IMP Press Release

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Vienna, April 1, 2015

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A Clear View for the Vienna Biocenter

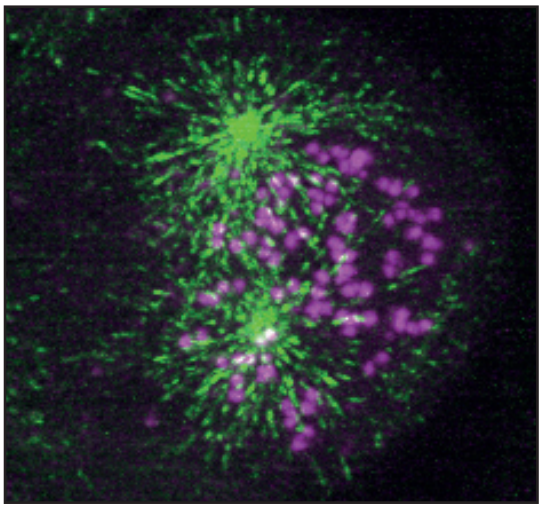
WWTF supports innovative microscopy techniques with 1.7 million euros worth of grants

In its 2014 Life Sciences Call 'Imaging', the Vienna Science and Technology Fund (WWTF) aims to stimulate innovative biological and biomedical applications of novel imaging technologies and to foster collaboration between biologists and physicists. Out of the 126 initial proposals, eight were chosen for funding by an international jury.

Among the successful applications were three projects from researchers of the Vienna Biocenter (VBC). The total funding of 1.7 million euros will help to position the Vienna Biocenter as an international center of excellence for bioimaging.

The project "Whole brain imaging of decision-making in freely moving C. elegans" by neurobiologist Manuel Zimmer und physicist Alipasha Vaziri will address the question of how the nervous system processes information – from the initial sensory input to the resulting behavior. Both scientists are Group Leaders at the Research Institute of Molecular Pathology (IMP) in Vienna. Alipasha Vaziri is also affiliated with the Max F. Perutz Laboratories and the QuNaBioS research platform of the University of Vienna. For their research, they have chosen the nematode C. elegans as a model organism. The tiny worm's nervous system consists of only 302 cells but still shares basic characteristics with the mammalian brain. Zimmer and Vaziri recently published two new approaches that enable them to perform near simultaneous recording of the activity of almost all individual neurons in the worm. However, these measurements were only possible in paralyzed animals up to now. Their new project, funded with 582,000 euros, will combine innovative microscopy and behavioral tracking techniques for high-resolution brain-wide imaging of freely moving animals. The ultimate goal to reach a comprehensive understanding of the brain's operational principles will thus become one step closer.

The second project „Elucidating mitotic spindle assembly mechanisms by super-resolution fluorescence microscopy" was by Daniel Gerlich, group leader at the Institute for Molecular Biotechnology (IMBA). Together with Alipasha Vaziri and Kareem Elsayad, head of the CSF Advanced Microscopy Facility, they will study the function of microtubules during mitosis at the molecular level. With the funding of 582,000 euros a so-called „Bessel beam light-sheet" microscope will be built. This system is not yet commercially available and will be built according to the design of the microspcope in Chemistry Nobel Prize Laureate Eric Betzig's lab at the Janelia Research Campus (USA). The new technology will make it possible to observe individual microtubules building the mitotic spindle in real time, which is not feasible with conventional microscopy methods.



The third successful submission came from Dea Slade, group leader at the Max F. Perutz Laboratories (MFPL) of the University of Vienna and the Medical University of Vienna. The project „Imaging recruitment of chromatin remodeling proteins to the sites of DNA damage induced by laser microirradiation" is a joint project with Josef Gotzmann, head of the MFPL BioOptics Facility, and Kareem Elsayad. The funding of 517,000 euros will allow the extension of a recently acquired UV-laser microscopy system. Dea Slade and her team use this nano-manipulation system to induce site-specific damage in the genetic material (DNA) of single living cells and to study its following repair by a specialized endogenous protein machinery. The microscopic analysis, for which the

Caption:
Lattice light sheet microscopy of mitotic spindle assembly in live human HeLa cell expressing the microtubule tip-binding protein EB3-EGFP (green) and the kinetochore marker mCherry-CENP-A (magenta). Photo: IMBA

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involved proteins are fluorescently-labelled, allows the researchers to study the “damage response” at high spatial and temporal resolution, and to ultimately shed light on the highly complex network of individual actors involved in the DNA repair.

About the Vienna Biocenter

The Vienna Biocenter (VBC) is Vienna‘s largest life science hub and a center of molecular biological research excellence. In addition to six institutions that are dedicated to basic research, 14 companies are currently on location in New Marx. More than 1,400 employees and 700 students make the VBC a hotspot of innovative approaches in the life sciences. In the academic field, the Research Institute of Molecular Pathology (IMP), the Institute of Molecular Biotechnology (IMBA), the Gregor Mendel Institute (GMI) and the Max F. Perutz Laboratories (MFPL) are the flagships of the Vienna Biocenter. The Campus Science Support Facilities (CSF) provide state-of-the-art scientific services.

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