When in Doubt, Reach Out: Know When to Borrow Expert Eyes & Brains

S. Erdogan Damgard[1], L.A. Cummins[1], S.E. Miller[2]

[1] Mayo Clinic; [2] Duke Medical Center.

Abstract

Electron microscopy (EM) remains a powerful diagnostic tool when applied with appropriate expertise and context, particularly in the evaluation of tissues like renal biopsy specimens where ultrastructural analysis can uncover unexpected findings. Accurate interpretation relies fundamentally on a comprehensive understanding of normal tissue architecture and its range of variation, which provides the baseline for distinguishing pathological alterations. Equally critical is the adoption of a systematic and unbiased analytical approach—one that minimizes preconceived expectations and emphasizes careful observation. In many cases, tissue morphology itself directs the diagnostic process when examined with sufficient experience and attention. However, certain domains—such as infectious diseases—pose additional challenges, as ultrastructural examination may reveal unexpected microorganisms that require specialized expertise for accurate identification. Conversely, normal or pathological subcellular features may be misinterpreted as infectious agents in the absence of sufficient experience. These diagnostic pitfalls highlight the importance of recognizing the limits of individual expertise. In complex or ambiguous cases, consultation with subspecialty experts is essential to ensure accurate interpretation and to avoid overreliance on informal or nonvalidated resources. Together, these principles emphasize the importance of foundational knowledge, methodological rigor, and collaborative practice in maximizing the diagnostic value of electron microscopy.