

BSL3 INFRASTRUCTURE

Safe solutions for research into global threats
by infectious diseases

Erasmus MC



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Introduction

The world is increasingly confronted with zoonoses and pandemic threat from (re)emerging diseases. Research is essential to be able to support clinical management (diagnostics and therapy) and outbreak management. Controlled (biocontained) research conditions are indispensable for safely working with pathogens. Erasmus MC invested in BSL3-facilities that operate according to the highest international biosafety and biosecurity standards, providing pandemic preparedness by accommodating swift responses to (re)emerging diseases.

BSL3 Facilities and technologies at Erasmus MC

- A capacity of 8 separate labs; parallel uses enhance flexibility;
- All work with pathogens set in primary containment (class 2b and 3 biosafety cabinets and isolators);
- Cascade of stepwise inward reduced air pressure, air HEPA filtered per compartment;
- Onsite fumigation of equipment and labs, including HEPA filters (VHP), sterilization of fully assembled isolators and waste destruction;
- State of the art biosecurity governance implemented;
- In vivo and in vitro research is complemented with bioimaging (CT, IVIS, advanced microscopy), cell sorting and multiplex molecular analysis, as well as cryo-storage.



COVID-19 experimental research at Erasmus MC

A swift internationally collaborative research response contributed to societally and clinically high impact insights on pathogenesis and transmission, from the 2020 start of the pandemic:

1. *Comparative pathogenesis of COVID-19, MERS and SARS in a nonhuman primate model* (Science, April 2020)
2. *Sars-CoV-2 is transmitted via contact and via the air between ferrets* (Nature Communications, July 2020)

Lessons learned from the COVID-19 pandemic

- The BSL3-laboratories at Erasmus MC facilitated swift research response from the start of the COVID-19 pandemic, in support of global public health and medical responses.
- Building and maintenance of BSL3-infrastructure requires major investments and high-end engineering. **Erasmus MC offers (trans)national access to its infrastructure for other research groups.**
- International collaboration networks for infrastructures are necessary for pandemic preparedness and response.

National and European Research Infrastructure

- NWO National Roadmap for large-scale Research Infrastructure (call 2017-2018, #184,034,010)
- European research infrastructure for the study of highly pathogenic agents (Erinha), ESFRI landmark (www.erinha.eu). Erinha federates high biocontainment research facilities, essential for European research (infrastructure) consortia, such as:
 - Management of ISIDORE – Integrated Services for Infectious Disease Outbreak Research (150+ partners, www.isidore-project.eu)
 - Coordinator/partner in other European projects and global networks (i.a. HORIZON-HLTH-2023-DISEASE-03)



erinha

European Research Infrastructure
on Highly Pathogenic Agents

