and Developmental Biology. These extended clusters spanning across Departments will be used to guide the recruitment of future professors in order to reinforce the different clusters, and to facilitate the recruitment of SNSF professors, MHV and Ambizione Fellows.

**Lectures, seminars and meetings.** Each department has own seminar series. We will coordinate these series and organize common seminars and meetings around the research clusters to foster discussion and communication.

**Common technical platforms.** Due to historical reasons, several infrastructures of common interest have been developed at multiple locations on the Pérolles campus. The increasing need of high-tech equipment or specific infrastructures, the need to supervise their use by trained personnel, the associated costs and the limited resources available, has forced us to reconsider the way such equipment and infrastructures are purchased, used, maintained and replaced. A working group including representative of the two Departments has been created to address this issue. Relevant infrastructures and equipment include:

- Animal hosting (including a unique primate facility in Switzerland). Several facilities exist on the campus and a new facility is under construction in PER 09. In the short-term, the coordination of their management at faculty level is under discussion. An animal welfare officer (AWO) under the responsibility of the Dean’s Office was recruited to oversee all faculty facilities. On the long term (i.e. within the Life Sciences Tower) we plan to create a large common facility (excluding primates).
- Cellular and tissue imaging.
- Flow cytometry. Three flow cytometers are already available on campus. The purchase of a cell sorter is under way.
- In vivo imaging for small animals.
- Tissue processing: Histology, Immunohistochemistry.
- Bioinformatics. A Bioinformatics service has already been established in the Department of Biology. Users of the DepMed participate in the financial support.

C. Location

A modular temporary building hosting three groups of the DepMed (Pathology, Pharmacology and Microbiology), and Bioinformatics is scheduled to open in 2015. This will create a first physical thematic cluster.

On the long term a common building hosting research groups with shared research interest (clusters) is planned on the Pérolles Campus (Life Science Tower) (see 5.3.5. New buildings).

5.2.2. Thematic clusters

Thanks to the extension of the medical curriculum to the 3rd year and the inclusion of Movements Sciences, the DepMed has become the department of the Faculty of Science with the highest number of professors (n=20). The current internal partition in teaching domains is historically derived from the former institutes of Anatomy and Physiology, plus the recent addition of Clinical Medicine and Movement Sciences. This structure still reflects a traditional teaching approach in which each discipline, although integrated with others in thematic modules, is largely taught based on own concepts and programs.

If one considers the development of clinical medicine and research toward multidisciplinary approaches, these historical divisions, although successful in the past, are becoming obsolete. Such an approach limits the development of truly integrative programs as well as the assimilation of research and teaching activities within a same theme.

We therefore plan to restructure the DepMed in thematic research clusters to reflect a more up-to-date view of medical teaching, which corresponds better to research needs for infrastructure and integration into a Life Science Center. Practically, we will move away from a compartmentalized vertical structure (disciplines) toward an open horizontal organization (thematic modules).

Based on currently available competences we foresee creating three clusters (Table 1 and Figure 6):

- Neurosciences
- Cardiovascular research, Metabolism and Endocrinology
- Cancer, Immunology and Microbiology
Medicine and Society is a fourth topic of teaching and research. This topic covers such large
domains of medicine that it is obviously positioned at the crossroads of the three clusters.

Research focus is needed because resources are limited. Also, clusters will facilitate
synergies among research groups and create a visible pool of activities attractive to young
scientists (Postdocs or SNSF professors). Clusters are useful for sharing equipment, and
improve chances of successful funding applications for large equipment (e.g. visual
neuroscience equipment by Neurosciences and the Department of Psychology, flow
cytometry/cell sorting by the Cancer – Immunology cluster; in vivo ultrasound imaging by
Cardiovascular Studies and Metabolism). Finally, clusters will be important to define
priorities and interactions within the planned Center of Life Sciences. Since a critical mass
of professors is needed to ensure proper functioning and continuity of each cluster, faculty
members recruited in the future to the DepMed must be able to contribute to one of these
clusters.

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Table 1: New structure of the DepMed in research thematic clusters (lines), with relation to
teaching domains (columns).
5.2.3. Thematic repositioning of the next chairs due for renewal

Over the period covered by the present strategic plan, three chairs (Systems Physiology, Neurophysiology and Histology) are up for renewal after retirement of the current full professors (Montani, Rouiller, and Celio, respectively). This will allow repositioning of the chairs in order to reinforce the new thematic research clusters. In this way, one chair (new full professor) can be attributed to each of the three clusters: Neurosciences, Cardiovascular and Metabolism, and Cancer, Immunology and Microbiology. In the latter cluster, this will be the long sought opportunity to recruit an immunologist, a choice that was already in discussion while defining the chairs in Clinical Medicine, but which was not realized. An immunologist will not only reinforce the Cancer, Immunology and Microbiology cluster but will also have ample possibilities to collaborate with many other scientists on campus. Also, he/she will take over immunology teaching, which is currently ensured by invited professors.

5.2.4. Established and emerging research niches

To endure in the face of strong competition from other Swiss Universities and beyond, one strategy is to focus on specific niches that are particular to Fribourg and provide a competitive advantage. For example, the DepMed has a strong tradition in a systemic approach to research in metabolism and cardiovascular physiology as well as in neuroscience research on the non-human primate (NHP) animal model. This latter research topic has received support from the CUS (Conférence Universitaire Suisse) in the form of the recently established “Swiss Primate Competence Center for Research” (SPCCR: www.unifr.ch/neuro/rouiller/SPCCR/welcome.html). UniFR is the leading house of the SPCCR, with the University of Zurich as partner institution. A budget of 1.4 Million CHF has been awarded for the 2013-2016 period, after which the funding will be taken over by the two partner Universities.

The recently established Movement Sciences also contribute to reinforcing the research niche in neurosciences. For example, a highly innovative virtual reality laboratory is currently being set up in which it will be possible to track and record body and eye movements and to manipulate sensory information (e.g., visual or auditory). This will allow using a variety of virtual scenarios to assess participants’ performance in a large range of perceptive and motor tasks, both in the sports domain and in everyday life situations (e.g., walking, driving, learning/re-learning).

Among the emerging topics, cancer, immunity and microbiology have a good chance to form a competitive cluster thanks to the newly recruited competencies that are highly visible in their fields. For these emerging clusters it will be particularly important to establish national and international connections through research programs (e.g. NCCR or EU-sponsored) and specific collaborations. We will also develop a strategy to attract junior research groups.

For renewal of professor positions in respective research clusters, established and emerging niche areas of research should thus be maintained and reinforced whenever possible.

5.2.5. Medical and clinical skills education

The department is developing a line of research in the field of medical education, conducted by the pedagogic team in collaboration with members of the HFR. The research proposal, in the form of a longitudinal study, aims at developing new approaches to support, monitor and evaluate the professional competences acquired by the medical students along the BMed training. Emphasis is put on the development and assessment of simulation methods, based on human subjects trained to simulate different pathologies and presented to the students (both for training and subsequently for the clinical skills’ examination at the end of the BMed).
5.2.6. Hosting junior research groups and fellows

In the past, the DepMed successfully recruited in the field of neurosciences several junior research groups and senior research fellows financed by external funds, either European or Swiss: 1 EURYI fellow (Rainer), 1 SNSF Professor (Lavenex), 1 SNSF Ambizione fellow (Schmidlin), 2 SNSF MHV fellows (Dominique Loffing, Pamela Banta-Lavenex); (excluding those recruited in Biochemistry). More recently we have had a surge in requests from SNSF professor candidates. Competitive recruitment of excellent junior group leaders or senior research Fellows has now become a priority for the DepMed for the following reasons:

- Strengthen scientific research
- Obtain additional (external) financial resources
- Identify candidates for future faculty positions
- Improve national and international visibility and networking

We will focus on candidates that strengthen one of the defined research clusters or candidates that have the ability to create synergies between existing groups or clusters and integrate into the Life Science Center.

We aim at hosting one SNSF Professor, Ambizione and Marie Heim-Vögtlin (MHV) Fellow or ERC grant laureate per cluster at any given time. This means that in average every year we need to recruit one new Fellow. The major limitation in recent years was the lack of space to integrate new groups (a problem affecting the entire Faculty of Science). To be attractive relative to other Swiss universities, we have taken some measures:

- New laboratory space will be available in PER09 upon the termination of the modular building on square Charles-Aloyse-Fontaine in 2015 (see 5.3.5. New buildings).
- SNF Professors and ERC grantees will have full access to the Department budget. Additional resources (coming from SNF overheads) should be provided by the Rectorate to offer SNF professors additional positions (e.g. Ph.D. student), complementing their SNF grant.
- Discussion will be pursued with the Rectorate to offer funds for equipment at installation and also «Tenure track» positions to SNF professors in selected cases, for example in view of the replacement of a retiring professor.
- Ambizione and MHV Fellows will be integrated into research groups (although conducting their independent projects) and will benefit from existing infrastructure. For MHV Fellows the University (Rectorate) formerly provided a salary for a third year, employing funds reserved for the promotion of women in science. The DepMed will ask the Rectorate to reactivate such crucial prolongation support.
- We will actively advertise openings through the Department web site, in scientific journals and by personal communication with peers.

5.2.7. Physical clustering based on research topics

At present, the groups of the DepMed are distributed in 7 different buildings on the Pérolles campus. Only a few groups already benefit from some proximity. On the mid-long term it will be important that research groups belonging to the same cluster are hosted in close proximity. A first step in this direction is made possible by the construction of a modular building on square Charles-Aloyse-Fontaine in the center of the Pérolles campus. This building will host three groups of the Cluster “Cancer, Immunity and Microbiology” (i.e. Pathology, Pharmacology and Microbiology). The Bioinformatics group and service facility, affiliated to the Department of Biology, will also be hosted in this building.

On the long term, a new building (Science Tower) hosting all research groups of the DepMed and some groups of the Department of Biology is planned and scheduled to open at the horizon of 2025 (see 5.3.5. New buildings).
5.2.8. Scientific Advisory Board (SAB)

We have currently no advisory board for research activities at DepMed. An external survey from a SAB is becoming a frequent practice for research institutes worldwide, although it is generally in the form of a mandate emitted by the authority financing the research activities. This would not be the case here, as the proposal of SAB comes from the DepMed itself. As part of the effort to improve research and visibility and to define long-term strategies, we propose to create a SAB consisting of 3-5 external experts in our thematic clusters. The SAB would be invited every 3-4 years to give its opinion and to advise on ongoing research activities, strategic decisions and future developments. By its nature the SAB will have only an advisory role and no executive power. At times of budgetary restrictions it will contribute to strengthen credibility of the Department toward the University and political leadership.

We plan to create a SAB in 2014, by defining its role and identifying members and to call for a first meeting in 2015.

5.2.9. Research collaboration of the DepMed with other entities

In addition to structured interactions within the planned Life Science Center, a multitude of scientific interactions and collaborations between the DepMed and other entities are already ongoing and will be further pursued in the future (Figure 7).

Figure 7. Synopsis of interactions of the DepMed with other entities.

5.2.9.1. Faculty of Science

Close collaboration with the Faculty of Science is a structural advantage for the DepMed compared to the Medical Faculties of other Swiss Universities. Many groups already collaborate with other Departments of the Science Faculty, in particular Chemistry, Physics, Mathematics and Biology. These scientific interactions will not be affected by the increased structural and financial autonomy of the DepMed. Interactions with the Department of
Biology will be strengthened in the frame of the Life Science Project (see 5.2.1. Life Science Center).

5.2.9.2. Fribourg Cognition Center

The interfaculty Fribourg Center for Cognition was established in 2011 to coordinate research and teaching in cognitive neuosciences between the Faculties of Science and Letters (Department of Psychology). Current activities organized by the Center include joint supervision of bachelor or doctoral students, for example students from the psychology department that perform their thesis work in the DepMed. A yearly “Cognition Day” brings together researchers from both departments to exchange ideas and foster collaborations. There is considerable overlap not only in research interests but also in research methodologies, offering potential synergies in teaching beneficial to both departments. The neuroscience research cluster of the DepMed thus aims to enhance collaborative projects in both teaching and research with the department of psychology through the Cognition Center.

5.2.9.3. Adolphe Merkle Institute (AMI)

Interactions already exist between several groups at AMI and groups at the DepMed working on nanomaterials. Some of these collaborations are facilitated by the FriMat network of the Faculty of Sciences in the field of nanomaterials. The DepMed is very much interested in pursuing these interactions, and conversely, AMI is keen in interacting with groups at DepMed for projects involving nanomaterials and living cells and organisms. This strong interest resulted in the participation of the DepMed in the NCCR application on “Bio-inspired, stimuli responsive materials”.

5.3.9.4. Fribourg Hospital (HFR)

The DepMed supports research activities at HFR wherever possible. Several collaborative projects already exist in the field of neurosciences involving non-invasive imaging (MRI), in cardiology for the assessment of risk of heart attacks, and in movement sciences, for virtual reality tasks and computer tracking of patient movements. Projects in Oncology have also been established concerning clinical studies on biomarkers. Additional interactions are currently under way in the field of microbiology (antibiotic resistance). The DepMed has also provided access to research infrastructure at Pérolles for HFR professors and would like to extend this collaboration if space allows, since it is clearly beneficial to both institutions. Space in PER09 was already made accessible to a first group working on stem cells.

5.2.9.5. Fribourg Mental Health network (RFSM)

The joint appointment of the new professor of Psychiatry in our Department and as Médecin Directeur at the RFSM (Prof. M. Merlo) has opened new opportunities toward the development of research projects between the two institutions. A first joint project aimed at giving adequate support to the families of mentally ill patients by specifically educating care givers through interactive information and skills practice has been already initiated.

5.2.9.6. Fribourg Health College (HedS) and Clinical Skills Center

The department collaborates with the HEdS (Haute École de la Santé Fribourg) and the Clinical Skills Center to conduct research projects in the field of professional competences and simulation methods.

5.2.9.7. Federal Sports Center Macolin (HEFSM)

The federal sports competence center in Macolin is a key strategic partner of the DepMed in the area of teaching of UNIFR sports students at the Master level. An extension of this
cooperation to joint research activities between DepMed and HEFSM is desirable in the future.

5.3. Novel structure of the DepMed

The DepMed was created in 2001 from the fusion of the former institutes of Anatomy, Biochemistry, Histology and Physiology to establish a more integrative structure. The transfer of Biochemistry to the Department of Biology, the addition of the 8 chairs in Clinical Medicine, the implementation of the Bachelors in Biomedical Sciences (BMS), Medicine (BMed) and the curriculum Movement Sciences (Bachelor and Master), associated with a significant increase in the number of students registered (plus 300% since 2004), have dramatically boosted the administrative and executive workload of the DepMed. This burden will further increase in the future with the financial and structural autonomy of the DepMed as requested by the accreditation process.

In order to adapt to recent changes and future challenges we plan to modify the structure of the DepMed by reinforcing the President Office and the Pedagogical and Secretary Pool (Groupe Pédagogique et Secrétariat, GPS), enforcing the assignment of administrative tasks to members of the Department and adapting the positions of the local secretaries to their new additional responsibilities.

5.3.1 New Organigram of the Department

The Department will be organized in 3 thematic Research Clusters, plus Medicine and Society (Table 2). This theme-oriented organization has several advantages compared to the historical discipline-oriented organization, which impacts on the teaching as well. In particular it will:

- Facilitate the reorganization of teaching within each Cluster.
- Consolidate and strengthen research activities of the individual groups and create synergies among groups.
- Enhance visibility and attractively to recruit SNSF professors, Ambizione and MHV Fellows.
- Facilitate integration in the Life Science Center.
- Allocate resources based on teaching within each Cluster.
- Optimize the purchase, use and maintenance of common equipment.
### Thematic research cluster | Research groups
---|---
**Neurosciences** | Histology (B. Schwaller, PA)  
Neurophysiology (G. Rainer, PA)  
Neurology (J.-M. Annoni, PO)  
Psychiatry (M. Merlo, PO)  
Movement Science (W. Taube, PO)  
Movement Science (J.-P. Bresciani, PA)  
**Histology (M. Celio, PO, departure year not yet announced)**  
**Neurophysiology (E. Rouiller, PO, departure year not yet announced)**  
**Neuroanatomy (NN, PA, succession R. Kretz, from 2014)**  
**Topic to be defined (NN, PO, succession E. Rouiller, date to be determined)**  
**Sports Medicine (NN, PO, position still to be created)**

**Cardiovascular research, Metabolism and Endocrinology** | Anatomy (F. Theilig, PA)  
Physiology (Z. Yang, PA)  
Physiology (A. Dulloo, MER)  
Cardiology (S. Cook/M. Togni, PO/PO)  
Endocrinology (A. Lauber-Biason, PO)  
**Physiology (J.-P. Montani, PO, until 2016)**  
**Topic to be defined (NN, PO, succession J.P. Montani from 2016)**

**Cancer, Immunology and Microbiology** | Anatomy (L. Filgueira, PO)  
Histology (B. Schwaller, PA)  
Pharmacology (C. Bourquin, PO)  
Microbiology (P. Nordmann, PO)  
Pathology (C. Rüegg, PO)  
**Planned topic Immunology (NN, succession M. Celio, PO, date to be determined)**

**Medicine and Society** | A. Wenger, PO

Table 2: Planned structure of the DepMed according to thematic research clusters. The professors who will retire during this planning period are indicated in green. The attribution of their planned successors to the different thematic clusters are indicated in blue. The mid-term chair in Sports Medicine to be planned is indicated in red.

For current and newly recruited faculty members at the “associate professor” level, the DepMed aims to offer the perspective of promotion to “full professor” after several years. The criteria for promotion should be the performance both in research and teaching, as well as the integration into the DepMed with respect to administrative duties.

### 5.3.2 Reinforcement of the presidency, GPS and administration

In order to respond to the increasing burden of tasks and growing complexity of the DepMed, we specifically plan to (Figure 8; see annex 9 of the accreditation report):

- Implement a Presidium consisting of a President and 2 Vice-Presidents that will direct the Department.
- Create a position of assistant (adjoint) to the President, in charge of the management of the DepMed.
• Reinforce the secretarial support of the President’s office and of the teaching assistants (adjoints pédagogiques) (GPS).
• Systematically implement the distribution of tasks to members of the departments based on the already approved Matrix structure, which covers all tasks related to the administration, teaching and research (See Annex 7 of the accreditation report).
• Upgrade the position of the local secretaries in Anatomy, Physiology, Movement Sciences and one of the secretaries in Clinical Medicine to Sécretaires de direction.
• Define a representative for each of the 3 Thematic Clusters plus Medicine and Society for representation within the Department’s Committee and Council.

Figure 8: proposed novel structure of the Presidium, GPS and local secretariats of the Department (Presidium as of September 2013).

5.3.3. Resources

The major expansion of the number of students enrolled in the Department, the increase in the number of new research groups and the increase in the curricula offered, have only been partially compensated by a corresponding increase in the resources. This concerns in particular two critical issues:

Budget for large equipment. Large pieces of equipment (above CHF 100’000) are currently acquired though a common budget of the Faculty of Sciences. This budget has been dramatically cut when the budget restrictions imposed by the University to the Science Faculty took place in 2004-2007 (drop of CHF 700’000 per year). Now, with a contribution of the Rectorate taken from the SNF overheads, this yearly budget amounts to CHF 2.2 million. This budget includes the unique credit of installation of new professors (CHF 150’000 for PO and CHF 80’000 for PA), amounts that are dramatically insufficient in comparison to most other Swiss Universities or ETHs. Third party funding, in particular the R’Equip program of the SNSF is usually used to facilitate the acquisition of expensive equipment. However this approach has severe limitations as the R’Equip regulations require 50% of the sum in matching funds and stipulate that this funding instrument cannot be used to replace existing equipment. In addition,
we propose the following measures:

- to improve visibility for students and peers and gain public acceptance and political support,
- scientific institutions worldwide. This also concerns our University and the DepMed. In order to promote recognition and attractiveness of scientific institutions, we propose the following measures:

5.3.4. Visibility

Besides scientific productivity and communications in scientific journals and conferences, public visibility is becoming a critical issue to the promotion of recognition and attractiveness of scientific institutions worldwide. This also concerns our University and the DepMed. In order to improve visibility for students and peers and gain public acceptance and political support, we propose the following measures:

- **Communication to the scientific community.**
  - Improved DepMed web site. Research groups, events, resources, structure open positions, programs are openly presented.
  - Biannual Scientific report. A report covering the period 2011-2012 has been recently edited.
  - Research Day in Medicine. Since 2011 the DepMed and the Fribourg Hospital (HFR) are organizing a common research day in which Medical doctors, group leaders, postdocs and students are invited to present their results.
  - International conferences. Conferences in the field of obesity and metabolism, vascular biology, and cytoskeleton are regularly organized with great success.

- **Communication to the public.** There is great public interest in receiving communications on medical topics. We plan the following events, in collaboration with HFR and RFSM:
  - Public conferences on relevant medical topics, such as ageing, ethics, new therapies, personalized medicine, neurodegenerative diseases, cancer, psychosomatic medicine.
  - Columns and articles in the press. We will take opportunities based on published scientific results to convey information to the lay public. We have already started such a policy in collaboration with the press and communication office of the University.
  - Specific events. We will contribute to public open door events such as “la nuit de la science” or “la nuit des musées” to present our activities. In 2014 we will participate to the celebration of the 125th anniversary of our University with public events.
  - Cafés scientifiques: Members of the DepMed often contribute as experts in public forum discussions on various scientific themes.

- **Communication to politicians.** It is very important that our political leadership is fully aware of the value of the work performed at DepMed, but also of the
problems, current requirements and challenges we are facing. We plan here to improve the communication through:
  o Invitations to information sessions.
  o Establishing personal contacts with members of the General Council and State Council.
  o Increase our influence at the Senate of the University.

The planned Life Science Center will also significantly contribute to improving visibility among the scientific community.

In addition to external visibility, we will also improve internal visibility and communication of events and services. The following measures have been already implemented:

- **Information screens.** In the building of the DepMed additional screens have been installed to vehicle information of the DepMed and the University on news, events and services.
- **The DepMed web site** has been recently updated to communicate more detailed information on research, curricula and services. The site will be further improved and regularly upgraded in the future.

### 5.3.5 New buildings

The recruitment of the new professors in Movement Sciences and Clinical Medicine, the introduction of the Bachelors in Medicine and Biomedical Sciences and of the Movement Sciences curriculum, associated with a dramatic increase in the number of students (tripled in the past 10 years) resulted in an acute lack of space for both teaching (auditoria and laboratories for practical skills) and research (laboratory and common facilities) at DepMed. The move of Biochemistry to the Department of Biology has provided space to some of the Clinical Medicine professors, which are now located at Per09. Moreover, the groups of DepMed are spread out in 7 different buildings. An auditorium for teaching clinical disciplines and rooms for teaching clinical skills are located in St. Justin, on another part of the university campus.

In short, the DepMed is currently in a situation of severe lack of space. To resolve this situation, the DepMed works together with the Faculty of Sciences and the Rectorate to find viable solutions:

- **Preclinical teaching.** The largest auditoria on Pérolles campus have reached maximal capacity. For teaching students in Life Sciences a large auditorium is planned in the Life Sciences Tower. Alternatively, a Teaching Center with auditoria up to 400 places located underground in the center of the Pérolles campus is also under consideration.
- **Clinical teaching.** For the time being theoretical classes are given in St. Justin. In the future, clinical teaching might be integrated in the Life Science Tower. In the case of the introduction of a Master in Medicine (MMed), however, one may consider to bring the auditoria close to the canton hospital (HFR). While it is too early to envisage such an option, it is now part of the discussions related to the planned expansion of the HFR or the creation of a new Hospital on a different site.
- **Clinical Skills.** A new building for the HEdS of the Canton of Fribourg hosting a Center of Clinical Competence will be built near the Pérolles campus (Route des Arsenaux) and is scheduled to open in 2017. The University of Fribourg is partner of this project and the DepMed will have dedicated rooms to host Skill Labs. This unit will consists of 12 examination rooms (for simulated patients), 4 offices and a hall monitor and ancillary rooms. This will replace the current skill laboratories located at St. Justin. There is currently a plan to create an even more comprehensive center "Fribourg Centre for learning and assessment of clinical skills in Health Sciences"
involving six institutions of the Canton that are involved in teaching and assessment of clinical skills.

- **Research.** In order to rapidly create new laboratory surfaces and to thematically cluster some of the research groups, a modular building hosting three groups of the Cluster “Cancer, Immunity and Microbiology” (i.e. Pathology, Pharmacology and Microbiology), the group of Medicine and Society, the Bioinformatics group of the Department of Biology, plus rooms for practical exercises, the office of the Presidency, the GPS and seminar rooms is planned in the Square Charles-Aloyse-Fontaine in the center of the Pérolles campus. This building is scheduled to open in 2015. This building will free laboratories in PER09, which will be used to host junior groups, in particular SNSF professors and Ambizione Fellows.

- **A long-term solution** aimed at grouping all research groups of the DepMed and of the Department of Biology is under consideration (Figure 9 as far as DepMed is concerned). The construction of a new building (“Life Sciences Tower”) hosting all research groups of the DepMed and Department of Biology is currently envisaged. This tower will host research laboratories, common facilities, a common animal facility, auditoria and rooms for practical work. This building going in the line of the creation of a “Life Sciences Center” is planned for 2025.

![Figure 9](image)

**Figure 9. Planned regrouping of the research and teaching rooms of the DepMed on the Pérolles campus.** The modular building (Pavillon) on the square Charles-Aloyse-Fontaine will open in 2015, while a definitive clustering of all groups will need to await the construction of a Life Sciences Tower in 2025.

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**Annexes included in the accreditation report:**

Annex 8: Matrix structure of the DepMed
Annex 9: Additional human resources
Annex 14: Planification Life Science Center
Annex 15: Planification Life Science Center