Super-Resolution Microscopy: Visualizing Herpes Virus with Multi-Color dSTORM

Although super-resolution light microscopy has broken new ground in our understanding of subcellular structures and the movement of individual molecules within cells, its use to investigate virus particles is in its infancy. However, the field could be about to explode following the publication of work by a Cambridge University team using a trio of fast and ultra-sensitive Andor iXon EMCCD cameras. Led by Professor Clemens Kaminski and Dr Colin Crump, the team has successfully developed a methodology that allows dSTORM super-resolution microscopy to be used as a structural tool for the study of viruses.

This has enabled the team to construct an ultra-high-resolution image of the Herpes simplex virus type-1 (HSV-1) and determine the position of individual protein layers within the virion with nanometre precision. They also determined the distance between the capsid protein shell and the centre of the HSV-1 virion. Additionally, multi-colour dSTORM allowed the team to observe multiple layers simultaneously in individual virus particles.

"Pinpointing with nanometric precision the position of individual proteins within the HSV-1 structure is crucial in providing the research community with potential therapeutic targets," says Dr Romain Laine of the Department of Chemical Engineering and Biotechnology's Laser Analytics Group. "Understanding the structure gives us a chance to better understand the functions of the different proteins present in the virus, even to suggest new functionality, and to consider previously unforeseeable protein-protein interactions."

Original publication:

More information:
http://laser.ceb.cam.ac.uk/
http://www.andor.com/