The Institut Pasteur
and the Institut Pasteur
International Network

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The Mediterranean rim

« Knowledge is the heritage of humanity »
Louis Pasteur
The Mediterranean rim

Installed in eight countries of the Mediterranean rim, the Institut Pasteur International Network (RIIP) conducts numerous collaborations with various healthcare and research bodies in the countries concerned. The actions undertaken by the international network aim to strengthen research and training and help in the fight against the major diseases that affect the region.

> A number of collaborations

The Institut Pasteur has forged strong links in the Mediterranean with seven member institutes from the Institut Pasteur International Network in the Euro-Mediterranean region: Algeria, Bulgaria, Greece, Italy, Morocco, Romania and Tunisia. It also has a privileged relationship with various research and healthcare bodies in Israel, Egypt and Lebanon.

The aim of these partnerships is two-fold:
- scientific collaboration in the face of similar problems and contribution to training and teaching
- participation in the development of a Euro-Mediterranean forum for health and solidarity within the context of the Union for the Mediterranean.

Presentation of the region
Members of the Union for the Mediterranean (UPM)

- Member states of the European Union and UPM
- UPM Member States
- Observer State
- Institutes from the Institut Pasteur International Network
RIIP research in the Mediterranean

The huge healthcare issues in the region form the subject of basic research, surveillance and public health programmes.

> Viral hepatitis

Research into the genetic diversity of the hepatitis B virus and improvements in diagnosis connect several teams in Paris, Athens and Romania, opening up new perspectives in the development of a vaccine.

The programmes conducted also feature:

- interaction of the C and G virus with their host cells (Paris, Tunis, Athens),
- the development of bioinformatic tools of analysis (Institut Pasteur - Cenci Bolognetti Foundation),
- the epidemiological study of hepatitis E (Morocco, Algeria, Tunis),
- the impact of vaccination on the epidemiology of hepatitis B (Tunis, Morocco),
- the aetiologies of hepatocellular carcinomas (Morocco, Algeria, Tunis, Paris).

> Tuberculosis

The Institut Pasteur International Network is involved in national programmes in the fight against tuberculosis and plays an active part in the diagnosis and surveillance of this infection, especially in Algeria, Morocco and Tunisia.

They participate in research into new anti-tuberculosis vaccines, the epidemiology of and genetic susceptibility to this disease. Finally, in collaboration with the Institut Pasteur in Paris, they study the mechanisms for acquiring resistance.

EpiSouth is a network of epidemiology laboratories

- Objectives: surveillance of transmissible diseases across 27 countries in the Mediterranean and Balkans
- Three axes of surveillance:
  - epidemic surveillance,
  - vaccine-preventable diseases,
  - emergent zoonoses.

Within this project, the Institut Pasteur is involved in the creation of a network of reference laboratories.

To find out more: www.episouth.org
> Viruses and cancer
The activities of the diagnosis laboratories on viruses and cancers focus on:
• the Epstein-Barr virus associated with cancer of the nasopharynx and lymphoma;
• the papilloma viruses associated with cancer of the neck of the uterus (physiopathology, screening, vaccination and treatment);
• the viruses responsible for herpes, especially in the context of opportunistic AIDs infections.

> Genetic diseases
Several diseases are studied in the various institutes of the network and may become part of an inter-institutional collaboration:
• thalassaemias and disorders of the red blood cells;
• neurosensory disorders (deafness and retinitis pigmentosa);
• infertility;
• diabetes.

> Leishmaniasis infections
An international-scale project is being conducted jointly by Athens, Paris, Tunis and Morocco. This project aims to develop epidemiological studies, and tools for the diagnosis and control of Leishmaniasis infections. In parallel, it will study the clinical expression of the disease in order to improve vaccination, and will also examine the biology of the parasites, their diversity and virulence.
Another project, coordinated by the Institut Pasteur in Tunis, analyses the cellular and molecular processes which may underlie the resistance or sensitivity of mice to the infection.
> Rabies

The Institut Pasteur International Network has two anti-rabies vaccination centres in the region, in Morocco and Algeria, to treat people who have been in contact with suspect animals. In addition, the institutes in Algeria and Tunis are involved in the development of new vaccines.

The network is also concerned with epidemiological studies. A team in Paris, in association with the Mateu Orfila Foundation of the Balearic Islands and the University of Barcelona, is studying the infection dynamics of colonies of bald mice in Spain.

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**Controlling rabies**

The RABMEDCONTROL project of the European Union involves a number of research, public health and veterinary institutions in nine countries in the Mediterranean rim.

The aim of the project is to:
- collect epidemiological and virological data on human and animal rabies in North Africa;
- clarify the epidemiology of this infection;
- prevent the disease;
- treat the disease.

The research will enable a better understanding of the ecological aspects of dog and Chiroptera populations (bald mice), as well as the human behaviours that influence the dynamics of rabies.

These multi-disciplinary data will then lead to recommendations for controlling rabies in North Africa.

The Institut Pasteur, the Institut Pasteur in Tunis, the Institut Pasteur in Morocco and the Institut Pasteur in Algeria are actively involved.

To find out more: [www.rabmedcontrol.org](http://www.rabmedcontrol.org)

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> Venoms and toxins

Venoms provide a wide area for investigation and have a number of biological effects: toxicity, coagulation, anti-coagulation, haemorrhage, necrosis, oedema.

The institutes in Algeria, Morocco and Tunis, which produce anti-venom sera, were recently linked to research novel compounds for therapeutic use and the optimisation of sera, with the support of the WHO.

Within the framework of a second programme with the teams in Tunisia, the toxins isolated from scorpion venom have advanced research into autoimmune diseases such as multiple sclerosis, type 1 diabetes and rheumatoid arthritis.
Training

The Institut Pasteur International Network also has the mission of strengthening the human resources capacities in the countries of the Mediterranean rim.

Research training programmes (specific teaching, workshops) are developed in partnership with the universities and other local parties. Initially intended for researchers in the network, they are now accessible to all.

> Diverse teaching and training

- **Immunology**: advanced course on Mediterranean Immunology, « From basic immunology to antiparasitic immunology» (Algiers) and course in immuno-physiology of infections (Algiers), in partnership with the French Association of Immunology (SFI).

- **Mycobacteriology**: course in medical mycobacteriology and training in mycobacteriological techniques (Algiers). This programme is financed by the Institut Pasteur, the WHO and the International Union in the fight against Tuberculosis and Respiratory Diseases.

- **Bioinformatics**: Bioinformatic analysis of sequencing data (Casablanca); Bioinformatics and comparative genomic analysis (Tunis).

- **Resistance to antibiotics**: basic courses on the mechanisms of resistance to antibiotics, practical studies based on the discovery and identification of genes of resistance (Casablanca).

- **The EPIM programme**: (Epidemiology of intervention and applied informatics in the countries of the Eastern Mediterranean which border rivers) initiated by the Institut Pasteur, in partnership with the Agency for Preventative Medicine (AMP), aims to strengthen epidemiological surveillance in this region.
> The main healthcare issues

• **Tuberculosis** is still the most deadly disease among adults in the Eastern Mediterranean, where it causes more than 110,000 deaths each year.

• **Leishmaniasis** infections are caused by various parasites of the Leishmania species and are transmitted by the bites of sandflies that are very widespread in the Mediterranean area. These bites cause very debilitating skin or visceral infections, which may even prove fatal if not treated.

The countries of the Mediterranean are affected to varying degrees by:
• all the **viral hepatitis** types known to date (A, B, C, Delta, E and G).
• **poisoning** due to scorpion or snake bite in the Maghreb and Near East, which represents another serious public health issue due to the frequency and severity of the cases.

These countries are also facing an increase in the number:
• of **cancers**
• of **genetic diseases** (diabetes, infertility etc.) into which several teams from RIIP are undertaking studies.
Institut Pasteur: a worldwide presence

A certified not-for-profit private foundation, the Institut Pasteur exercises three missions in the service of the public good since its creation in 1887: research, public health, and training.

At the nexus of several disciplines, including microbiology, immunology and molecular biology, it is one of the foremost centres of biomedical research worldwide. Ten Pasteurian scientists have been named laureates of the Nobel Prize in physiology or medicine.

Open to the world, the Institut Pasteur is at the heart of an International Network of some thirty institutes on every continent, most of which are independent entities governed by their national authorities.

These institutes are associated by partnerships and cooperation agreements covering scientific research, training and public health services, and they share common values and objectives.