

EXPANDING CREATIVITY, ADDING VALUE, TOGETHER.

BIOASTER PRESENTATION TO BIOTUESDAY, NOV 7 2017

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Deputy Chief Scientific Officer



BIOASTER at a Glance



Created in 2012, BIOASTER is a **Technological Research Institute** dedicated to **Microbiology** and **Infectious Diseases**



BIOASTER is a private **non-for-profit** Foundation for Scientific Cooperation



BIOASTER promotes **Translational Research** between academia knowledge and industrial needs



BIOASTER builds national or international **Research Programs** by associating **public and private partners** and funding



BIOASTER leads and **co-funds Technological Research Programs** that are of **high medical, technological and economical added-value**

2 sites in France, 120+ People



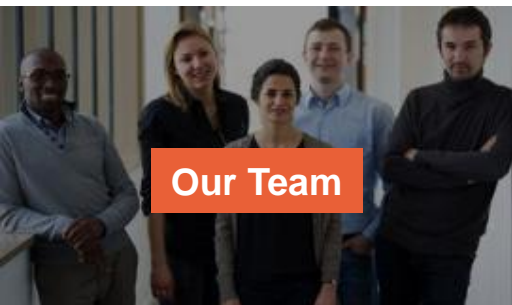
BIOASTER Lyon (Headquarters, 3600 m²)

- BSL2 & BSL3 Laboratories
- Access to the largest BSL4 in Europe
- Dedicated collaborative spaces



BIOASTER Paris (Institut Pasteur Campus, 600 m²)

- BSL2 Laboratories
- Dedicated collaborative spaces



Our Team

120+ people

- Origins: 60% private, 40% academic
- 70% of PhD & Bac+5 (international curriculum)
- 17 citizenships: Europe, Asia, Africa, Americas

An integrated approach

4 Programs & 7 Technological Units

MICROBIOTA

1. Exploration: microbiote composition, host-microbiota interactions
2. Development: protocols and methods, industrial applications
3. Validation: predictive models & clinical studies set-up

DIAGNOSTIC

1. Biomarkers: new markers identification, candidate markers/panels evaluation, signature refinement
2. Assay development: sample preparation, prototypes development and validation (performances, repeatability and robustness)
3. Sample collection: clinical network management, biological specimens and ethical constraints

ANTIMICROBIALS

1. Identification & characterization of new drugs
2. Host-pathogens & host-drugs interactions
3. Support to alternative approaches

VACCINES

1. Healthy vs sick population biomarker identification
2. New vaccines/adjuvants mode of actions
3. Production and quality control development

7 Technological Units *(industrial standards)*

- Biological Collections & Microbiology
- Genomics & Transcriptomics
- Metabolomics & Proteomics
- Immunomonitoring
- Expression systems proteins engineering
- Pre-clinical models & Imaging
- Data Management & Analysis

Technology units - overview

★ BIOLOGICAL COLLECTIONS & MICROBIOLOGY

- Single point of access to biological samples (<https://biospecimens.bioaster.org/>)
- Isolation and extensive characterization of microbiological strains
- Sample prep for gut microbiota analysis

★ GENOMICS & TRANSCRIPTOMICS

- Microbial genomics (*de novo*, resequencing); metagenomics (target, WGS), transcriptomics (host/pathogen, mode of action),
- *NGS, microarrays, HT validation systems, qPCR, dPCR, pre-analytical steps automation*

★ METABOLOMICS & PROTEOMICS

- Integrated metabolome / metaproteome analysis. Profiling, fingerprinting, fluxomics, targeted analysis, lipidomics etc.
- *600 MHz NMR, high resolution mass spectrometry, pre-analytical automation, chemometrics & bioinformatics*

★ IMMUNOMONITORING

- Biomarker discovery and monitoring.
- Custom assay development
- *Flow, mass, image cytometry, fluorospot, Luminex, microfluidics, sample processing*

★ PROTEIN & EXPRESSION SYSTEM ENGINEERING

- Novel tools for biotherapeutics and diagnostics
- *Protein design, vectorization tools, host optimization and new host discovery, multimers, VLP, scaffolds, antibody engineering*

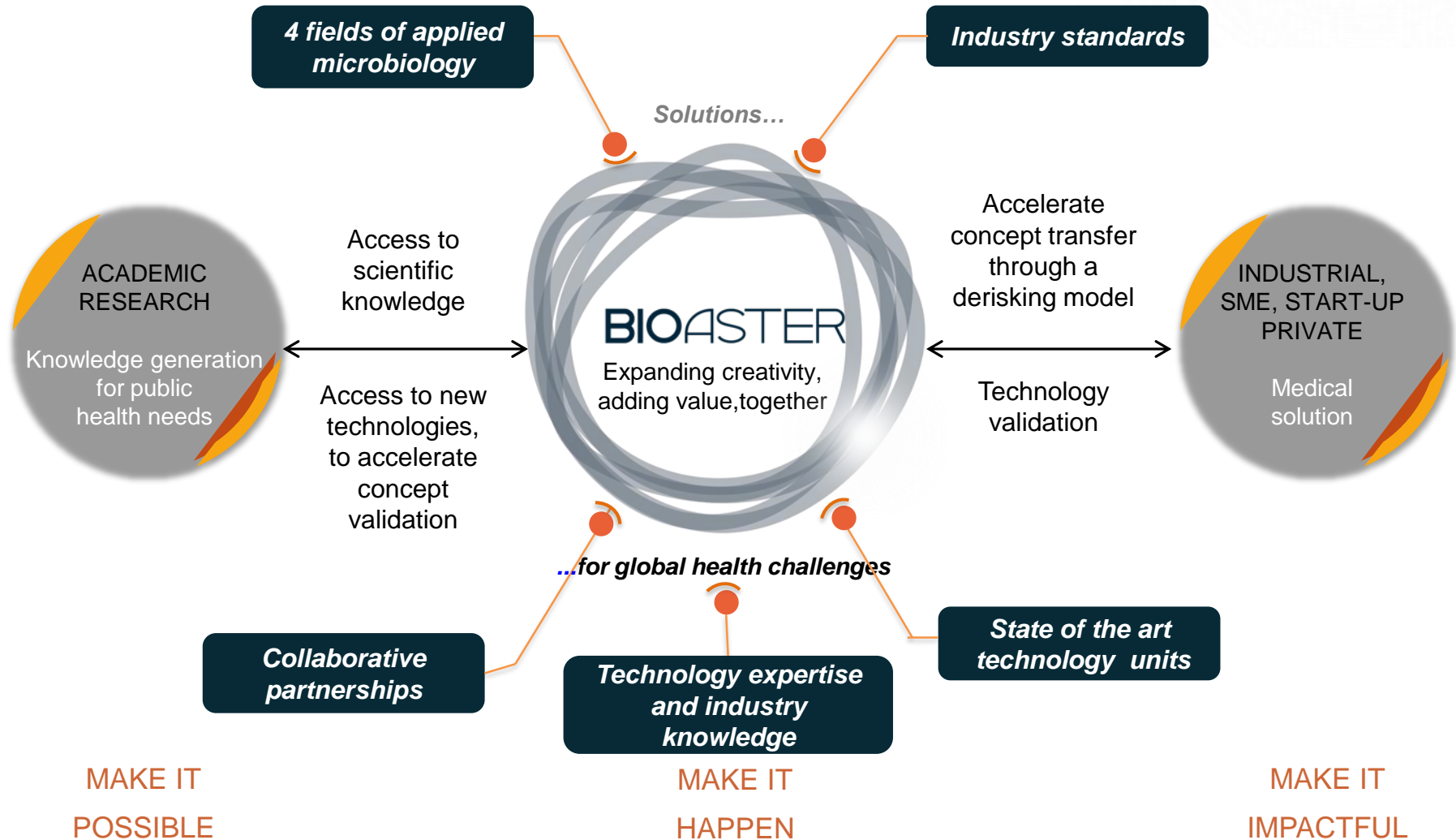
★ PRE-CLINICAL MODELS & IMAGING

- Specific microbiota & infectious-based models
- *Gnotobiology, host-microbiota interactions, infectious diseases, cell and molecular biology in vivo and 2D/3D imaging and biodistribution*

★ DATA MANAGEMENT & ANALYSIS




- Management, transversal analysis and integration of clinical, phenotypic and multi-omic experimental data
- *Massive data storage and intensive computing (Cloud-based HPC, Grid-computing), collaborative platforms (LIMS, eCRF, bioinformatics web platforms, tranSMART...), integrated knowledge management*

How does it work ?



De-risking innovation

Expanding Creativity, Adding Value, together

- 
Scientific de-risking
 Through the combination of academic and industrial expertise in science, technology and development
- 
Technological de-risking
 Through the combination of state of the art equipment operated under industry standards
- 
Financial de-risking
 Through co-investment (project-by-project basis)

**Number
of projects**



47

**Academic &
clinical partners**



20

Industrial partners



24

**Average project
budget (M€)**



1,6

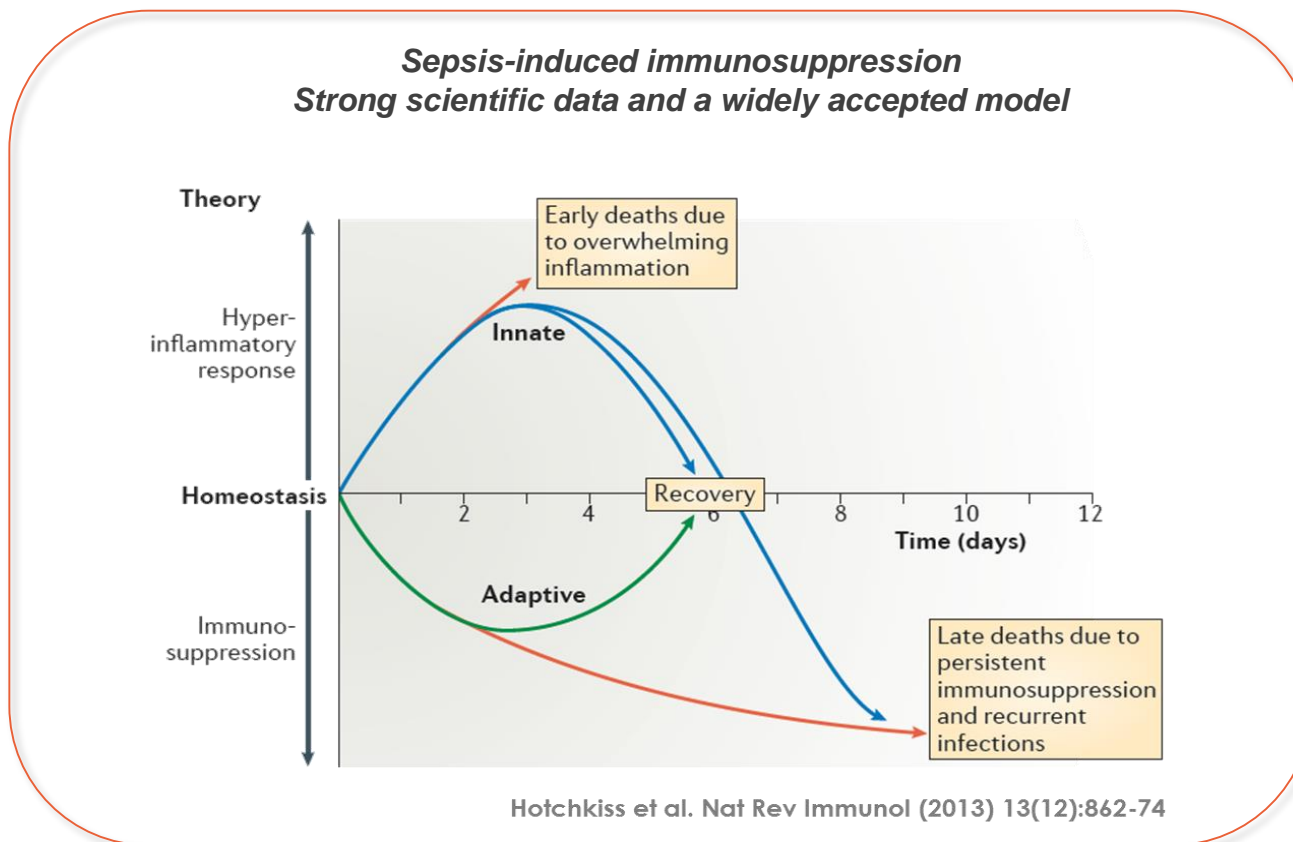
**Average project
duration (years)**



2,5

Projects *Examples*

- Monitor the immuno-inflammatory status of ICU patients and provide new innovative biomarkers for Infectious risk assessment and new therapeutic approaches



EBODIAG

an EBOLA Diagnostic Point Of Care test

- Define a sensitive immunochromatographic (lateral flow) rapid test to diagnose Ebola infection in endemic countries.



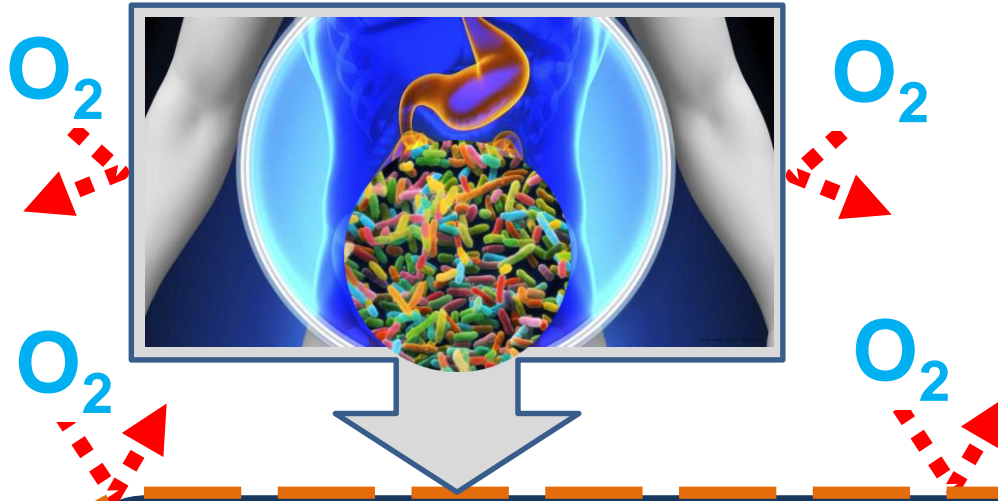
*Ultrasensitive diagnostic test
of Ebola Haemorrhagic Fever.*



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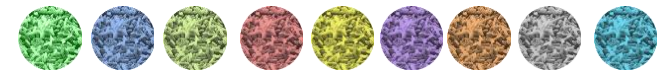


Intestinal (or other) microbiota



Application fields

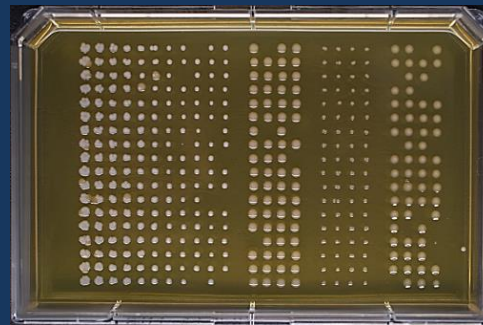
- ✓ Human health,
- ✓ Animal health/breeding,
- ✓ Animal models...



Isolated and characterized strains



Target, Sort, Isolate



Cultivation & identification

Phenotypic and genomic characterization, Immunoreactivity

Met-SAMoA

Metabolic Screening of Antimicrobial Mode of Action

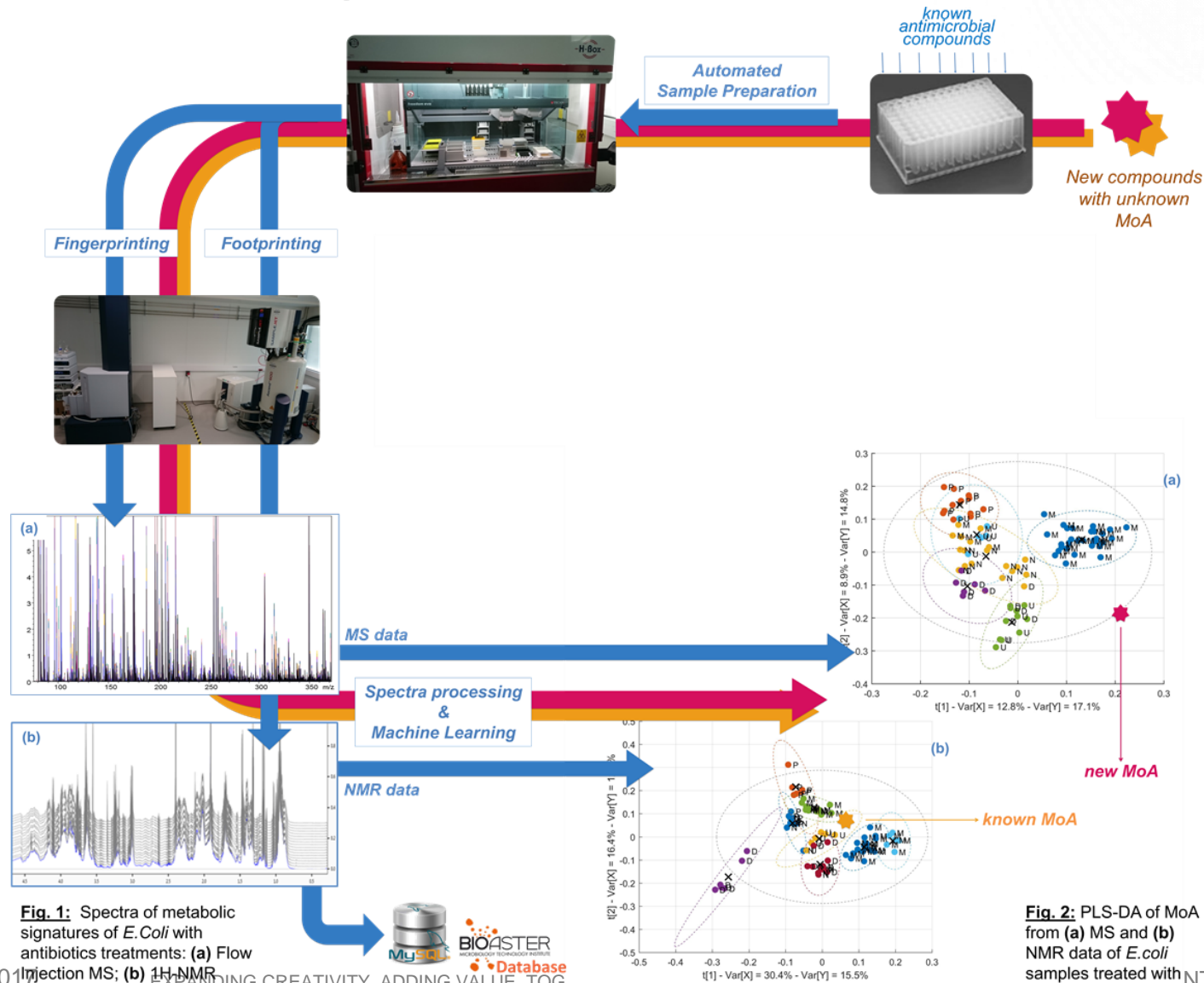


Fig. 1: Spectra of metabolic signatures of *E. coli* with antibiotics treatments: (a) Flow Injection MS; (b) 1H-NMR

Fig. 2: PLS-DA of MoA from (a) MS and (b) NMR data of *E. coli* samples treated with antibiotics



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GRAND LYON
la métropole



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