

INVITATION PUBLIC DEFENCE

Silencing the neighbourhood:
Pseudorabies virus-induced suppression of gap
junctional intercellular communication

Alexander Tishchenko Khoruzh

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PROMOTOR

Prof. dr. Herman W. Favoreel
Faculty of Veterinary Medicine, UGent

Curriculum Vitae

Alexander Tishchenko Khoruzh was born on 2 March 1994 in Volgodonsk (Russia), and grew up in Spain. He obtained his Bachelor's degree in Biochemistry and Molecular Biology at Universitat Rovira i Virgili (Tarragona, Spain) in 2018, followed by a Master's degree in Translational Biomedical Research at Universitat Autònoma de Barcelona (Barcelona, Spain). During his Master's thesis at Vall d'Hebron Research Institute, supervised by Dr. Trond Aasen, he studied the role of tunnelling nanotubes, a form of direct intercellular communication, in breast cancer. In 2019, he joined the Laboratory of Immunology at Ghent University under supervision of Prof. Herman Favoreel. His doctoral research investigates how pseudorabies virus disrupts gap junction-mediated intercellular communication between neighbouring cells. He has published in international peer-reviewed journals and presented his work at national and international conferences.

Where?

The defense will take place on Tuesday 20 October 2026 at 17:00.

Auditorium Hoogbouw (3rd floor)

Faculty of Veterinary Medicine
Ghent University, Campus Merelbeke
Salisburylaan 133, Merelbeke

A reception will follow in the Museum of Morphology.

How to attend?

If you would like to attend the defense and reception, please confirm your attendance by 13 October 2026 by email to Alexander.Tishchenko@UGent.be.

Members of the Jury

Prof. dr. **An Martel**
Chair of the Jury
Faculty of Veterinary Medicine, UGent

Prof. dr. **Hans Nauwynck**
Faculty of Veterinary Medicine, UGent

Prof. dr. **Ward De Spiegelaere**
Faculty of Veterinary Medicine, UGent

Prof. dr. **Mathieu Vinken**
Faculty of Medicine and Pharmacy, Vrije Universiteit
Brussel

Prof. dr. **Marc Mesnil**
Faculty of Fundamental and Applied Sciences, University
of Poitiers, France

Summary

Most cells do not face infection alone. Within a tissue, neighbouring cells are connected by small channels called gap junctions, which allow them to exchange molecules and coordinate their responses. These connections also provide a route for sharing warning signals during a viral infection, helping neighbouring cells prepare their defence. Yet, relatively little is known about if and especially how viruses interfere with this direct form of communication.

This thesis investigates the relationship between pseudorabies virus (PRV), a porcine herpesvirus closely related to the human herpes simplex viruses, and gap junctional intercellular communication. It focuses on connexin 43, the most widely expressed proteins forming gap junction channels. By combining a review of existing knowledge with experimental research, the work examines how infection changes communication between cells and explores the significance of these changes for antiviral defence.

The findings show that PRV disrupts connexin 43-mediated communication in cultured cells. This disruption involves several viral and host cell proteins, and develops in stages: gap junction channels initially close, followed by a later reduction in connexin 43 abundance. These observations reveal that infection affects both the function and maintenance of the connections linking neighbouring cells.

The thesis also investigates the functional relationship between gap junctions and innate antiviral immunity. Experiments involving inhibition of STING, a central component of innate cellular defence against DNA viruses, provide evidence linking the observed reduction in intercellular communication to impaired antiviral signalling. These findings support the idea that PRV suppresses gap junction-mediated communication as a previously uncharacterized immune evasion strategy, while the data also suggest that infected cells seek to enhance this communication to alert neighbouring cells and coordinate an antiviral response.

A further discovery concerns light viral-particles: non-infectious particles released by infected cells that carry viral components but lack the viral genome. The research shows that these particles can also alter gap junctional communication without establishing a productive infection. Their effects therefore extend the influence of the virus beyond the cells they infect, revealing an additional way in which viral exposure can change the behaviour of the surrounding cellular community.

Together, these discoveries highlight the importance of communication between neighbouring cells during viral infection. Understanding how viruses disrupt these connections may help guide the design of antiviral therapies that preserve or restore the ability of cells to coordinate their defences. Further research is needed to establish whether these findings extend to *ex vivo/in vivo* tissues and other viral infections, and whether protecting intercellular communication can offer a therapeutic benefit.

Campus Merelbeke

Salisburylaan 133, 9820 Merelbeke

Defense and reception

Defense: 24 Auditorium 1

Reception: 22 Museum Morphology



Campus Merelbeke

- 22** Museum Morphologie
- 12** Auditorium A en B
- 19** Auditorium D
- 22** Auditorium 1 Maximum
- 24** Auditorium 1
- 5** Verloskunde kleine huisdieren
Obstetrics small animals
- 6** Verloskunde grote huisdieren
Obstetrics large animals

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- 7** Inwendige ziekten paard
Internal medicine horse
- 9** Inwendige ziekten rund
Internal medicine ruminants
- 17** Heelkunde en medische beeldvorming
Surgery and medical imaging
- 20** Kleine huisdieren
Small animals
- 76** Autopsie
Autopsy
- 79** Pluimvee en Bijzondere dieren
Poultry and exotic animals

-  Fietswegel / *Bicycle route*
-  Fietsenstalling / *Bicycle storage*
-  Resto / *Restaurant*
-  Parking
-  Buitenring / *Outer ring*
-  Binnenring / *Inner ring*