PhD Program between the Freie Universität Berlin (FUB) and the China Scholarship Council (CSC)

Open PhD position for CSC scholarship candidates 2015

The PhD position is only offered to Chinese PhD candidates for application in the framework of the FU-CSC Program.

Department/Institute:	Institute of Virology / Veterinary Medicine
Subject area:	Infection Medicine
Name of Supervisor:	Prof. Dr. Klaus Osterrieder
Number of open positions:	1
Project title:	Viral and cellular factors that regulate equine herpesvirus type 1 and 4 internalization and infection.

Project description:

Aims of the study:

We are planning to elucidate the role of different viral glycoproteins (gH, gL, and gB) during virus entry. Furthermore, the molecular mechanisms underlying the specific internalization pathways (fusion at the plasma membrane or after endocytosis) will be investigated.

Equine herpesvirus type 1 and type 4 (EHV-1 and EHV-4) are members of *Varicellovirus* geus nand cause much damage to horse industry by inducing abortion storms or sporadic abortions in pregnant mares, early neonatal death in foals, respiratory disease in young horses and myeloencephalopathy. EHV-1 and EHV-4 envelope glycoproteins gC, gB, gD, gH, and gL are conserved in both viruses with high similarities reaching around 85 %. They have been shown to play roles in viral fusion with the host cell. Although both viruses bind the same entry receptor, major histocompatibility class I (MHC-I), through gD, they follow different entry pathways. Recently, we have shown that EHV-4 can enter the cells via caveolin/raft-dependent endocytic pathway. On the other hand, EHV-1 enters cells through either direct fusion with the plasma membrane or endocytosis. The decision for one of the two pathways is mainly dependent on the interaction between viral gH and cell surface $\alpha_4\beta_1$ integrins. However, the molecular mechanisms that determine the internalization pathways in both cases are not fully understood. One possibility, among others, is that differential signaling following virus attachment determines which pathway is used.

Construction of recombinant viruses and Characterization of generated viruses.

Recombinant EHV-1 Ab4p containing EHV-4 gB, gL and/or gH or recombinant EHV-4 containing EHV-1 gB, gL and/or gH will be constructed. The correct size and insertion of these genes will be analyzed by PCR, restriction fragment length polymorphism (RFLP), nucleotide sequencing, and Southern blotting.

Western blotting and immunoflourescence assay.

Expression of the exchanged glycoproteins in recombinant viruses will be tested by Western blotting and indirect immunofluorescence assays.

Virus growth assays.
A plaque assay for measuring the efficiency of infection of generated viruses will be developed. In vitro replication assays to test the effect of mutagenesis on growth kinetics and plaque sizes will be performed.
Detection of efficiency of entry and entry pathway of recombinant viruses.
The newly constructed recombinant viruses, together with the parental viruses, will be evaluated in vitro for entry into different cells through the use of FACS analysis and confocal microscopy.
Virus-induced signaling cascades.
We will compare levels of phosphorylated and total cellular kinases by western blot at various time points after infection.

Academic requirements:

PhD degree obtained from a Chinese university. Good knowledge in English (spoken and written)

Link to professor and further information:

In a first step the complete application should submit to the Beijing Office for evaluation by January 4th. Please don't contact the professor before. She will get in contact with you after having received the complete application in January.