Super-Resolution Fluorescence Cryo-Microscopy (continuation)

Initiative: Freigeist-Fellowships

Bewilligung: 14.03.2024

Laufzeit: 3 Jahre

Super-resolution light microscopy - e.g. introducing fluorescent molecules and switching them on and off with lasers to 'calculate' much 'sharper' images - allows zooming into the complex nano-world of a cell unveiling their functional mechanistics. However, in many cases these super-microscopes are too slow to deal with the very dynamic environments in living cells and chemical fixation is used to stop all movement, but this also leads to structural changes. Thus, images from these super-microscopes are not necessarily valid representations of the structures and can cause misleading conclusions. Alternatively, samples can be frozen so quickly that no structural changes can occur. However, there is a lack of suitable technology for optical imaging of these cryo-samples at the super-microscopy level. During the first Freigeist funding phase, the Fellow has developed a new microscope that allows imaging cryo-samples at the super-resolution level, which opens up a new field of microscopy and bridges the gap to the world of electron cryo microscopy. This enables to access functional and structural information of the interior of a cell at the highest resolution level and investigating various biological problems that have remained unanswered so far - ranging from developmental biological processes to infection mechanisms of viruses and bacteria. In the second funding phase, the Fellow will investigate new cryo photo-physics phenomena, which play an important role to further increase the resolution.

Projektbeteiligte

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