

# H U B V P H

## VETERINARY PUBLIC HEALTH IN THE LYON AREA



January 2020



Lyon Veterinary Public Health Initiative



## Summary

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- **HUB VPH, Lyon Veterinary Public Health Initiative**
- **Value Chain of the Veterinary Public Health Industry in the Lyon area**
- **Lyon, birthplace of Infectiology, Vaccinology and Veterinary Public Health**
- **Education: Lyon, home of the oldest Vet School in the World**
- **A World-Class Research in Veterinary Public Health**
- **World industry leaders in Veterinary Public Health and a dense network of specialized SMEs and start-ups**
- **Networks & supports: Lyon, a very attractive location for R&D**



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Lyon Veterinary Public Health Initiative

# HUB VPH

## Lyon Veterinary Public Health Initiative

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- ❑ Launched on January 14th, 2020, the HUB VPH is the **world's leading** Veterinary Public Health hub.
  - ❑ Veterinary Public Health covers **major health, economic and social issues**
    - ❑ 60% of infectious diseases in humans originate from animals
    - ❑ +200 known diseases of animal origin are a proven threat to human and animal health
    - ❑ 20% of global animal production lost to infectious diseases
    - ❑ \$200 billion over 10 years: global economic impact of epizootics
  - ❑ **Custodian of a long tradition** in veterinary medicine and the cradle of infectiology and vaccinology...
  - ❑ ...Lyon intends to establish itself as **the reference territory** in Veterinary Public Health.
- ❑ **An outstanding public-private initiative** supported by Aderly, Région Auvergne-Rhône-Alpes, BIOASTER, Boehringer Ingelheim, Institut Mérieux, Lyonbiopôle, Métropole de Lyon, Université de Lyon and VetAgro Sup
  - ❑ **Priorities** focusing on **a few main areas**
    - ❑ Promotion of the concept of Veterinary Public Health and animation of a community of international experts,
    - ❑ Creation of an industrial chair for teaching and research in Veterinary Public Health supported by Boehringer Ingelheim, the CNRS, University de Lyon, University Claude Bernard Lyon 1 and VetAgro Sup.
    - ❑ Strengthening the region's attractiveness to innovative companies in the field of Veterinary Public Health supported by Aderly
    - ❑ Encourage vocational training to meet the challenges of companies in the field
    - ❑ Organizing and attracting major international events

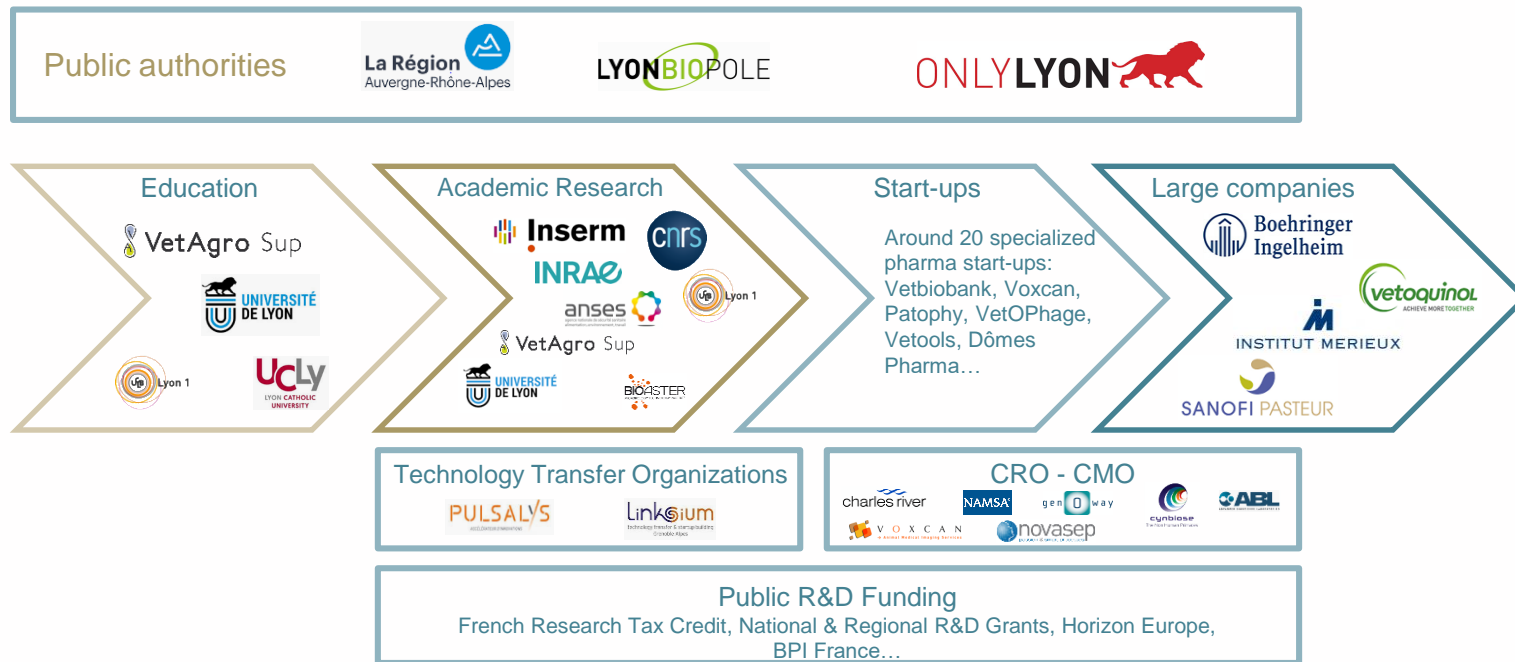




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# Value Chain of the Veterinary Public Health Industry in Lyon area





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# Lyon, birthplace of Infectiology, Vaccinology and Veterinary Public Health

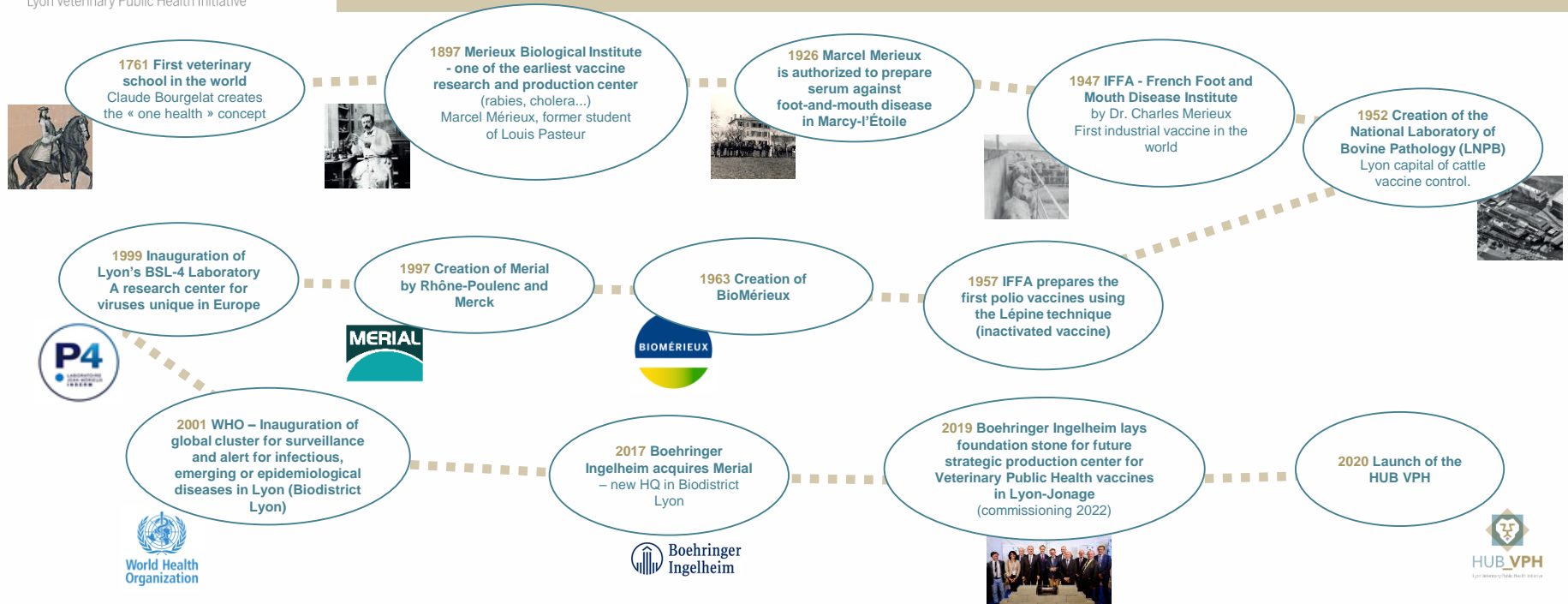




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## Lyon, birth place of infectiology, vaccinology and veterinary public health



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# Education

Lyon, home of the oldest  
vet school in the World





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## Workforces raised by higher education with expertise

### Lyon

- 2<sup>nd</sup> higher education and research center in France
- 150,000 students, 13,300 researchers, 168 labs
- University of LYON three priority themes:
  - Bio-Health and society
  - Science and engineering
  - Humanities and urbanity



### Region Auvergne-Rhône-Alpes (outside Lyon)

- 4 universities: Grenoble, Clermont-Ferrand, Saint-Etienne, Chambéry
- 150,000 students



Over 15,000 Life Sciences students...  
...and new 150 PhD students per year



Université Claude Bernard  Lyon 1

- Dept. of Chemistry and Biochemistry
- Dept. of Biology (Master's degrees)



VetAgro Sup

- One of the Four French Vet Schools



ENS DE LYON  
Département de biologie

- Department of Biology



INSA INSTITUT NATIONAL DES SCIENCES APPLIQUÉES LYON

- Biosciences Engineers



- Bachelor's and Master's degrees in Biotechnology, Biology and Biochemistry







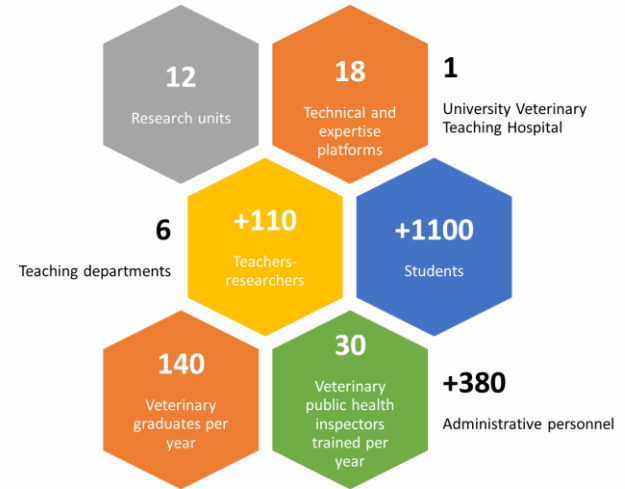
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# VetAgro Sup - agronomic and veterinary school

- **One of the Four French Vet Schools,**
  - 2 campuses (animal health in Lyon and agronomy in Clermont-Ferrand) covering more than 50 hectares
  - Research and teaching buildings with an area of 60,000 m<sup>2</sup>
  - +110 researchers
  - 330 administrative personnel
  - +1,100 students
  - +80 cooperation contracts in over 40 countries
  - Livestock, pets and sport animals (horses) university hospital

**Industrial Research Chair in Veterinary Public Health**  
(VetAgro Sup, Lyon University, CNRS, Boehringer Ingelheim...)



 **VetAgro Sup**

**Education, scientific research and services to companies and institutional partners**





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# A World-Class Research in Veterinary Public Health






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## A World-Class Research in Veterinary Public Health

### Dedicated research infrastructures to Veterinary Public Health

 **VetAgro Sup - One of the Four French Vet Schools**  
- 420 staffs

 **ANSES - Lyon Laboratory mainly contributes to improving the health of ruminants - 80 staffs in Lyon**  
National reference laboratory for several pathologies

 **INRA (Clermont-Ferrand) - 3rd largest of INRA's 21 research centers**  
Sustainable breeding, development of animal products, preventive nutrition and ageing...



**SAARA - 1<sup>st</sup> Thematic Regional Research Network for Animal Health and Welfare in Auvergne Rhône-Alpes**  
(VetAgro Sup, INRA, ANSES)

### World-Class Research in Infectious Diseases and Immunology



• **CIRI – International Infectiology Research Center** - 300 people

• **IBCP - Institute of Biology and Protein Chemistry** - 69 people



• **MMSB (BMSSI) Molecular Microbiology and Structural Biochemistry** - 69 people

• **LBTI Tissue Biology and Therapeutic Engineering**  
- 100 people



• **LBBE – Biometry and Evolutionary Biology laboratory**  
- 194 people



• **Jean Mérieux – INSERM - 4 laboratory**  
INSERM, Fondation Mérieux  
Only civilian BSL- 4 laboratory in France, the largest in Europe



• **BIOASTER only French Technology Research Institute in Health**  
An unique R&D model created in 2012, to disrupt healthcare and applied microbiology, to de-risk innovation

**A very dense and attractive R&D ecosystem in VPH, immunology and infectious diseases**



# A World-Class Research in Veterinary Public Health



## Dedicated labs to Veterinary Public Health (fully or partly)

- **EPIA - Epidemiology of animal and zoonotic diseases**  
*INRA, VetAgro Sup, 39 people*
- **HERBIVORES - Mixed Research Unit Herbivorous Animals**  
*INRA, VetAgro Sup, 95 people*
- **MYCO - Mycoplasmosis of ruminants**  
*VetAgro Sup, ANSES, Environment and Labor (ANSES), 12 people*
- **ICE - Interactions Cells environment**  
*VetAgro Sup*
- **APCSe - Pulmonary and circulatory aggression in sepsis**  
*VetAgro Sup, 20 people*
- **RS2GP - Wild Rodents, Health Risks and Population Management**  
*VetAgro Sup, INRA*
- **IVPC - Viral Infection and Comparative Pathology**  
*LYON University I, INRA, 30 people*

## Technology platforms

- **SFR Biosciences – Charles Merieux Campus**  
  
Shared pool of resources and technical core facilities (animal science, from cell to organism, protein science, genetic and cellular technologies)
- **ICLB - Claude Bourgelat Institute VetAgro Sup (in vivo preclinical research studies on a wide variety of species and sanitary status)**  
*Ministry of Agriculture, VetAgro Sup, 25 people*
- **Vet Tox - Laboratory of Veterinary Toxicology**  
*VetAgro Sup*
- **EVAAS - Veterinary and Agronomic Expertise Center Wild Animals**  
*VetAgro Sup*



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# A World-Class Research in VPH and Infectiology

## **ANSES**

**French Agency for Food, Environmental and Occupational Health & Safety**

- **Lyon Laboratory mainly contributes to improving the health of ruminants**
  - Animal health
  - Antimicrobial resistance
  - Food hygiene
  - Plant health
- **National Reference Laboratory (NRL) for**
  - Animal prion diseases (bovine spongiform encephalopathy [BSE] and scrapie)
  - Rift Valley fever (serology)
  - Antimicrobial resistance, with ANSES's laboratories in Fougères, Maisons-Alfort and Ploufragan-Plouzané
- **OIE Reference Laboratory for**
  - Contagious bovine pleuropneumonia (CBPP)
  - Rift Valley fever (together with the Institut Pasteur)
- **Around 80 staff members**



## **Jean Mérieux BSL-4 laboratory**

- **Laboratory of high containment dedicated to the study of pathogenic agents of class 4 (Ebola, Marburg, Lassa), the highest level**
  - European structure of this containment level that offers the largest experimental capacity
  - Activities include : fundamental & applied research, diagnostics and collections management
  - More than a dozen French or foreign scientific teams use the P4 laboratory



## **BIOASTER, Technology Research Institute**

- **Involved in four areas of application**
  - Antimicrobials: combat antimicrobial resistance
  - Vaccines: improve the safety and efficacy of vaccines
  - Microbiota: take full advantage of the human and animal microbiota
  - Diagnosis: quickly diagnose infections at the patient bedside
- **Mission**
  - BIOASTER designs, develops and uses transformative technological innovations to meet the industries needs
  - Through collaborative public / private projects, it helps to accelerate the development of medical and nutritional solutions with high added value for the benefit of human and animal health





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# A World-Class Research in in VPH and Infectiology

## **CIRI**

**International Center for Infectology Research**



- **“Understanding infectious diseases to better control them”**
  - Multidisciplinary approach combining microbiology (bacteriology and virology), immunology, cell biology, clinical research and epidemiology, with a strong interface with the industry
- **300 researchers in 20 different teams**
- **The research programs of CIRI concern objectives of broad interest in the field of infectious diseases**
  - Integrated immunology for vaccination and biotherapies
  - Metabolo-infectiology and non-communicable diseases
  - Nosocomial infections
  - Emerging and highly pathogenic infections
  - Consequences of co-infections with human pathogenic agents

## **IBCP**

**Institute of Biology and Protein Chemistry**



- **IBCP hosts 2 mixed research units CNRS-Lyon 1 university**
  - Molecular Microbiology and Structural Biochemistry (MMSB)
  - Laboratory of Tissue Biology and Therapeutic Engineering



- **Molecular Microbiology and Structural Biochemistry (MMSB)**
  - 10 research teams (80 people)

### **Areas of research**

- Understanding the molecular mechanisms underlying microbial pathogenesis
  - Study of molecular and macromolecular interactions in structural, dynamic and functional terms
- **Laboratory of Tissue Biology and Therapeutic Engineering (LBTI)**
    - 5 research teams (100 people)

### **Areas of research**

- Analyzing the fundamental mechanisms of extracellular matrix organization in tissues
- Describing and evaluating tissue response to insults
- Proposing and testing innovative therapeutic approaches





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World industry leaders in VPH  
and a dense network of specialized  
SMEs and start-ups





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# Lyon area: #1 French veterinary hub

## #1 French veterinary hub: 23 % of the jobs in the French veterinary pharmaceutical industry

### Region Auvergne Rhône-Alpes:

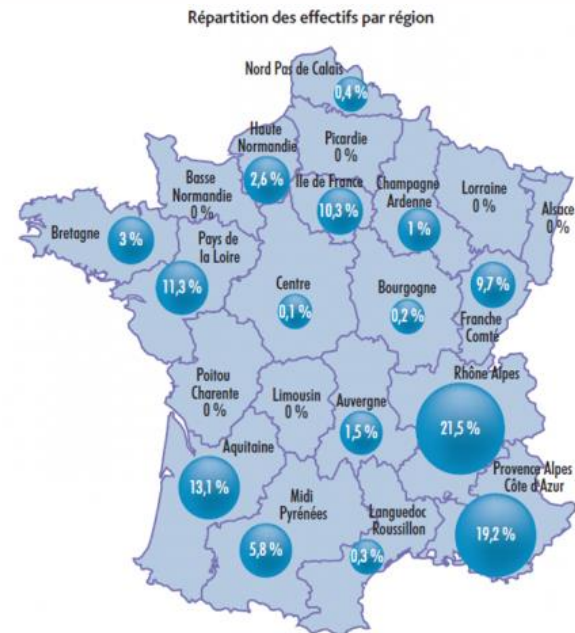
- 15 % of the veterinary establishments \* (#1 with Brittany)  
48 companies / 74 establishments
- 29 % of the manufacturing sites for veterinary medicinal products  
(#1 far ahead of Pays de la Loire & Centre - Val de Loire: 11 % each)  
18 manufacturers / 25 manufacturing sites

\* manufacturers, distributors, importers, agents...

Répertoire des Établissements Pharmaceutiques Vétérinaires (Base Etavet®)

LYON: #2 French health cluster with Lyonbiopôle

Within the European top 5 for Life sciences clusters





# France: an historical world leader for Animal Health

- **France, World #2 and Europe #1 in terms of R&D and manufacturing of veterinary drugs and diagnostics**

- 4 of the 10 world largest animal health companies are French: Merial (today Boehringer Ingelheim Animal Health), Ceva, Virbac and Vétquinol



- bioMérieux: World leader in IVD, incl. animal health



- Turnover: €2.1 billion in 2016, 60% export, 50 industrial manufacturing sites and numerous specialized R&D centers (SIMV)
- 6,700 employees
- Largest range of available veterinary medicinal products in Europe (2,700 marketing authorizations)

- **France, #2 largest world animal health market... just behind the USA!**



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# World leaders in VPH in Lyon

## Boehringer Ingelheim Animal Health (former Merial)



- World #1 in Veterinary Public Health
- World #2 in Animal Health
- A historical presence in Lyon and French HQ, 1,500 staffs
- World's largest production site for animal vaccines in Lyon (2 sites)
- World's largest R&D center for VPH (2 sites)

## Animal Health (other)

### • Vetoquinol

- World #9 in Animal Health Development,
- Manufacturing of dietetics and topical products



### • ThermoFischer

- Laboratoire Service International – LSI
- Reagents for animal health diagnostic



Lyon: #1 vaccine production center in the world

## “One Health players”

- **Sanofi Pasteur, World #3 vaccines manufacturer**
  - World HQ in Lyon, 5,000 staffs
  - One of largest vaccines production site in the world
- **BioMérieux, World #1 in *in vitro* microbiologic diagnostic (incl. animal health)**
  - World HQ in Lyon, 3,500 staffs
- **Merieux NutriSciences: Food safety & nutrition**
- **World Health Organization (WHO)**



SANOFI PASTEUR



World Health Organization





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## A dense network of specialized SMEs and start-ups

### Animal e-health



Digital tools for the health and well-being of animals



Digital tool for veterinary medicine diagnostic assistance



Development and manufacturing of connected medical devices and delivery systems for Human and Animal Health

### Diagnostic



DNA tests for origin certification and diseases prevention in pet animals



Diagnostic tools for animal infectious diseases

### Therapeutics, veterinary products



Wide range of veterinary products (medicine, hygienic products and food supplements) for pets



Animal Health 100% Natural. Specialist in allopathy for pets and horses



Bacteriophage research and development (drug-resistant bacterial infections)



Number 1 for veterinary regenerative medicine in France

### Consulting



Global epidemiology consulting - terrestrial and aquatic animals, humans, plants and OneHealth



Laboratory of veterinary analysis for trace elements, minerals, vitamins and metabolic parameters of animals

### Veterinary labs



Laboratory of veterinary biology and anatomocytology of domestic carnivores and equines



Veterinary pathology lab. specialized in the pathology of domestic animals, NACs, animals of zoos and wildlife and farm animals.

### Contract Research Organizations



CRO - In vivo studies



CRO - Animals models and in vivo studies



Animal models



CRO - Animal medical imaging services



CRO - Non human primates models and in vivo studies



CRO specialized in regulatory and exploratory preclinical studies in production animals



CRO - Veterinary bio imaging with MRI (vet. diagnostic and pharmaceutical R&D)





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# Networks and Supports

## Lyon, a very attractive location for R&D





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## Infrastructure & Support for SMEs

### LYONBIOPOLE

**1<sup>st</sup> French Health Cluster**  
The one-stop shop for  
healthcare innovation in  
Auvergne-Rhône-Alpes

- support SME development
- stimulate innovation & collaboration
- develop a high-level infrastructure level
- strengthen the cluster's international position



### ONLYLYON

**La Région**   
Auvergne-Rhône-Alpes

**Public Authorities**  
Economic Development Agencies  
Supporting and facilitating companies and  
business set-up in the Lyon Region

### Technology Transfer Organizations

Creation of startups

**linksium**

University of Grenoble

**PULSALYS**  
SATT LYON ST ETIENNE

University of Lyon – Saint Etienne

**SATT** SOCIÉTÉ  
D'ACCELERATION  
DU TRANSFERT  
DE TECHNOLOGIE  
GRAND CENTRE

University of Clermont-Ferrand

### Public financing



**ANR**



MINISTÈRE  
DE L'ENSEIGNEMENT SUPÉRIEUR,  
DE LA RECHERCHE  
ET DE L'INNOVATION

**La Région**   
Auvergne-Rhône-Alpes

**bpi**france

**BANQUE des TERRITOIRES**



# Public funding

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## France, a very attractive location for R&D

**Research Tax Credit**  
30% of all R&D expenses

**France Public Investment Bank**  
Grants, loans, guarantees, equity  
**bpi**france

**EU Horizon 2020**  
R&D grants, mostly  
collaborative research  
projects

**National & regional**  
R&D grants  
Non refundable and  
refundable

**Patent Box**  
Reduced tax rate

**“Young Innovative  
Companies” status**  
Tax exemption

**“Young Doctor”  
measure**  
Tax incentives

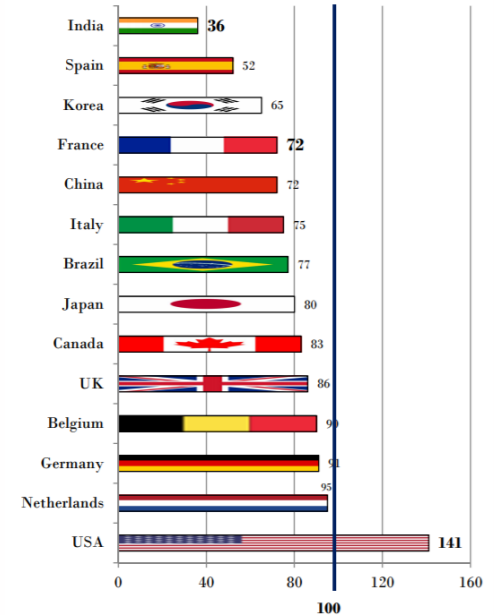
**CIFRE**  
“Industrial Convention of  
Formation by Research  
contract”

# France: a highly competitive cost of research!

## Average researcher cost after incentives (2018)

- Support for industrial R&D in France is based on simple and stable rules (*Research Tax Credit*)
- R&D cost are **20 to 25 %** higher in Germany and UK than in France
- Undertaking technological developments in the US is **twice as expensive** as in France!
- Rapid increase of researcher cost in China, now similar to those in France.

Source: ANRT, International comparison of researcher rates reported by groups receiving Research Tax Credit (RTC) in 2017, October 2018



| 100 = Cost in France with no RTC or subsidies |



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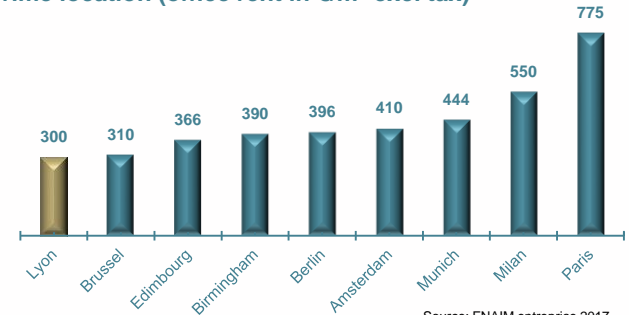
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# Business incubators/accelerators and real estate in Lyon Area

- **Dedicated real estate offers and business incubators for biotech start-ups**
  - Lyonbiopôle Innovation and Business Centers
    - “Ready to use” BSL 2 and BSL 3 labs + offices
  - Public real estate dedicated to young innovative companies
    - Laennec, Tony Garnier, Einstein (offices and small labs)
  - Business accelerator Synapse by Boehringer Ingelheim
  - Lyon University Labs (to be evaluated case by case)
  - Biopolis Grenoble
  - Biopôle Clermont-Limagne
- **Business incubators for spin off (mostly)**
  - VetAgro Sup – Institut Bourgelat
  - ENS Lyon Incubator (300 m<sup>2</sup> offices and labs)
  - IBCP incubator (around 100 m<sup>2</sup> offices and labs)
  - Incubator ISARA/Agropole Foodshaker
- **Other Business incubators for innovative start-ups**
  - Bel Air Camp, H7, Insavalor – CEI (Centre d’Entreprise et d’Innovation)
- **Large offer in Business centers and co-working spaces in Lyon Area**
  - Strong development

## COMPETITIVE REAL ESTATE COSTS

Prime location (office rent in €/m<sup>2</sup> excl tax)



Source: FNAIM entreprise 2017

Costs lower than those of big European cities and 30% lower than Ile-de-France





## A dense landscape of investors

- **78** investment structures specialized in Life Sciences in France
- **Lyonbiopôle** supports its members (start-ups and SMEs) to access private funding with:
  - a mapped network of **200** of French and international investors
  - a complete panel of dedicated tools
- **Fund raising** by Lyonbiopôle's members in 2018
  - **310 MEUR** (similar to 2017)

### Investment banks



### Regional investors



### Business Angels Networks





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# Lyon region – a top place to find talent in life sciences



France's 2<sup>nd</sup> largest employer  
in Life Sciences

Almost 100,000 jobs in  
Healthcare sector in the region  
Auvergne-Rhône-Alpes

50% in Biotech and Medtech  
companies

20% of French pharmaceutical  
industry jobs



150 Labs in life sciences

9,000 researchers in Life  
Sciences in Rhône-Alpes

30 % in infectiology



Over 15,000 Life Sciences  
students...

...and new 150 PhD students per  
year

VETAGRO SUP: 2<sup>nd</sup> European Vet School  
with an US accreditation

Competitive labor costs in France and Europe  
Gross annual salary in Lyon  
20 to 25% < Paris  
30% < UK - 40% < Germany



# Welcome to Lyon Region!

## Contact

### ADERLY / INVEST IN LYON

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<http://www.hub-vph.org/>



<https://www.youtube.com/channel/ucwz-vzI80ft1jj1-cm6xma>



[https://twitter.com/hub\\_vph](https://twitter.com/hub_vph)

## Founding partners



## Associate partners

