

# erinha

European Research Infrastructure  
on Highly Pathogenic Agents

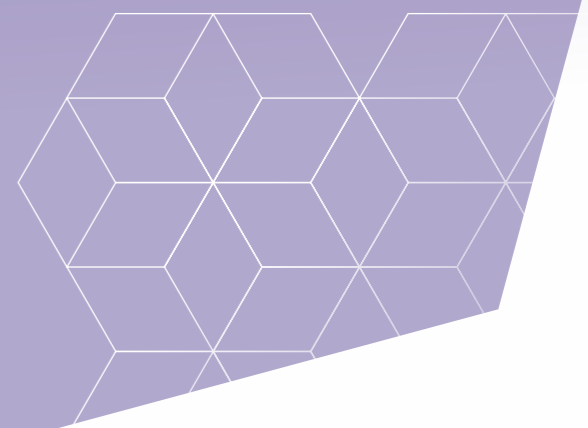
## RESEARCH PORTFOLIO





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## ERINHA'S UNIQUENESS

# 1 THE CONTEXT

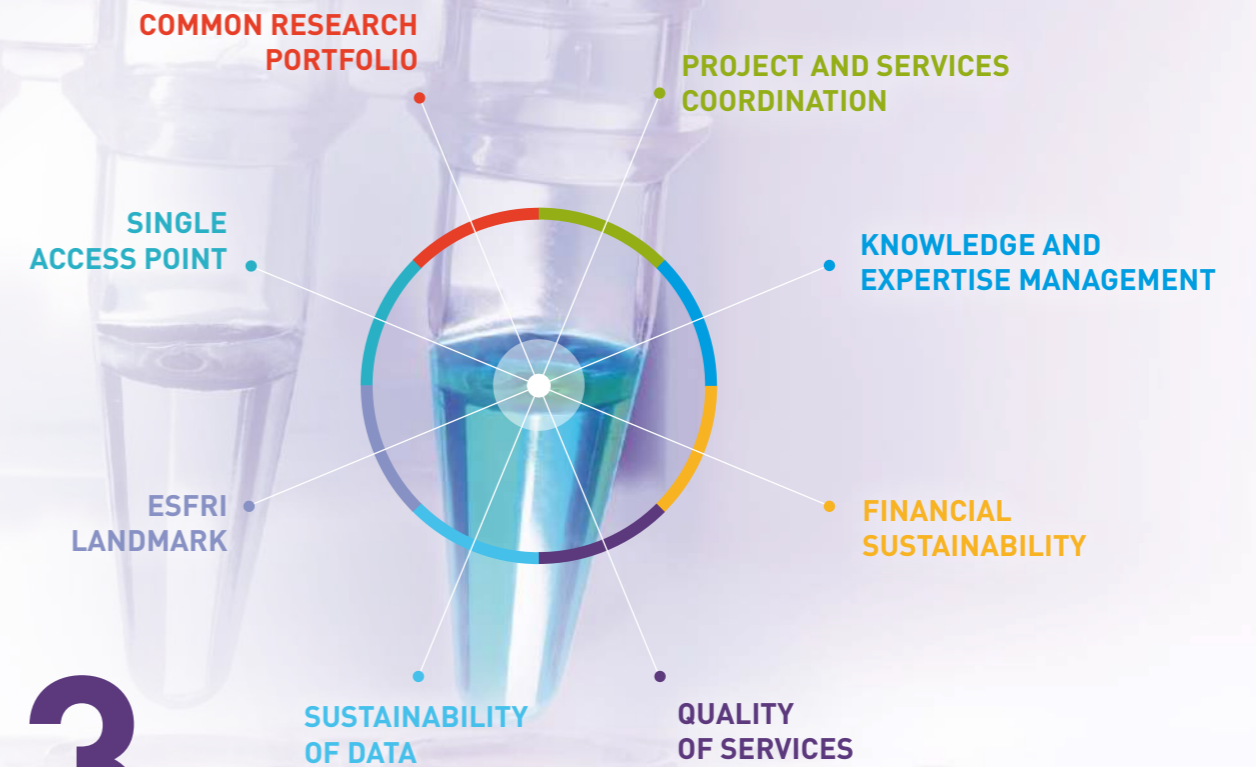
The 21<sup>st</sup> century has been marked by the rapid globalisation of infectious diseases. In this environment of independent trade, travel, migration and international economic markets, many factors now play an important role in the rise, emergence and re-emergence of infectious diseases. This demands a coordinated global response, involving multiple research capacities and expertise to prevent and respond to the spread of epidemics more effectively.

The 2014-2015 Ebola outbreak, cases of Lassa Fever in Germany, regular cases of Crimean Congo Haemorrhagic Fever in Bulgaria and Spain, ongoing Ebola outbreak in the Democratic Republic of Congo demonstrate the reality of dangerous infectious threats and the worldwide vulnerability, highlighting the need for a common action involving the entire European capacity. Learning lessons from the Ebola outbreak, a R&D Blueprint for action to prevent epidemics has been developed by the WHO, in which a number of highly infectious diseases and viral haemorrhagic fevers are included. In their 2018 updated list, the following RG4 pathogens have been prioritized: CCHF, Ebola virus, Marburg virus, Nipah fever and Disease X (unknown).

As highlighted in the WHO R&D Blueprint for actions to prevent epidemics there is a lack of vaccines, drugs and diagnostic tests for the most highly pathogenic (RG4) agents and too little public and private investment in R&D to respond to these diseases. There is a need for coordinated and collective action to enable robust and accelerated R&D for epidemics.

# 2 WHAT IS ERINHA ?

- ✦ A pan-European distributed Research Infrastructure (RI) of leading European BioSafety Level 4 (BSL4) facilities and national research institutes
- ✦ Aim: Facilitate and accelerate research on highly pathogenic agents by providing a coordinated access to members' cutting-edge facilities
- ✦ Focus: Large projects which require the capabilities of a number of research facilities
- ✦ Expertise: Highly pathogenic agents, e.g. Ebola, Lassa, Nipah
- ✦ ESFRI Landmark since 2018
- ✦ Set up as a legal entity in 2017



# 3 ERINHA'S CONCEPT

## ERINHA: ANSWERING UNMET NEEDS

ERINHA provides the **expertise, capacities and functions** required to lead or support research studies into human diseases caused by the most **highly pathogenic agents**, as well as **applied research** to develop new countermeasures and other interventions against these diseases.

ERINHA provides access to cutting-edge research facilities including unique BSL-4 *in vitro* and *in-vivo* capacities to perform animal experimentations thus allowing excellent science to be performed.

A pool of **trained specialists** to perform research as well as renowned senior scientists are part of ERINHA. ERINHA members have historically well-established

collaborations and strong connections with countries and local expert institutes, e.g. numerous bilateral collaborations with countries from the African continent where Risk Group 4 (RG4) pathogens are more broadly present. ERINHA's experts have extensive **field experience** and have been involved as members or coordinators in several Mobile Laboratory projects.

ERINHA systematically reassesses its capacities as well as gaps to better respond to unmet needs in the field of research and improve (through shared investment) or enlarge (through new memberships) its capabilities and expertise. Its internal research projects carried out in collabo-

ration across distributed sites provide it the tools and generic capabilities which allow to host ambitious projects in collaboration with Academia and Industry, focusing on **increasing European and global preparedness for outbreaks** of high consequence pathogens.

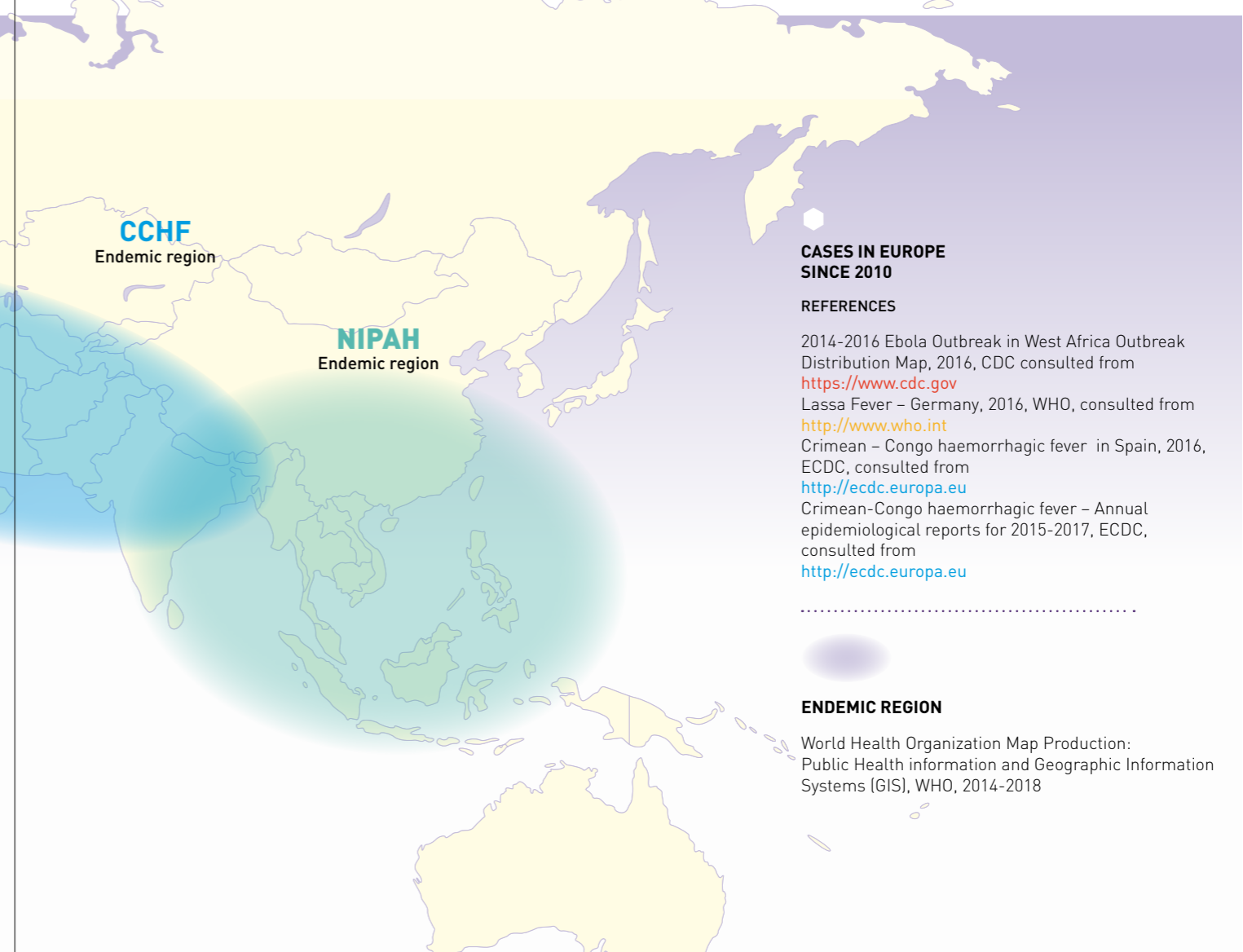
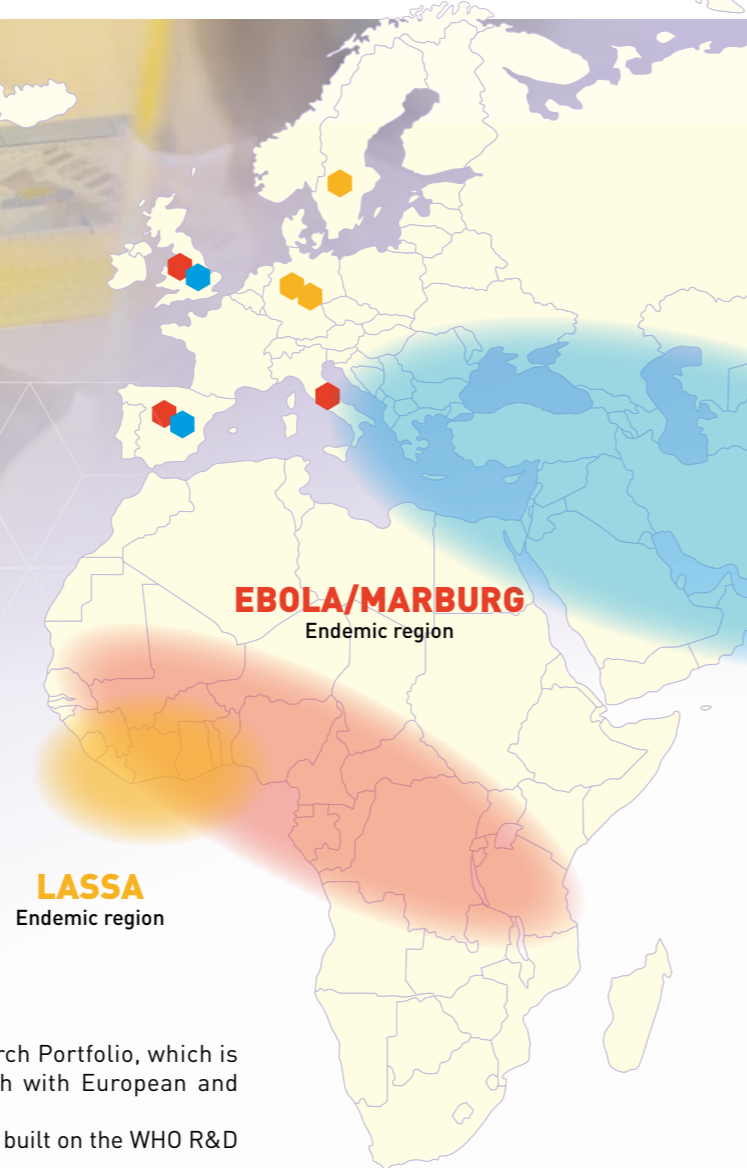
ERINHA produces the ideal environment to **facilitate coordination** of research on RG4 agents in Europe. The infrastructure will contribute to the **enhancement** of the European and global capacity, **capability and emergency preparedness in response to global outbreaks** and will thus constitute a key European contribution to global health research and innovation.



# 4 ERINHA'S RESEARCH PORTFOLIO

ERINHA has developed its scientific strategy – a Research Portfolio, which is an evolving strategy with systematic updates to match with European and Global Research and Innovation and Public Health needs. The table below presents ERINHA's prioritized pathogens, built on the WHO R&D Blueprint:

THE AGENTS	DIAGNOSTICS	PROPHYLAXIS	THERAPEUTIC INTERVENTIONS	MORTALITY RATES
<b>EBOLA</b>	Molecular testing, antibody or antigen detection, virus isolation	Clinical phase trials	Clinical phase trials	Up to 90% <sup>(1)</sup>
<b>MARBURG</b>	Molecular testing, antibody or antigen detection, virus isolation	No vaccine	No therapeutic intervention	Up to 88% <sup>(2)</sup>
<b>LASSA FEVER</b>	Molecular testing, antibody or antigen detection, virus isolation	No vaccine	Ribavirin	Up to 15% <sup>(3)</sup>
<b>CCHF</b> CRIMEAN-CONGO HAEMORRHAGIC FEVER	Molecular testing, antibody or antigen detection, virus isolation	No vaccine	Ribavirin	Up to 40% <sup>(4)</sup>



### CASES IN EUROPE SINCE 2010

#### REFERENCES

- 2014-2016 Ebola Outbreak in West Africa Outbreak Distribution Map, 2016, CDC consulted from <https://www.cdc.gov>
- Lassa Fever – Germany, 2016, WHO, consulted from <http://www.who.int>
- Crimean – Congo haemorrhagic fever in Spain, 2016, ECDC, consulted from <http://ecdc.europa.eu>
- Crimean-Congo haemorrhagic fever – Annual epidemiological reports for 2015-2017, ECDC, consulted from <http://ecdc.europa.eu>

#### ENDEMIC REGION

World Health Organization Map Production: Public Health information and Geographic Information Systems (GIS), WHO, 2014-2018

THE AGENTS	DIAGNOSTICS	PROPHYLAXIS	THERAPEUTIC INTERVENTIONS	MORTALITY RATES
<b>NIPAH/HENDRA</b>	Molecular testing, antibody or antigen detection, virus isolation	Equine vaccine, no human vaccine	No therapeutic intervention	Up to 75% <sup>(5)</sup>
<b>UNKNOWN AGENT</b>	Tests not produced yet	No vaccine	No therapeutic intervention	UNKNOWN MAY CAUSE OTHER DETRIMENTAL HEALTH EFFECTS
<b>BACTERIA</b>	Standardised molecular testing	Vaccine prevalence decreasing	Increasing resistance to therapeutics	ABOUT 1.8 MILLION <sup>(6)</sup> DEATHS PER YEAR*

\*from Tuberculosis (TB)

#### REFERENCES

- (1) Ebola virus disease fact sheet, 2019, who, consulted from <https://www.who.int/news-room/fact-sheets/detail/ebola-virus-disease>
- (2) Marburg haemorrhagic fever fact sheet, 2017, who, consulted from <https://www.who.int/en/news-room/fact-sheets/detail/marburg-virus-disease>
- (3) Lassa fever fact sheet, 2017, who, consulted from <https://www.who.int/en/news-room/fact-sheets/detail/lassa-fever>
- (4) Crimean-congo haemorrhagic fever fact sheet, 2013, who, consulted from <http://www.who.int/mediacentre/factsheets/fs208/en/>
- (5) Nipah virus outbreaks in the who south-east asia region, 2018, who consulted from <https://www.who.int/news-room/fact-sheets/detail/nipah-virus>
- (6) Hendra virus fact sheet, 2017, new south wales government- australia, consulted from [https://www.health.nsw.gov.au/infectious/factsheets/pages/hendra\\_virus.aspx](https://www.health.nsw.gov.au/infectious/factsheets/pages/hendra_virus.aspx)
- (7) Tuberculosis factsheet, 2017, WHO, consulted from <http://www.who.int/mediacentre/factsheets/fs104/en/>

# FROM DISCOVERY TO PREVENTION- ERINHA'S RESEARCH APPROACH



## REINFORCING EUROPEAN RESEARCH CAPACITIES FOR GLOBAL EPIDEMICS

01

### PROVIDING DIAGNOSTIC CAPABILITIES

02

### INCREASING THE UNDERSTANDING OF THE DISEASE

03

### DEVELOPING NEW INTERVENTIONS

04

### TRANSLATING INTERVENTION TO THE MARKET

## THE OUTPUTS

- DIAGNOSTIC TOOLS
- VACCINES
- THERAPEUTICS
- INCREASED KNOWLEDGE
- EVIDENCE-BASED INFECTION CONTROL

### 01 PROVIDING DIAGNOSTIC CAPABILITIES

- Maintain diagnostic pipeline for all newly identified agents of global concern
- Share reagents and methods
- EQA schemes on developed diagnostics
- Test rapid diagnostic provision capability
- Increase epidemiological knowledge
- Provision of diagnostics for field studies
- Input from Academia and Industry on new diagnostic methods.
- Sequencing and Bioinformatics

### 02 INCREASING THE UNDERSTANDING OF THE DISEASE

- Development of immunological tools for identification of correlate of protection discovery
- Vaccine target discovery, development and efficacy testing capability using animal models
- Therapeutic target discovery, development efficacy testing
- Infection control practice development

### 03 DEVELOPING NEW INTERVENTIONS

- *In vitro* modelling capability
- Provide small animal models of infection
- NHP modelling
- Host animal modelling
- Vector competence studies
- Understanding blood chemistry
- Modelling survival in body fluids (blood, urine, semen)
- Modelling survival on surfaces environments

### 04 TRANSLATING INTERVENTION TO THE MARKET

- GLP testing for intervention manufacturers
- Analytical capability for clinical trials
- Testing existing therapeutics against emerging agents
- Efficacy data on disinfectant efficacy
- Applied research on infection control

# 5 COLLABORATION AND COOPERATION

ERINHA's research programs (collaborative and contract research) and project outcomes aim to generate a number of interactions between ERINHA and other ongoing initiatives in the biosciences. Many of ERINHA members are participants, members or coordinators of other initiatives which are complementary with ERINHA's scope of activities. ERINHA develops its strategies in close collaboration with all key stakeholders in the field of infectious diseases: WHO, ECDC, EVDLabnet, EDCTP, as well as EFPIA (IMI), CEPI and European projects/networks in the field: EVAg, EMERGE etc. ERINHA developed long standing cooperation with other European Research infrastructures in the field of life-sciences either through bilateral interactions or cluster projects (e.g. Corbel, EOSC-Life)



ERINHA can provide its expertise on high consequence pathogens in the WHO expert groups. ERINHA's strategy is aligned with the WHO R&D Blueprint.



ERINHA's facilities can be used for early stage clinical trials.



A coordinated access can be provided to ERINHA's facilities & expertise through CEPI funded projects (e.g. preclinical studies in animal models).

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Samples produced and collected through ERINHA can be added to the Biobanking network.



ERINHA can perform analyses of biological samples during the clinical trials for high consequence pathogens within the European & Developing Countries Clinical Trials Partnership.



ERINHA will contribute to ECDC missions with knowledge on the epidemiology and pathogenesis of RG4 viruses.

ERINHA is currently involved in many collaborative projects to enhance its capacities and functions and to foster European and international partnerships.

**ERINHA-Advance**  
**EOSC-Life**  
**RI-Vis**  
**Corbel**  
**ECRAID-Plan**

# 6 FUNDING

ERINHA's Research Activities are funded from a variety of sources depending on the type of activity.

National funding coming from individual states contributes to early preparedness research; European funding (e.g. H2020, Horizon Europe) finances research activities and industrial international donors, and public/private partnerships (e.g. IMI, CEPI) fund intervention development and translation activities.

These are just a few examples of funding pathways, as other funding mechanisms on the global and European levels can be developed.

# 7 ERINHA'S IMPACT

## ON SCIENCE

ERINHA contributes to European Scientific excellence by reinforcing European research capacities for the study of highly infectious diseases and enhancing coordination of BSL4 and complementary facilities.

A large range of unmet scientific questions will be answered, such as better understanding of disease processes, new animal models and new therapies.

ERINHA will contribute to boosting European competitiveness and Research & Innovation. By including complementary capabilities, ERINHA facilitates complex and comprehensive research programmes able to compete with those conducted outside the EU. In addition, the involvement of multiple BSL4 capacities within one infrastructure enables ERINHA to respond effectively and efficiently to the partnership needs of Academia and Industry.

## ON HEALTH

ERINHA's main scientific advancements will have the highest impact on health as in the field of RG4 pathogens limited countermeasures are available and there is a lack of standardized diagnostic tools.

ERINHA aims to be an essential source of state-of-the-art knowledge and expertise, consulting, education and training (pathogens, biosafety, and decontamination).

It provides an environment of highly qualified and trained personnel able to be quickly involved in outbreak response activities.

Research carried out in the infrastructure is intended to contribute to the overarching aim of protecting human health by increasing Europe's preparedness for and capability to respond to an existing severe infectious disease or a newly emerged infectious disease threat.



## ACCESS TO ERINHA'S SERVICES

- ERINHA's operational procedures are based on the business model and legal statutes.

- The Central Coordinating Unit ensures the access to ERINHA RI.

- **Project Submission:** projects can be submitted by academic, public and industrial users or ERINHA members.

- **Projects are selected based on** scientific excellence and should match with ERINHA's scientific strategy.

- Selected projects **are allocated to the relevant and available** research facilities within ERINHA Research Infrastructure.



# 8 F.A.Q

## How is ERINHA organized?

ERINHA was officially awarded the AISBL statutes by a Belgian Royal decree approval in July 2017. Its governing bodies are General Assembly (ultimate decision-making body), Executive Board (Executive Body), CCU and Director General (daily management responsibilities). The access to the ERINHA RI is organized through its CCU. The main scientific and technical services of ERINHA are provided by its members' facilities (national nodes) which are linked to ERINHA by Service level agreements.

## What is an ERINHA node?

A national or international research institute or a network of institutes located in a Member country that enters into a Service Level Agreement with ERINHA, upon the fulfilment of the conditions and procedures established by the ERINHA General Assembly, to provide services with European dimension and that have an added value for ERINHA.

## How to become an ERINHA node?

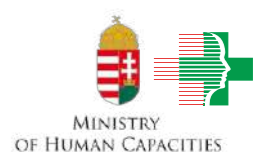
Any application for (Full or Associate) membership shall be sent to the Central Coordinating Unit (CCU). Such letter shall include information on the applicant's corporate status and its activities. ERINHA CCU submits the application to the Executive Board for a discussion and the final decision is made by the General Assembly of ERINHA AISBL.

## What is the advantage of working with ERINHA over working with an independent lab on a bilateral basis?

ERINHA allows conducting projects which are broad in scope, ambition and require a range of capabilities inside and outside of BSL4 facilities that no single laboratory can provide on its own. Common governance makes access to the infrastructure's facilities quicker and easier. It also provides a pool of trained specialists and scientists on RG4 pathogens which no single European capacity is able to do. Moreover, ERINHA ensures sustainable support functions and quality audit of its member facilities to provide excellent research corresponding to European and international standards and requirements.



## MEMBERS







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