2023 Master internship at University of Gdańsk

TITLE : HOW DOES THE HERPESVIRUS OF SEALS MODULATE THE IMMUNE RESPONSE?

LAB & PEOPLE

- **Name of the hosting lab:** Department of Virus Molecular Biology and Department of Recombinant Vaccines (Virology Gdańsk), Intercollegiate Faculty of Biotechnology of the University of Gdańsk and Medical University of Gdańsk
- **General activities of the lab:** Virology, cell culture, viral immunity, antiviral compounds
- **Website:** https://virologygdansk.ug.edu.pl/research/
- **Number of staff / PhD**:8 permanent, 11 PhDs
- **Supervisor name and contact:** Andrea Lipińska, andrea.lipinska@biotech.ug.edu.pl, and Ewelina Król, ewelina.krol@biotech.ug.edu.pl

TOPIC OF THE INTERNSHIP

- **Scientific context of the internship** (max 20 lines)

Viruses are the most dynamically developing group of pathogens, infecting humans, animals, and plants. As intracellular parasites, they change the balance of the infected cell and exploit the molecular machinery of their hosts. Herpesviruses are masters of immune evasion – the escape and modulation of host antiviral response (Schuren et al., 2016). Marine animals, like fish, turtles, and mammals, are threatened by herpesvirus infections. Phocid herpesvirus 1 (PhHV-1) is an important pathogen of harbor seals, *Phoca vitulina*, leading to deaths or health impairment (e.g., blindness) of seal pups (Himworth et al, 2010). Vaccination of seals is currently on halt. Our understanding of the virus interactions with the host organism is also limited.

In this project, we will explore the mechanism of PhHV-1 immune evasion, especially the inhibition of antigen presentation. Our group previously identified a protein inhibitor in other herpesviruses, that should be also active in the seal virus (Verweij et al., 2011). The virus grows and can be tested in laboratory cell lines of feline origin. The project will give a good opportunity to develop skills in cell culture and virus culture systems (PhV-1 is non-pathogenic to humans), and immunological assays (virus titration, fluorescence microscopy, flow cytometry, Western blotting, ELISA). Understanding of immune evasion properties of the virus can lead to the improvement of antiviral vaccines.

Keywords : herpesvirus, phocid herpesvirus 1, UL49.5 protein, MHC class I, antigen presentation

Bibliography :
Schuren A.B., Costa A.I., Wiertz E.J. (2016) Recent advances in viral evasion of the MHC Class I processing pathway. doi: 10.1016/j.coi.2016.02.007.
Himworth C.G, Haulena M., and al. (2010) Pathology and epidemiology of phocid herpesvirus-1 in wild and rehabilitating harbor seals (Phoca vitulina richardsi) in the northeastern Pacific. doi: 10.7589/0090-3558-46.3.
Verweij M.C., Lipinska A.D. et al. (2011) The capacity of UL49.5 proteins to inhibit TAP is widely distributed among members of the genus Varicellovirus. doi: 10.1128/JVI.01621-10.

Tasks and duties entrusted to the student:

Feline cell line culture, PhHV-1 culture, molecular cloning of PhHV-1 gene, analysis of MHC class I levels by flow cytometry.

Skills to be acquired or developed:

Cell culture, virus culture, and titration, gene cloning, flow cytometry.

PROFILE OF THE DESIRED STUDENT

- **Minimum level of study required:** Master
- **Field(s) of study:** (Marine) biology, biotechnology, natural sciences
- **Scientific skills :** cell culture (if possible), work with DNA, Western blotting
- **Language skills required :** Communicative English.

THE INTERNSHIP ASSIGNMENT:

Desired duration of the internship (in months): 5

Desired Starting date of the mission: *(please indicate the level of flexibility) :* between 15th of January and 15th of February

Indicative weekly schedule: 35h / week

Remuneration *?*

Erasmus grant : additional Erasmus grant could be asked to your own university.

Internship agreement: *an internship agreement will be signed.*

To SEA-EU students:

If you're interested please send your CV and letter of motivation to the scientist in charge, andrea.lipinska@biotech.ug.edu.pl before the date ***01/12/ 2023*** *(as soon as possible).*