VetBioNet - Periodic Technical Report Part B (M54) - Public Summary

Sascha Trapp, Marie-Isabelle Thoulouze

1. Summary for publication

1.1. Summary of the context and overall objectives of the project

VetBioNet seeks to strengthen the European capacity and competence to meet the challenges of emerging infectious disease outbreaks by establishing a comprehensive network of European BSL3 infrastructures, academic institutes, industries and international organisations.

To reach this overall objective, the Activities of VetBioNet are dedicated to:

- Opening the VetBioNet infrastructure resources to external users by providing Transnational Access (TNA) to BSL3 animal experimental facilities and laboratories, technological platforms, and sample collections.
- New scientific and technological developments.
- Enhanced preparedness of the major European BSL3 research infrastructures that will allow a swift response to (re-)emerging epizootic and zoonotic threats.
- Harmonization of Best Practices and a larger use of global standards in European BSL3 infrastructures.
- Determining the social impact deriving from VetBioNet activities.
- Establishing a sustainability plan that will allow VetBioNet to offer its services beyond the project duration.
- Providing improved scientific and technological standards for the services offered by the VetBioNet infrastructures.

1.2. Work performed from the beginning of the project to the end of the period covered by the report and main results achieved so far

The TNA access-point (TNAAP) and the web-based interface of VetBioNet enable easy access for potential user groups to the offered services. A total of 65 requests (22 in the 3rd reporting period) have been submitted and applicants and service providers have been brought into contact by the TNAAP. 34 projects (10 in the 3rd reporting period) have been approved after review by the User Selection Panel (USP) and the VetBioNet Executive Committee (ExCom).

The “Veterinary Emerging Threat Response Group” (VETRG) has been set up as a consultation group to deliberate on the project’s means to respond to imminent and/or predictable emerging infectious disease threats. An internal call for projects related to African swine fever (ASF) and zoonotic flavivirus infections has been launched in November 2019 using a €200.000 Emergency Fund (EF) withheld for urgent and/or priority research responses. Three projects related to ASF have been selected for EF support.

The use of a “VetBioNet” area on the International Veterinary Biosafety Work Group (IVBW) website has allowed widespread dissemination of project outputs regarding Best Practices. Eight Best Practices guideline documents were published on the VetBioNet website.

The consortium’s work on ethical and social aspects of VetBioNet has led to a “Transparency and Stakeholder Engagement Strategy” paper, “Ethics Committee best practice guidance”, a “Report on the ethics of high-containment animal infectious disease research” and various resources and tools related to the 3Rs, ethics and European regulations.

For the VetBioNet website >170.000 visitors and >1.730.000 page-clicks were recorded. Two short videos presenting VetBioNet topics available on YouTube had a total of 554 call-ups. Two webinars

were livestreamed and published on the VetBioNet website. Three training events were organised: VetBioNet 3Rs Training Event (Jan 2019), VetBioNet Summer School (July 2021) and VetBioNet Fall School (October 2021). A database was created to share data generated by the project and made available on February 2020.

VetBioNet sustainability is, at least in parts, achieved by the development of the Integrated Services for Infectious Diseases Outbreak Research (ISIDORe) project (HORIZON-INFRA-2021-EMERGENCY-02, HERA Incubator). The VetBioNet Sustainability Board has launched the procedure for creating a VetBioNet European Research Group (ERG).

Various livestock models have been developed for infection studies with PRRV, AIV, HEV and Orthonairoviruses. Reservoir host models have been developed for infection studies with SARS-CoV-2, MERS-CoV, IAV and RVFV. Animal models have been developed for airborne infection studies with SARS-CoV, SARS-CoV-2 and IAV. Fish models have been developed for infection studies with various viral pathogens. Numerous alternative infection models based on immortalised primary cells, organoids, viable tissue explants and embryonated chicken eggs have been developed.

Transcriptomics and deep-sequencing approaches to elucidate the host immune responses of livestock, as well as characterising the viral characteristics within the infected host have been undertaken. High-throughput targeted transcriptomic platforms have been developed and validated to explore the host cell responses to infection, as well as diagnostic assays to help speed up pathogen and infection recognition in rabbits, salmonids and ruminants.

New telemetric tools and protocols have been developed to monitor physiological parameters and behaviour in livestock, fish and laboratory animals. Novel in-vivo and in-situ bioimaging approaches have been applied in high-containment settings.

1.3. Progress beyond the state of the art and expected potential impact (including the socio-economic impact and the wider societal implications of the project so far)

VetBioNet TNA activities consist in providing free-of-charge access to BSL3 facilities and technical resources of the consortium. The call is permanent and project proposals are promptly handled by the VetBioNet TNAAP. Joint Research Activities (JRAs) aim at improving the scientific and technical standards of the services provided by the consortium's infrastructures. Some JRAs will develop and optimise livestock infection models for a number of high-impact epizootic and zoonotic diseases. Other JRAs will advance the state-of-the-art of the current analytical, telemetric or bioimaging approaches in animal infectious disease research. Five private partners are directly involved in the VetBioNet JRAs, thus permitting technologic development at an advanced Technology Readiness Level and potentially commercialisation of project outputs. Collectively, VetBioNet TNA and JRAs are helping to increase the competitiveness of the participating infrastructures and to advance the European research and R&D agenda related to epizootic and zoonotic diseases.

The overall goal of the Networking Activities (NAs) is to foster the cooperation between the consortium partners and forge cooperative relationships with other European or international research initiatives, industrial stakeholders, international organizations and policy makers. A Preparedness Plan has been implemented to establish VetBioNet as a central player in the European emergency response to infectious disease outbreaks. Concerted action by the "Veterinary Emerging Threat Response Group" (VETRG) is crucial to warrant a swift and efficient response of the consortium. VetBioNet NAs addressing Best Practices and the harmonisation of protocols help

advancing the biosafety standards in high-containment facilities and may inform EU guidelines and regulations. NAs aiming to ensure high ethical standards and clarify the social impact of VetBioNet activities provide an ambitious and unique approach to map and positively alter the public perception of animal infectious disease research.