

# FOCUS

THE LYONBIOPÔLE BULLETIN

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LYONBIOPOLE

## Lyonbiopôle and the Guyana Tropical Health Cluster: high potential for collaboration

The Inter-Ministry Committee for Regional Development and Competitiveness (CIACT) meeting of July 5th, 2007 approved the project to create the Guyana Tropical Health cluster, backing it with support from the Lyonbiopôle world competitive cluster. This initiative aims to give French research increased international exposure by bringing together competitive clusters working in the same focus areas.

Geared towards emergency medicine, the Guyana Tropical Health cluster specializes in health monitoring and epidemiological analysis of tropical diseases.

On October 23rd, 2007, a delegation of leading Guyanese politicians and scientists was hosted in Lyon by Jacques Gérard, Prefect of the Rhône-Alpes region, and by the Lyonbiopôle team in order to pinpoint areas for scientific and technological cooperation between the two competitive clusters.

### A climate that favors the development of infectious diseases

Guyana's equatorial climate, characterized by high humidity (minimum 80%), favors the spread of infectious agents, particularly those carried by insects (malaria, dengue and yellow fever). In Guyana, increased travel for work, socioeconomic reasons or leisure can also favor the transmission of some illnesses. The geographic and demographic backdrop offers a valuable opportunity to understand and analyze the emergence and transmission of infectious diseases using the power of tele-epidemiology. This should enable authorities to determine and plan for the measures to be taken in the event

infectious agents spread and naturally evolve. Guyana is thus an excellent region for studying emerging diseases.

### Key figures on Guyana

#### A young population

Located between Brazil and Surinam, Guyana has approximately 220,000 inhabitants. This French territory (administrative equivalent of a county) features the highest annual demographic growth in France, i.e. around 3.5%. The population is very young: 44% of the population is less than 20 years of age, and only 6% of Guyanese people are older than 60 years of age.

#### A booming economy

Guyana's industrial sector and economy are booming: in addition to the space exploration activities on the launching base located in Kourou, the region is also home to a growing number of new companies. For several years, the country has exceeded the milestone of 1,000 new company creations annually, all sectors combined. Guyana features a highly active training center with some 2,500 students, 2,000 of whom are enrolled in continuous training programs.

#### High level of biodiversity

With its 84,000 sq. km./ 35,000 sq. mile surface area, Guyana is the largest French county. It is also France's most forested county, with 96% of the landscape covered by one of the world's most abundant tropical rain forests, home to rich animal and plant biodiversity.

### Key milestones

July 2007

Affiliation of the Guyana Tropical Health Cluster to Lyonbiopôle

October 2007

Lyonbiopôle welcomes a delegation of leading Guyanese politicians and scientists

December 2007

Guyana submits collaborative R&D projects to Lyonbiopôle

January 2008

First follow-up meeting in Lyon with Thierry Marie-Magdelaine, Competitiveness Clusters Coordinator

February 2008

Nicolas Sarkozy's official tour in Guyana. Jean-François Dehecq, sanofi-aventis Chairman, is appointed to steer an ambitious project on developing natural resources in Guyana

April 2008

Accreditation of the LEISHMAP project submitted to the National Agency for Research (ANR); research on finding new therapeutic leishmaniasis targets

July 2008

Submission of the report on the mission headed by Jean-François Dehecq to the President Nicolas Sarkozy



*The Menelaus Blue Morpho butterfly living in tropical areas as Guyana*

# Healthcare: Guyana's local strengths

**Guyana is one of France's few counties with such a large number of major French health research centers, thus fostering synergy and dialogue**

**Institut Pasteur** is a reference organization for the study of arboviruses (viruses transmitted by insects) including dengue, yellow fever and other illnesses such as the flu, as well as for the study of resistance to malaria. Public healthcare activities are concentrated at this institute, which features a laboratory that handles analyses specific to Guyana, such as tuberculosis and HIV. This activity has required the installation of Biosafety Level 2 and 3 laboratories.

**The CNRS** (The French National Center for Scientific Research) has had a facility in Guyana since 2002. The primary aim is to develop research in Guyana in the fields of ecology, environmental sciences, and human sciences thanks to support from several partners, including the French State, the region, higher education institutions (universities) and research organizations. With the CNRS actively working in the field in Guyana, the conditions for carrying out research are improving. This means less burdensome administrative procedures, a nearby decisionmaking center, and offices or laboratories that can host researchers on temporary missions. All of these factors hold great appeal for the international research community.

**The IRD** (The Institute of Research for Development) is a public scientific and technological organization, under the dual authority of the Ministries of Research and Foreign Affairs. It carries out three key missions: research, assessment and training. The Cayenne IRD takes part in European and international research programs in a variety of fields, ranging from the biodiversity of tropical rain forests and pharmacology of natural substances to remote sensing, botany and more. For these purposes, it features two multi-disciplinary laboratories,

a chemistry laboratory, (the Applied Mathematics and Analysis Laboratory) and a remote sensing laboratory (the Espace unit), as well as a number of research support services, namely a herbarium containing more than 130,000 samples of native plants from Guyana.

**INSERM** (The French National Institute for Healthcare and Medical Research) has been active in Guyana for only a short time, with the recent creation of a Guyana-French West Indies Clinical Investigation and Clinical Epidemiology Center (CIC-EC), headquartered in Cayenne at the Antilles Guyane University (UAG) Medical School. The aim is to bring together and optimize skills and human, material and financial resources around the topic of methodology in clinical trials and epidemiology. This program thus offers support for scientists from public organizations and industrial firms in their research.

A French organization, **INRA** (National Institute of Agronomical Research) is Europe's leading agronomical research institute, and is the second largest in the world. It carries out research programs in the fields of agriculture, food, the environment and regional management. Its primary mission involves better managing rural areas, natural resources and biodiversity. INRA counts 1,826 researchers, 2,396 engineers, 4,354 technicians and administrative staff, 1,634 doctoral students, 14 scientific departments and 20 regional facilities.

**Dynamic training centers strengthened by a hospital-university cluster at Cayenne's Andrée Rosemon Hospital**

Building laboratories and strengthening research teams is a priority that goes hand-in-hand with setting up a range of top-flight training programs, at Master's and PhD level, in Guyana's identified areas of excellence, i.e. tropical pathology, retrovirology in tropical areas, infectious and tropical dermatology, providing care in tropical areas, applied epidemiology in tropical areas and pediatric emergency care. Antilles Guyane University (UAG) Medical School, located in Cayenne, hosts a team led by Professor Bernard Carme that specializes in the field of tropical parasitology. It offers six university degree programs focusing on healthcare in tropical areas. In addition, the creation of the Guyana University Cluster (PUG) illustrates the shared willingness of local players and partners to develop higher education and research in Guyana. The aim is to create local scientific and technological know-how that can help the region to make a name for itself on the international scene: to host foreign researchers, to build international collaborative projects, to train high-level scientific managers, to produce expertise and to foster innovation.



*The Andrée Rosemon Hospital*

## **Cayenne's Andrée Rosemon Hospital is home to the LHUPM led by Professor Bernard Carme**

Since 2000, Cayenne's Andrée Rosemon Hospital has managed 21 healthcare centers (providing continuous medical care) and healthcare outposts (providing medical care on an occasional basis) in the county's remote areas. This medical center has 326 beds for general medicine, surgery, gynecology and obstetrics patients. At the end of 2006, the total headcount was 1,467 persons.

More particularly, the Hospital-University Parasitology-Mycology Laboratory (LHUPM) at Andrée Rosemon Hospital offers, in addition to the purely academic teaching and research activities (six university degree programs focusing on healthcare in tropical areas), training programs for hospital medical and paramedical staff assigned to the healthcare centers, as well as epidemiological monitoring of endemic local parasites. The Bernard Carme's team has access to the Hospital's P3 high security level laboratory.

# Areas for scientific and technological cooperation between the two competitive clusters

## Lyonbiopôle will bring the Guyana cluster its expertise

in setting up R&D projects and, if required, will accredit the cluster in order to help it more easily obtain funding.

## The Tropical Health cluster will provide in-the-field expertise

in diseases such as dengue fever, malaria, Chagas disease, skin diseases and more. The data collected in Guyana in favorable technical conditions will be precious in setting up large-scale tropical studies.

From a medical standpoint, in-the-field researchers and practitioners will be involved in the R&D projects in order to take isolation and local customs into account.

## Target markets

Guyana can be used as a model for all of Latin America and South America. Indeed, the county's humidity and temperature are characteristic of the inter-tropic climate over a wider area. Although the Guyana market in itself is small, it is

representative of the needs of countries within the inter-tropical zone, which form a market of worldwide scale.



*The Guyana University Cluster (PUG) at Troubiran*

# Aims for closer cooperation

## 1- Develop industrial partnerships and complementary training programs

### Public/private research collaborations

Research activities conducted in Guyana on biodiversity and infectious diseases generate a need for support services that can be developed in partnership with local SMBs or rely on groups already set up in France. One example, Institut Pasteur's collaboration with Lyon based microbiology service provider Bactup, which maintains and preserves its collections of micro-organisms and biological molecules, is a good illustration of future opportunities for exhaustive studies on biodiversity.

In the long term, we can even foresee the creation of biotech firms that provide marketable products derived from Guyana's natural resources.

### Infrastructures in South America

Guyana's geographical position enables Europe to set up research facilities in South America that can serve as a support for collaboration between Europe and Brazil or other Latin American countries.

### Training programs

Two types of training could be provided:

- Training programs on infectiology developed by Lyonbiopôle could include Guyanese students
- Guyana is the ideal place for conducting in-the-field studies in parasitology and tropical virology. Medical students from Grenoble and Lyon could be offered semester-long courses in parasitology at the Cayenne Hospital on a regular basis.

## 2- Build a Biodiversity Institute in order to make the Tropical Health Cluster an international reference

### Creation of a reference database on Guyana's biodiversity using tele-epidemiology

This is a multi-criteria modeling project that consists of a system to manage various kinds of data in fields ranging from space to molecular biology. This tool is designed to anticipate epidemics (tele-detection). It will include data collection, modeling and testing of simple models.

The quality of the data, namely during collection, is primordial and will require support from people with in-the-field experience.

### Setup of a facility to study biodiversity

In the first phase, this ambitious project aims to build a combinatorial library using plants from the traditional materia medica, as well as a gene library in collaboration with geneticists from research facilities located in Guyana, such as Institut Pasteur or INRA.



# The structure of the Tropical Health cluster

The Tropical Health cluster is governed by three entities:

## The Governing Board

Responsible for twinning the Tropical Health cluster with Lyonbiopôle, as well as for mobilizing the various players to encourage collaboration

## The Strategic Committee

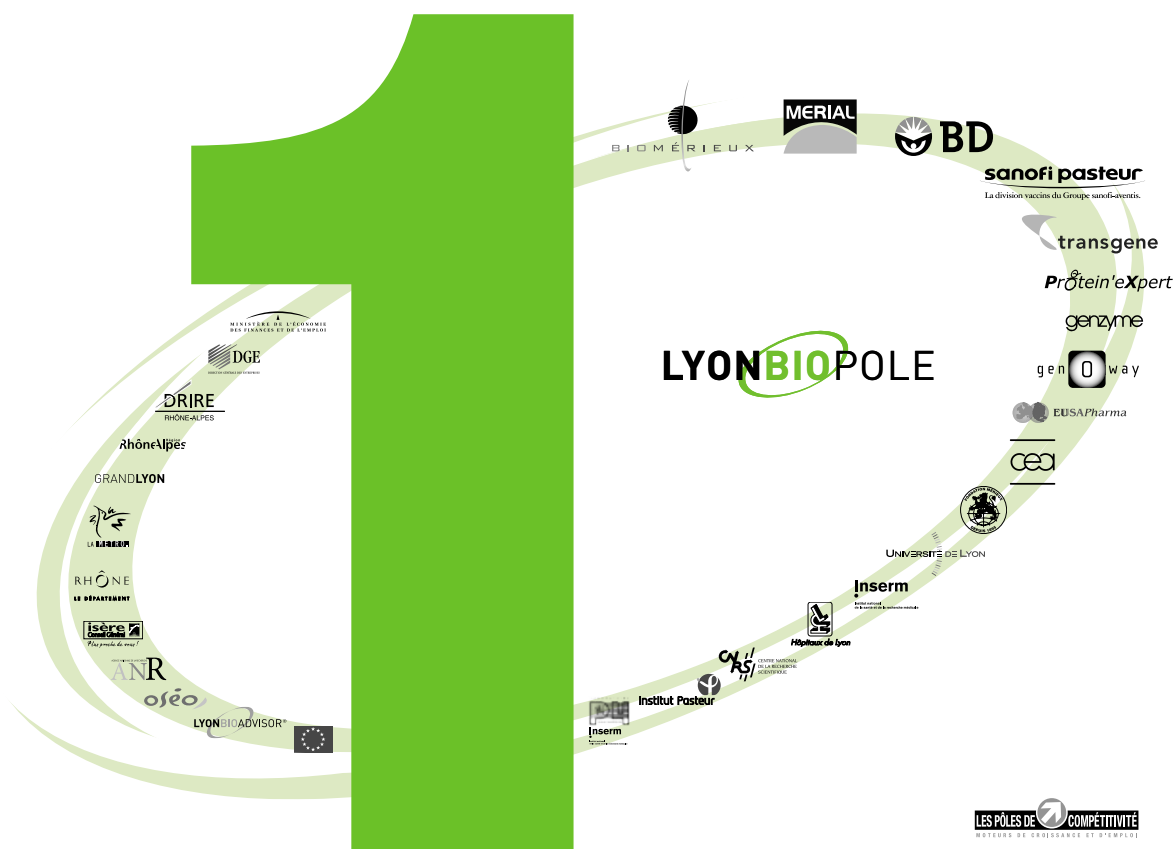
In charge of identifying and setting up collaborative projects

## Guyane Technopôle

In charge of running the cluster

## The main players

- French Development Agency (AFD)
- Regional Hospitalization Agency (ARH)
- Guyana Chamber of Commerce and Industry
- Andrée Rosemon Hospital
- National Center for Space Studies
- Guyana Space Center
- National Scientific Research Center (CNRS)
- Guyana General Council
- Regional Delegation for Research and Technology (DRRT)
- Guyane Technopôle
- Institut Pasteur
- Institute of Research for Development (IRD)
- Lyonbiopôle
- Guyana Regional Healthcare Observatory (ORSG)
- Guyana Prefecture
- Guyana Region
- General Secretariats for Regional Affairs (SGAR)
- Antilles-Guyana University (host team EA3593 - PUG)



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