

Studying the pathogenesis of Onchocerciasis-associated Epilepsy: Novel Rhabdovirus, OVRV1, found in *O. volvulus* and *Simulium*.

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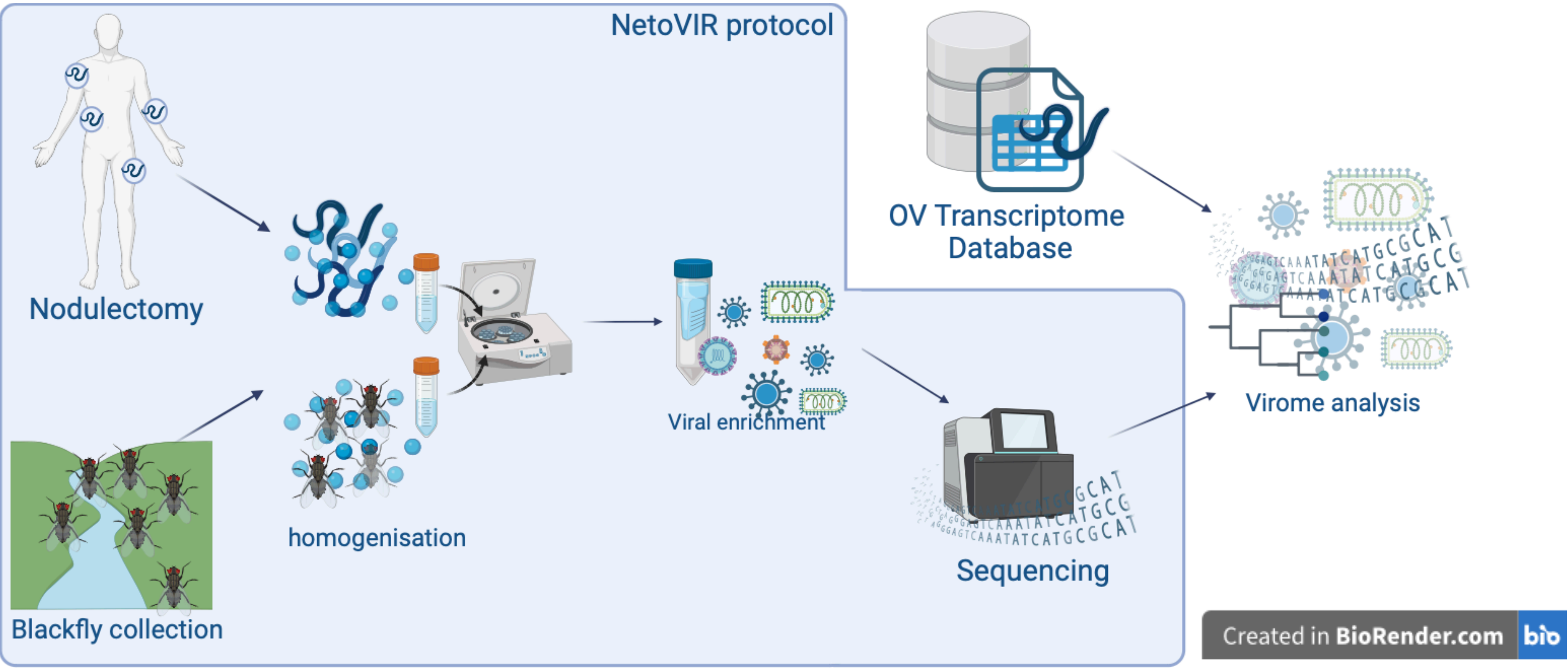
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Introduction

- Onchocerciasis:** a NTD caused by filarial nematode *O. volvulus* transmitted by blackflies (*Simulium*), commonly known as ‘river blindness’.
- Onchocerciasis-associated Epilepsy (OAE):** epilepsy appearing in onchocerciasis-endemic regions in children, ages 3 to 18 years, without obvious cause.
- Knowledge gaps:**
 - OAE is epidemiologically associated to Onchocerciasis BUT **pathogenesis unknown**
 - Basic biology of *O. volvulus* and *Simulium* remains largely uncharted, no metagenomic analysis into potential symbiotic microorganisms/viruses is available.

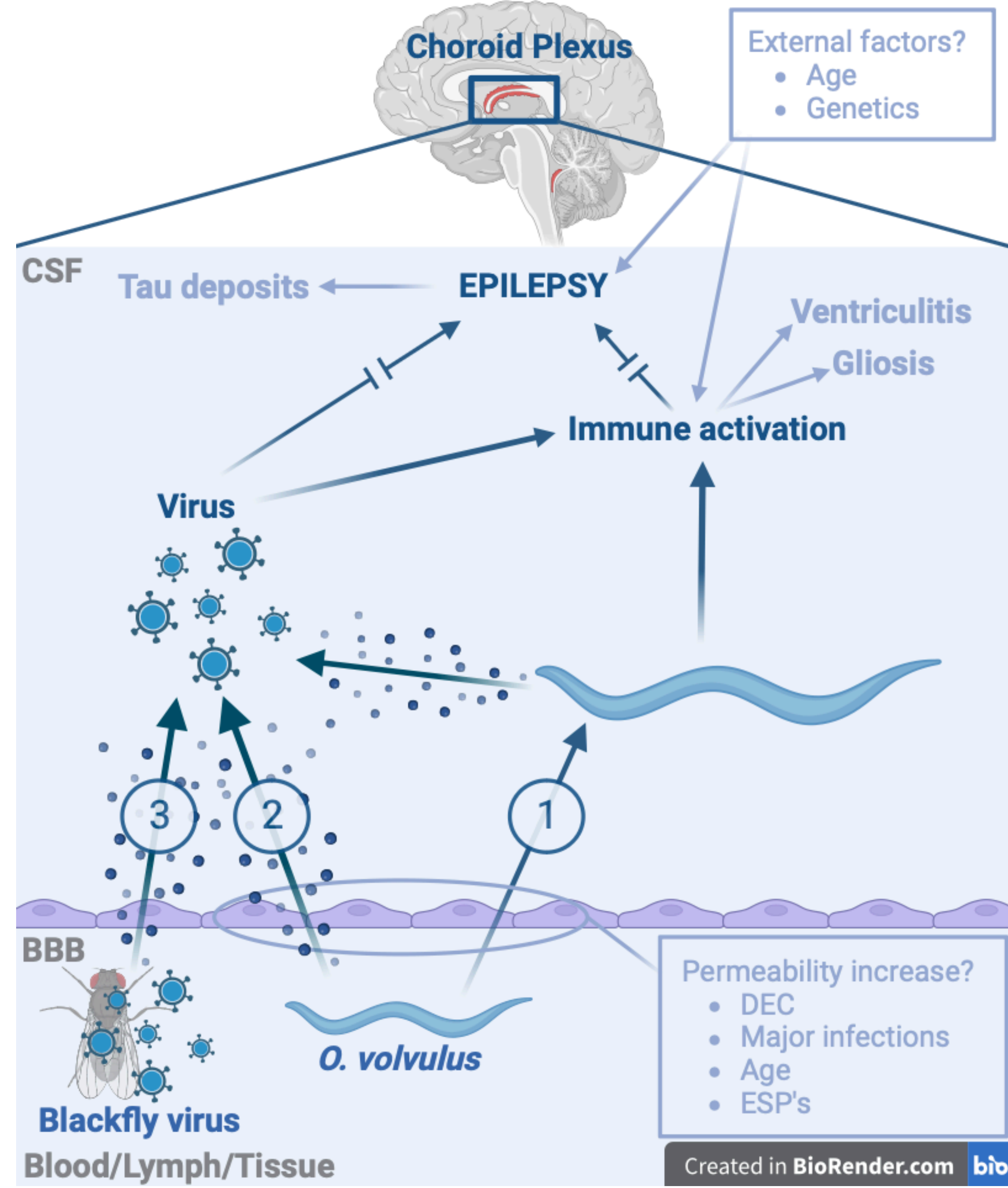
Materials and Methods



Principal References

- Hadermann, A. et al. “Onchocerciasis-associated epilepsy: an update and future perspectives.” *Trends in parasitology* vol. 39,2 (2023): 126-138.
- Conceição-Neto, N. et al. “Modular approach to customise sample preparation procedures for viral metagenomics: a reproducible protocol for virome analysis”. *Sci. Rep.* 5, (2015).

Hypothesis

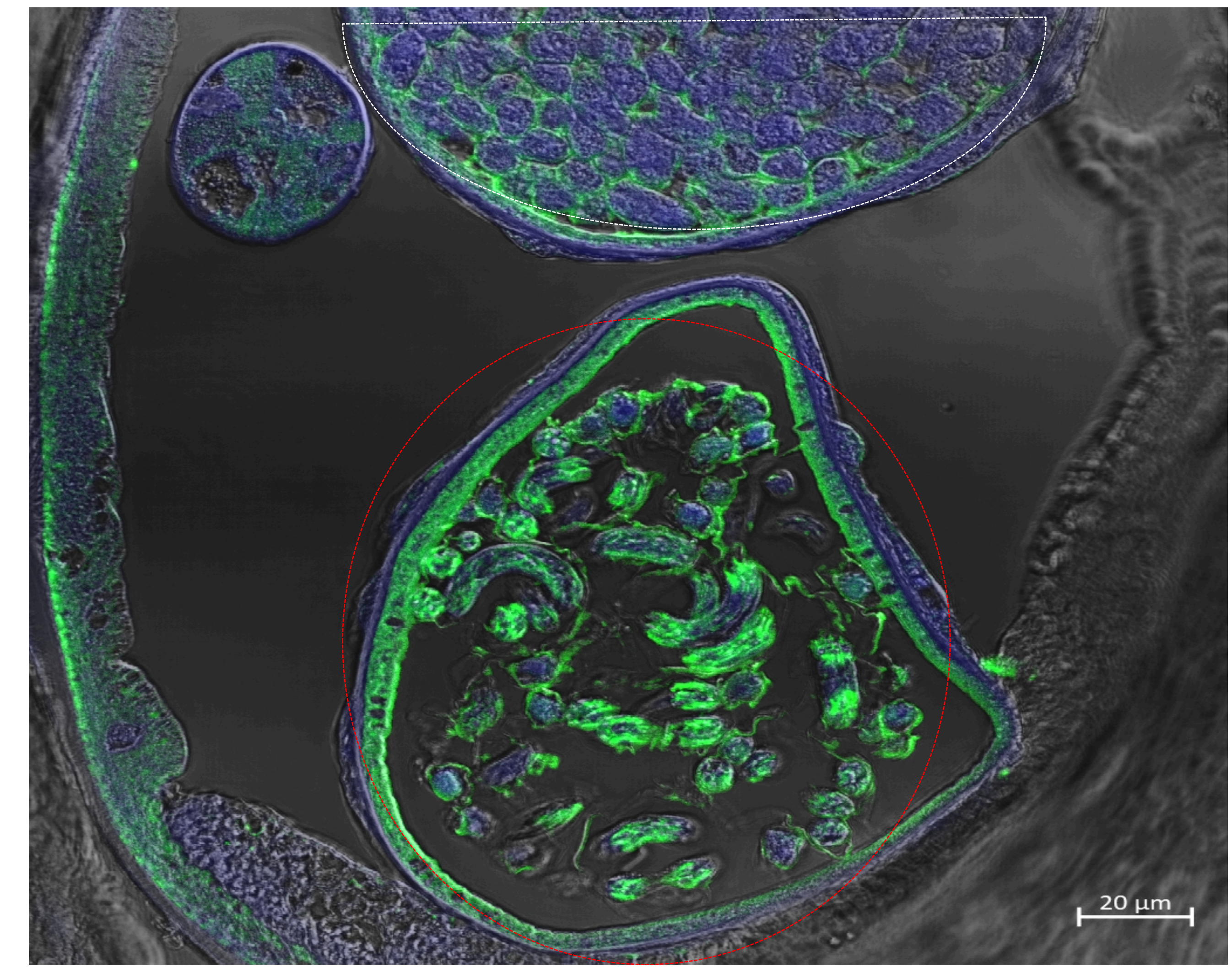


Funding and Partners



Results

- Novel Rhabdovirus, **OVRV1**, identified in *O. volvulus* from **Ghana, Cameroon, Nigeria and Togo**.
 - Antibody response** against OVRV1 glycoprotein found in seropositive persons from Ghana, Cameroon, Nigeria and Togo.
- OVRV1 reads **also found in *Simulium*** metagenomics results.
- OVRV1 **found across all life stages** and most in the female macrofilariae reproductive organs.



Immunofluorescence histochemistry images of OVRV1 in sections of *O. volvulus* nodules. Section of an *O. volvulus* female showing virus signal surrounding and entering developing embryos (red dashed circle) and eggs (white dashed circle). Blue = DAPI nuclear stain, green = OVRV1 immunofluorescence signal, cyan = signal overlap.

Next Step: Linking OVRV1 to OAE

- Association:** Screening blood samples from OAE Case-Control studies for OVRV1 with ELISA and PCR.
- Pathogenesis:** Screening CSF for presence of OVRV1 or immune response to OVRV1.