

Expansion microscopy of apicomplexan parasites

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Abstract

Apicomplexan parasites comprise significant pathogens of humans, livestock, and wildlife, but also represent a diverse group of eukaryotes with interesting and unique cell biology. Study of cell biology in apicomplexan parasites is complicated by their small size, and historically this has required the application of cutting-edge microscopy techniques to investigate fundamental processes like mitosis or cell division in these organisms. Recently, a technique called expansion microscopy has been developed, which rather than increasing instrument resolution like most imaging modalities, physically expands a biological sample >4-fold. In only a few years since its development, a derivative of expansion microscopy known as ultrastructure-expansion microscopy (U-ExM) has been widely adopted and proven extremely useful for studying cell biology of Apicomplexa. Here we review the insights into apicomplexan cell biology that have been enabled through the use of U-ExM, with a specific focus on *Plasmodium*, *Toxoplasma*, and *Cryptosporidium*. Further, we summarise emerging expansion microscopy modifications and modalities and forecast how these may influence the field of parasite cell biology in future.

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