SWOT analysis
(Montpellier Infectious Diseases, MID)
October 2011

A public/private task force to fight against infectious diseases
Strengths (1)

Researches in Biology, Health and Chemistry:
- A tradition of excellence in Medicine (and hospital cohorts)
- Good clinical research (in particular clinical investigations on HIV)
- A lead role in coordinating European projects for the South
- WHO collaborating centres (in parasitology; in vectors/insecticides; in HIV)
- Coordination of ANRS centres (Cameroun and Burkina-Faso)
- Major public partners (CNRS, Inserm, IRD, INRA, CIRAD, EFS, EID)
- Developments in the understanding of tropical pathologies
- Research excellence in ecology, cell biology and chemistry
- Developments at the Chemistry – Biology interface
- Developments of Biology-Ecology interface
- Pluridisciplinary studies of infectious diseases (including biophysics, bioinformatics, system biology)
- Diversity of research topic in infectious diseases
- 80 persons associated with the university hospitals (CHU) and 430 scientists in public research institutions, with high ranking publications

- Significant involvement in national assessment of research (several colleagues serve as President of national scientific commissions, and/or scientific councils)
General organisation

- Hospital CHU
- Ecological and Biological research
- Biosafety Labs (BSL3)

- Infectious Agents
- Screening, molecular Modeling, structural biology and chemistry
- Pathogens
- Animals (A3) platform
- Insects (I3) platform

Teaching and training

Clinical investigations

BioCampus platforms
- Genomic sequencing
- Fonc. Proteomics
- Structural Biol.
- RiolImaging

Chemical research

Research and drug Design

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Published papers and Citations
2000-2011 (after the IGMM/CRBM/CPBS InfoCom group)
Topic=(infectio*OR virus OR virology OR retrovir* OR parasitology OR parasite* OR bacteriology OR microbiology OR bacteri* OR mosquito*) AND Address

Montpellier
Results found: 5106
Sum of the Times Cited [7]: 82262
Sum of Times Cited without self-citations [7]: 73774
Citing Articles[7]: 90303
View Citing Articles
View without self-citations
Average Citations per Item [7]: 16.13
h-index [7]: 98

Marseille
Results found: 9326
Sum of the Times Cited [7]: 87660
Sum of Times Cited without self-citations [7]: 79776
Citing Articles[7]: 98956
View Citing Articles
View without self-citations
Average Citations per Item [7]: 17.44
h-index [7]: 101

Lyon
Results found: 6017
Sum of the Times Cited [7]: 115941
Sum of Times Cited without self-citations [7]: 105974
Citing Articles[7]: 79722
View Citing Articles
View without self-citations
Average Citations per Item [7]: 19.27
h-index [7]: 122

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Strengths (2)

High technology Facilities for infectious diseases:
- Numerous biosafety level 3 (BSL-3) and BSL-2 facilities
- Montpellier animal care network (RAM) including a biosafety A3 facility
- Biosafety 2 insect facility (I2)
- Cell therapy and gene therapy (viral vectors) unit
- National reference centre for Leishmania
- Coming up (2012): the CEMIPAI large BSL-3 laboratory – with bioactive molecules (antiviral molecules and antibiotics) screening platform, and confined imaging equipments
- Coming up (2013): Biosafety 3 insect facility (I3)

Several other platforms from BioCampus:
- Montpellier RioImaging (MRI)
- Functional proteomics platform
- Microarray/transcriptome platform
- Montpellier Genomix platform (MGX; high throughput sequencing)

Coordination of experts network: in infectious diseases
- CNEV : National centre for the study of vectors (Network of 39 partners)
Examples (among others) of high-technology facilities for manipulation of pathogens

Montpellier’ CIRAD BSL
- Laboratories BSL2: 600 m²
  BSL3: 250 m²
- Insect facility I2: 250 m²
- Animal facility A2: 188 m²

Montpellier’ CNRS RdM BSL
- Laboratories 8x BSL2: 250 m²
  CPBS BSL3: 100 m²
  IGMM BSL3: 50 m²
  CEMIPAI BSL3: 550 m²
Examples (among others) of high-technology facilities for manipulation of pathogens

The animal facility A3/BSL3 on the site of Triolet (UM2), which is integrated into the breeding center and conditioning experimental animal models (CECEMA) joint service of the university, is available to MID research groups since 2010.

Montpellier’ CNRS/Inserm/IRD, universities
- BSL2, 10x BSL3
- Insect facility I3 (to be built on the IRD agropolis site)

Montpellier’ Triolet animal facility (UM2 university)
- Animal facility A3: 350 m² (7 rooms for mice and rats storage; 8 rooms for microcebs storage; 4 laboratory rooms; washing room: 50 m²)
- Laboratories BSL3: 150 m² for bench experiences (including cell culture, histology, biochemistry, biophysics—spectrometry, fluorometry, HPLC-, microscopy)

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Strengths (3)

Partnerships with private companies:
- Partnerships and financial support have allowed basic research discoveries made by MID research teams (a consortium of more than 30 research teams) to be translated to diagnostic tools and new therapies
- Cap Gamma and Cap Delta, two business centres dedicated to biotechnology startups (incubated in MID research institutes)

Industrial partners in the region:
Sanofi-Aventis; Bio-Rad; Idenix; Horiba-ABX; Cezanne; Bausch & Lomb

- And several start up incubated in MID’s laboratories: Splicos (anti-HIV), Deinove with Deinol project (Biotechnologies using bacteria) and Deinobiotics project (Antibiotics), Metafora Biosystems (Viruses; metabolism biomarkers),…

Industrial partners outside the region:
- Abbott, Boehringer, GlaxoSmithKline, Merck, Pfizer, Roche, Schering-Plough, Bayer, Sumitomo,…
Partnerships with private companies and Startups

Oxeltis

Deinobiotics

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HIV clinical research: development and strategic use of antiretroviral therapy in partnership with private companies

- **New drugs in development:**
  Over the last decade, HIV/infectious diseases department of Montpellier University Hospital (CHU) has conducted (phase 2 or 3 international clinical trials) **14 new anti-HIV compounds** (2 protease, 4 RT, 3 integrase, 5 entry inhibitors) for **9 pharmaceutical companies** (Abbott, Boehringer Ingelheim, Gilead, GlaxoSmithKline-ViiV Healthcare, Merck Sharp & Dohme, Pfizer, Roche, Schering-Plough, Tibotec)

Other compounds for clinical trials against infectious pathogens were designed by MID laboratories such as the anti-HCV prodrog IDX184 (Idenix), anti-HBV telbivudine (Novartis), and an anti-malarial molecule (Sanofi)

- **Strategic use and complications of ART:**
  **ANRS clinical research center**
  - Scaling up Antiretroviral Therapy in **Resource-Limited Settings** (Cameroun, Sénégal)
  - **New strategies and HIV challenges:** new targets, residual replication-latency and functional cure; immune activation; inflammation and ageing; co-infections (HCV, HBV, leishmaniasis); cancers; antibiotics.
Strengths (4)

Attractivity for Students:
Montpellier ranks as the most attractive European city for business set up and running costs, and is very attractive for students (after KPMG consulting)

- 70,000 university students
- A large spectrum of masters in Biology and Health
- The ED 168 for PhD in Biology and Health
- The Sibaghe school for PhD in Ecology, Biology and Health (partnership with the Asian « Institut Pasteur du Cambodge »)
- A school for engineers in chemistry
- « CNRS-formation » national BSL3 training program
- Project for a collaboration between Universities « South triangle in infectiology » (Montpellier, Marseille, Lyon) and colleagues from the « Alliance for Emerging Infectious Diseases » (Wuhan Universities and CAS, China), signed March 23, 2009
Examples (among others) of collaborations between the University of Montpellier and South Asia

March 2009
Training of PhD students from the Wuhan Institute of Virology, CAS, China
Weaknesses

Research:
- Diversity of research topic in infectious diseases: a strength which turns sometime to be a problem for visibility

- Insufficient coordination and collaborations between the teams (but it moves quickly and positively with the development of the MID network)

- Insufficient development at the interface between biological and social sciences

Universities:
- The multiplicity of Universities in Montpellier (UM1-UM2-UM3) might hamper the internal coordination and blurred the exterior visibility

- Students in basic biology do not benefit enough from training in new fields such as systems biology and biophysics (yet, new courses are gradually introduced at the University)
Opportunities

Research:
- A new local dynamics for coordination and visibility: Montpellier Infectious Diseases MID network (and MID annual meeting)
- Coming up soon: the MID Website
- Coordination of large national and international projects, ie: CaribVet Network; EDEN and ENDENext european program; Culicoïdes and Bluetongue project; Gripavi national program; …
- Labex EpiGenMed Montpellier (with actions in infectious diseases)
- Labex CEMEB Montpellier (with actions in ecology and health)
- Equipex France-BiosafetyNet (confined imaging under evaluation); opportunity for collaboration with the CEA on atomic force microscopy (confined imaging)
- Institute for computational Biology (complex structures; under evaluation)

Institutions:
- Montpellier selected for the « Plan Campus »
- PRES UMSF: Infectious diseases identified as one of the three priorities of the universities in the field of Biology and Health
- The contract between the French ministry of research and the Languedoc-Roussillon region gave financial support priority to major Biosafety infrastructures
- « EuroBioMed » the inter-regional Health Sciences competitive cluster
- « Infectiopole South », thematic network for research and healthcare
- Synergy with local pharmaceutical and biotechnology companies.
Examples (among others) of large international projects: CaribVet; CRV-OI

- French Network on vector-borne Infectious diseases
- CARIBNET (Martinique, Guadeloupe, Bénin, Thaïlande, Cambodge)
- REMESA
- Resolab
- SEA Grease
- CaribVET (Guadeloupe)
  - Laboratories BSL2+: 200 m²
  - Animal facility A1: 190 m² with breeding of ticks

Sites with permanent position workers

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Examples (among others) of large international projects: EDEN/EDENEXT; Gripavi

25 M€ from EC-PCRD (PCRD 6 & 7)
46 partners, 22 countries
Example of MID research unit geographic spread in the South: the MiVEGEC geographic Scheme
Threats

Financial support reduced:

- The current financial crisis could have a major impact on financing of laboratories
- There is a risk that funding is concentrated on a few topics only HIV, TB, Malaria and recently emerged pathogens; this could exhaust the diversity of the projects

Attractivity of students:

- In Montpellier, surprisingly, there are three times more researchers with « HDR » allowed to supervise a PhD student, than PhD students in Biology. This is a consequence of very rapid growth in the number of researchers in biology in Montpellier, far beyond the training capacity of universities.
Conclusion

Main strengths:
- Excellence in medicine, biology, ecology, chemistry, biophysics
- A lead role in coordinating European projects for the South
- Diversity of research topic in infectious diseases
- High technology Facilities for infectious diseases (BSL3, A3) and I3 soon
- Several other platforms from BioCampus such as RioImaging (MRI)
- Coordination of experts network in infectious diseases (CNEV)
- Strong partnerships with private companies

Main weaknesses:
- Insufficient coordination and collaborations between the teams (but it moves quickly thanks to the MID network)
Diversity of research topic in infectious diseases: a strength which turns sometime to be a problem for visibility

Main opportunities:
- Developments at the Chemistry – Biology-Biophysics interface and strong partnership with private companies for drug design
- Developments of Biology-Ecology interface (origins of EID)

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