Optimized preparation of graphene-supported grids for high-resolution cryo-EM

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Cryogenic electron microscopy (cryo-EM) has emerged as a leading technique for structural biology, yet specimen preparation remains a major bottleneck. Conventional holey carbon grids often suffer from sample loss, preferred particle orientation, and beam-induced motion, limiting data quality. Graphene, with its single-atom thickness, high electrical conductivity, and mechanical stability, offers a promising alternative support film for cryo-EM. Here, we present an optimized workflow for the preparation of graphene-coated grids suitable for high-resolution cryo-EM imaging. Our method emphasizes improved graphene transfer strategies to achieve uniform coverage and enhanced protein adsorption without compromising particle integrity. Using this approach, we were able to determine the high-resolution structure of apoferritin, validating the robustness and reproducibility of the method. This strategy provides a reliable route to generate high-quality graphene supports, paving the way for more accurate structural studies of challenging biomolecular specimens.