2017 Helmholtz – OCPC – Programme
for the involvement of postdocs in bilateral collaboration projects

PART A

Title of the project: Characterization of SERINC5-mediated restriction of HIV-1 infection

Helmholtz Centre and institute: Helmholtz Centre for Infection Research, Institute of Experimental Virology, Group "Innate Immunity and Viral Evasion"

Project leader: Prof. Dr. Christine Goffinet

Web-address:
http://www.twincore.de/en/institutes/experimental-virology/rg-innate-immunity-and-viral-evasion/

Description of the project:

The overall scientific interest of the group focuses on innate immunity against HIV-1 and respective viral antagonistic strategies. Specifically, we are interested in understanding how antiviral proteins, so-called restriction factors, interfere with the replication cycle of HIV-1, e.g. by modulating assembly and infectivity of particles, and how HIV-1 has evolved to counteract these cellular defence mechanisms. A second interest is the characterization of HIV-1 DNA sensing by the DNA sensor cGAS in primary HIV-1 target cells, which triggers an antiviral type I interferon response in HIV-1-infected cell cultures.

In the project, the successful applicant will work on the characterization of SERINC5, a recently identified cellular multipass transmembrane protein and restriction factor which reduces the infectivity of HIV-1 by a yet-to-be defined mode of action that may involve its incorporation into nascent particles, resulting in impaired HIV-1 Env-mediated fusion of virions with target cells. HIV-1 Nef efficiently counteracts this restriction by downregulating SERINC5 from the virus producer´s cell surface, thus preventing viral incorporation of the antiviral factor. Specifically, it is planned to elucidate its antiviral potency during cell-to-cell transmission of HIV-1, to study basic parameters of expression and subcellular localization of the endogenously expressed SERINC5 protein in the absence and presence of HIV-1, and to characterize the impact of human variants of the *serinc5* gene on HIV-1 infection. This project has the potential to identify new key features of SERINC5-mediated restriction of HIV-1 and may pave avenues avenues towards the development of novel antiviral strategies that are effective *in vivo* in HIV-1-infected patients.

The methodologies include functional assays for quantification of individual HIV-1 replication steps, generation of infectious HIV-1 stocks in the BSL3 laboratory, lentiviral shRNA-mediated knockdown of individual genes, Q-RT-PCR, quantitative LI-COR Odyssey Infrared imaging-based Western Blotting, flow cytometry, cultivation of human blood-derived primary cells. The successful applicant will be embedded in a small, interactive research

group dedicated to research on cellular antiviral immunity and virus evasion, and benefit from multiple ongoing collaborations with internal and external partners.

Description of existing or sought Chinese collaboration partner institute:
Ideally, the Chinese collaboration partner institute should have a strong expertise on HIV-1 biology and innate immunity aspects against viral infections.

Required qualification of the post-doc:

- PhD in virology, preferably HIV-1
- Experience with BSL3 working
- Additional skills in communication, presentation and organization
- Ability and interest to work on an internationally competitive project

PART B

Documents to be provided by the post-doc:

- Detailed description of the interest in joining the project (motivation letter)
- Curriculum vitae, copies of degrees
- List of publications
- 2 letters of recommendation

PART C

Additional requirements to be fulfilled by the post-doc:

- Max. age of 35 years
- PhD degree not older than 5 years
- Very good command of the English language
- Strong ability to work independently and in a team