Proposal Evaluation Form

EUROPEAN COMMISSION

Horizon Europe Framework Programme (HORIZON)

Evaluation Summary Report - Postdoctoral Fellowships

Call: HORIZON-MSCA-2024-PF-01

Type of action: HORIZON-TMA-MSCA-PF-EF

Proposal number: 101199110

Proposal acronym: EvoVax

Duration (months): 24

Proposal title: Unraveling the Impact of Vaccination on Rinderpest Virus Evolution

Activity: EF-LIF

N.	Proposer name	Country	Total eligible costs	%	Grant Requested	%
1	KATHOLIEKE UNIVERSITEIT LEUVEN	BE	200,400	100.00%	200,400	100.00%
	Total:		200,400		200,400	

Abstract:

Rinderpest virus (RPV) was historically one of the most devastating pathogens affecting cattle, with a global impact unmatched by any other livestock disease. Although largely eradicated in Europe by the late 19th century, RPV continued causing catastrophic outbreaks in Africa and Asia, leading to severe economic and agricultural consequences. The introduction of a vaccine in the 1960s marked a turning point, ultimately leading to the official eradication of RPV in 2011, a landmark achievement in veterinary and human medicine. However, the effects of vaccination on the evolutionary dynamics of RPV remain unexplored.

My MSCA proposal aims to investigate how vaccination efforts influenced the evolution of RPV. I hypothesize that widespread vaccine use exerted selective pressures on the virus, leading to genetic bottlenecks and reduced genomic diversity over time and across regions. I also suspect that the staggered rollout of vaccination programs worldwide resulted in the emergence of distinct regional RPV lineages.

To test these hypotheses, I will analyze historical RPV samples, expanding the genetic dataset by sequencing additional genomes from a rare collection of 45 European pathological specimens collected before vaccination. This will be complemented by analyzing existing sequences from Asia and Africa. I will develop innovative phylodynamic models to account for time-dependent evolutionary rates and lineage dynamics, providing a comprehensive view of the virus's evolutionary response to vaccination.

By combining my solid track record in virus-host interactions and paleogenetics with the host's extensive expertise in virus phylodynamics, this fellowship will provide me with the key scientific and transferable skills necessary to achieve this research agenda and fulfill the outlined objectives. It will also enable me to establish myself as a research leader in the field and make substantial contributions to the study of viral evolution.

Evaluation Summary Report

Evaluation Result

Total score: 99.40 % (Threshold: 70 /100.00)

Criterion 1 - Excellence

Score: **5.00** (Threshold: 0 / 5.00 , Weight: 50.00%)

• Quality and pertinence of the project's research and innovation objectives (and the extent to which they are ambitious, and go beyond the state of the art).
• Soundness of the proposed methodology (including interdisciplinary approaches, consideration of the gender dimension and other diversity aspects if relevant for the research project, and the quality and appropriateness of open science practices).
• Quality of the supervision, training and of the two-way transfer of knowledge between the researcher and the host.
• Quality and appropriateness of the researcher's professional experience, competences and skills.

Strengths:
- Research objectives are of high quality, focusing on a significant research question, the evolution of the Rinderpest virus (RPV) under vaccine-driven eradication pressures, using state-of-the-art phylogenetic and evolutionary modelling.
- Research objectives are ambitious but realistically achievable given the proposed methods and timeframe; they are well-defined, measurable and feasible within the project's scope.
- The nature of the proposal is innovative, especially with the incorporation of historical viral samples and phylodynamic analysis of all known RPV strains, which addresses an important knowledge gap and goes beyond the state-of-the-art. This approach could contribute to advancements in our understanding of viral evolution under selective pressures of preventive strategies like vaccines.
- The proposed methodology is robust, well-structured and suitable for achieving the project's objectives. Its strength is the use of advanced phylodynamic methodology, specifically suited to study viral evolution under episodic selection at variable rates over time.
- The project successfully integrates interdisciplinary aspects, notably combining paleobiology, pathogen evolution and statistical molecular evolution, which are essential to the project's objectives. The expertise from various fields, including a lab-focused secondment, is well-coordinated.
- The open science practices are of high quality and include plans to share data, code and research protocols and adhere to FAIR principles in data management.
- The gender dimension is well addressed.
- The supervisor is a highly qualified, experienced scientific leader with a robust track record in the project's research area. The supervisor's experience with EU grants, publication record, contributions to cutting-edge software development and expertise in both project management and postdoc mentoring are substantial assets for the proposal.
- The project has a strong training component, including scientific training in phylodynamics, as well developing skills in leadership, project management and grant writing. This plan is thorough and relevant to both the research objectives and the researcher's career development .
- The two-way transfer of knowledge is a well-integrated part of the proposal. The researcher will gain new skills in hybrid capture techniques and Bayesian evolutionary models, while the host organization will benefit from the researcher's experience in ancient microbial paleogenetics and alternative Bayesian modelling frameworks.
- The secondment is well-justified for developing the researcher's paleogenomics skills, including access to rare viral strains. A strong network of collaborators will support statistical model-building and enhance proposal quality.
- The researcher's background in viral bioinformatics, paleogenomics and viral biology is highly relevant, positioning the researcher well to achieve the project's objectives.
- The researcher's strong publication record, international conference presentations and PhD awards demonstrate productivity and recognition, enhancing credibility and readiness to contribute effectively to the project.

Weaknesses:
None identified.

Criterion 2 - Impact

Score: **4.90** (Threshold: 0 / 5.00 , Weight: 30.00%)

• Credibility of the measures to enhance the career perspectives and employability of researchers and contribution to their skills development.
• Suitability and quality of the measures to maximise expected outcomes and impacts, as set out in the dissemination and exploitation plan, including communication activities.
• The magnitude and importance of the project's contribution to the expected scientific, societal and economic impacts.

Strengths:
- The proposal provides a clear understanding of how this project will contribute to the researcher's career advancement. The plan outlines steps that are both credible and appropriate, supporting a long-term trajectory in both academic and applied research.
- The project offers the researcher opportunities to acquire a diverse set of skills, including bioinformatics, wet lab techniques and interdisciplinary experience across different labs. This combination of expertise is expected to enhance employability in various research settings, particularly in the growing field of viral evolution and epidemic dynamics.
- The proposal effectively supports the researcher's progression towards independence, preparing them for leadership roles, such as building their own interdisciplinary team or applying for tenure-track positions. This experience will strengthen the researcher's potential for a successful independent research career.
- The proposal presents a well-rounded dissemination strategy aimed at the scientific audience. Plans include open-access publications, conference presentations, and user-friendly software, ensuring accessibility and engagement with the scientific community.
- The planned public engagement initiatives are creative and engaging, leveraging the researcher's experience via the "Project Pangolin" association. Activities such as the "Pint of Science" events and the creation of an educational board game demonstrate a strong commitment to informing and educating a broad audience about viral outbreaks.
- The proposal has strong potential to advance understanding in viral evolution and epidemiology, particularly regarding how viruses adapt to vaccination. The combination of unique datasets and robust methodology is expected to generate insights that can influence future research and improve modelling approaches in viral dynamics and pathogen evolution.
- The project's findings are highly relevant to public health, with potential applications for designing effective vaccination campaigns, improving outbreak prevention efforts, and guiding resource allocation for epidemic response. These insights could be valuable for shaping responses to future pandemics and improving pathogen surveillance strategies.

Weaknesses:
- The dissemination plan does not sufficiently address outreach to public health bodies and health policy-makers, which limits the proposal's potential to impact public health strategies.

Criterion 3 - Implementation

Score: **5.00** (Threshold: 0 / 5.00 , Weight: 20.00%)

• Quality and effectiveness of the work plan, assessment of risks and appropriateness of the effort assigned to work packages.
• Quality and capacity of the host institutions and participating organisations, including hosting arrangements.

Strengths:
- The proposal presents a high-quality, detailed work plan supported by a comprehensive Gantt chart that clearly outlines work packages, milestones, deliverables, and the timeline of the secondment. The plan is well-aligned with the project's scope, ensuring a realistic and achievable timeline for each objective.
- The workload is appropriately distributed across the work packages, with a balanced allocation of time and resources for each task. Milestones and deliverables are well-defined, facilitating effective tracking and monitoring of project progress.
- The proposal provides a thorough risk assessment, identifying major risks along with their likelihood and severity. The contingency measures and mitigation strategies are sensible and align with the project's critical stages, ensuring preparedness for potential challenges.
- The hosting arrangements are of high quality, ensuring the researcher's seamless integration into the host team. The host institution offers a collaborative environment, with robust academic and administrative support that facilitates the researcher's integration and professional development.
- Both the host and secondment institutions provide all necessary infrastructure and facilities for the project's success, including access to laboratories, sequencing facilities, computational resources, and, where applicable, supercomputing capabilities. This strong support structure is well-suited to the project's needs and objectives.
- The host institution provides ample networking and collaboration opportunities, enabling the researcher to connect with relevant experts and expand professional networks. These arrangements are expected to contribute positively to the project's success and the researcher's career development.

Weaknesses:
None identified.

Scope of the application

Status: **Yes**

Comments (in case the proposal is out of scope)
Not provided

Exceptional funding

A third country participant/international organisation not listed in the General Annex to the Main Work Programme may exceptionally receive funding if their participation is essential for carrying out the project (for instance due to outstanding expertise, access to unique know-how, access to research infrastructure, access to particular geographical environments, possibility to involve key partners in emerging markets, access to data, etc.). (For more information, see the HE programme guide)

Please list the concerned applicants and requested grant amount and explain the reasons why.

Based on the information provided, the following participants should receive exceptional funding:
Not provided

Based on the information provided, the following participants should NOT receive exceptional funding:
Not provided

Use of human embryonic stem cells (hESC)

Status: **No**

If YES, please state whether the use of hESC is, or is not, in your opinion, necessary to achieve the scientific objectives of the proposal and the reasons why. Alternatively, please state if it cannot be assessed whether the use of hESC is necessary or not, because of a lack of information.
Not provided

Use of human embryos

Status: **No**

If YES, please explain how the human embryos will be used in the project.
Not provided

Activities excluded from funding

Status: **No**

If YES, please explain.
Not provided

Do no significant harm principle

Status: **Not applicable**

If Partially/No/Cannot be assessed please explain
Not provided

Exclusive focus on civil applications

Status: **Yes**

If NO, please explain.
Not provided

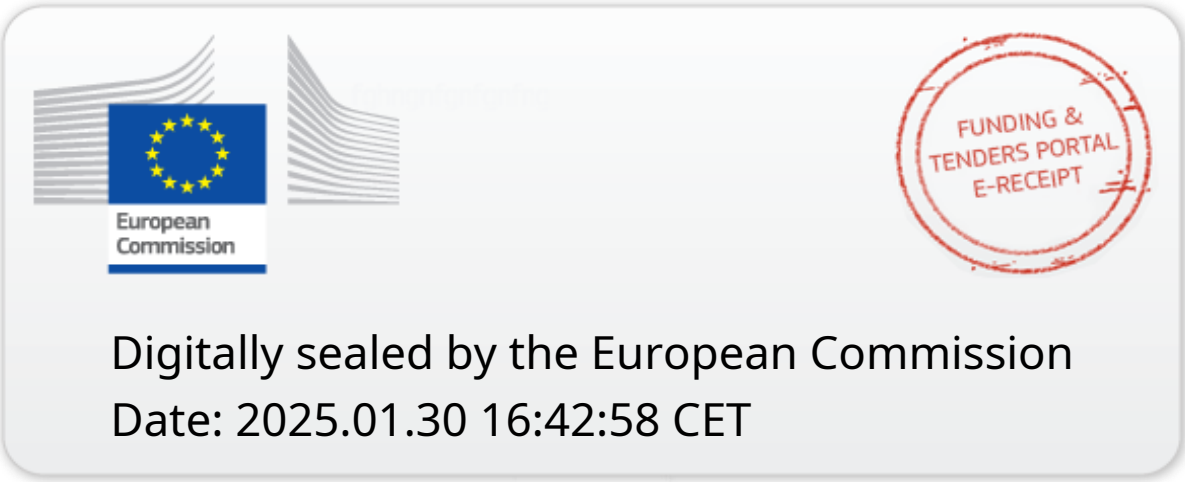
Artificial Intelligence

Status: **No**

If YES, the technical robustness of the proposed system must be evaluated under the appropriate criterion.

Overall comments

Not provided



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