SECOND HARMONIC GENERATION MICROSCOPY ON THE POLYHEDRAL INCLUSION BODIES OF NUCLEAR POLYHEDROSIS VIRUSES

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In recent years, nucleopolyhedrovirus (NPV) has drawn a lot of attentions due to its applications in the biological pesticides [1], the gene therapy [2], and the production of foreign proteins. The NPV infected cells will express large amount of polyhedrin used for occluding reproductive virions into micrometer-sized polyhedral inclusion bodies (PIB) in the nucleus. Traditionally, the number of PIBs can be either counted by a hemocytometer or estimated from their optical density. However, these quantification methods require the infected cells being lysed. Besides, in the early stage of infection, the size of PIBs might be smaller than 1μm, which is inconvenient to identify and count under the conventional optical microscope. Here, for the first time, we demonstrated the second harmonic generation (SHG) imaging on the PIBs in the infected cells. Exploiting their characteristic polarization anisotropy of SHG signal and the 3D sectioning capability of multimodal nonlinear optical microscopy, we can image the size and 3D distribution of the PIBs in the living infected cells without the help of exogenous stains.

References