

March 12, 2018

MS SPIDOC: EU Funding for the Investigation of Protein Structures

Introduction of new Mass Spectrometry Prototype for Single Particle Determination at the European XFEL

Hamburg. For the joint research project “MS SPIDOC” the Heinrich Pette Institute, Leibniz Institute for Experimental Virology (HPI) and its project partners receive about 3.7 million Euros. The project aims to revolutionize biological imaging at the Free-Electron Laser European XFEL by introducing a new mass spectrometry prototype.

For the development of new vaccines and drugs against infectious diseases not only the structure of the involved biomolecules has to be understood but also their dynamics. Single particle imaging experiments at Free-Electron Lasers like the European XFEL in Hamburg provide new insights into the dynamics by combining single snapshots from different protein structures into a “molecular movie”. However, the disadvantages of this approach are the wealth of data required, long processing times, high sample consumption as well as high background noise.

The “MS SPIDOC” consortium aims to overcome those challenges by developing a mass spectrometry prototype that will be integrated into a prototype experimental chamber at the European XFEL to provide mass and conformation selected biomolecules. This selection allows to depict distinct transition states with highest possible transmission efficiency. “An important aspect of the project is the orientation of protein complexes along their dipole axis upon imaging. This will result in big advantages for the data analysis and acquisition,” explains Dr. Charlotte Uetrecht, head of the HPI junior research group “Dynamics of Viral Structures”. “First theoretic approaches indicate feasibility of dipole orientation. Now we want to deepen these investigations and integrate a respective module into the prototype.”

“MS SPIDOC” is funded within the EU’s Horizon 2020 program “H2020-FETOPEN-2016-2017” (Research and Innovation Action). „MS SPIDOC“ is one of 27 champions that won over a total of 395 applications submitted to the last FET-Open Research and Innovation Actions call.

Beside the Heinrich Pette Institute and the European XFEL GmbH the following partners are members of the “MS SPIDOC” consortium: The University of Greifswald (Germany), the company Fasmatech Science and Technology SA (Greece), the Claude Bernard Lyon 1 University (Institut Lumière Matière, France), the company MS Vision (The Netherlands), the Uppsala University (Sweden) and the University of Manchester (Great Britain).

The Heinrich Pette Institute coordinates the “MS SPIDOC” project (801406), which will run for three years, starting September 1, 2018.

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Joint Research Project

801406 MS SPIDOC:
Mass Spectrometry for
Single Particle Imaging of
Dipole Oriented protein
Complexes
Call:
H2020-FETOPEN-2016-
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Heinrich Pette Institute, Leibniz Institute for Experimental Virology

The Heinrich Pette Institute, Leibniz Institute for Experimental Virology (HPI) investigates the biology of human pathogenic viruses with the aim of unraveling the molecular mechanisms that control viral life cycles and virus induced pathogenesis. The institute applies basic experimental research to develop new approaches for contemporary treatments of viral infections such as AIDS, influenza and hepatitis but also of emerging viral diseases.

The HPI was established by the philanthropist Philipp F. Reemtsma and the neurologist Heinrich Pette in 1948. The institute is a non-profit, independent research foundation that is part of the Leibniz Association.

Further information: www.hpi-hamburg.de