

Abstract Submitted
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Visualizing the cytoskeleton architecture of mammalian sperm flagella TERRANCE BISHOP, XINRAN XU, Colorado State University, MARIA GERVASI, University of Massachusetts, DIEGO KRAPF, Colorado State University, PABLO VISCONTI, University of Massachusetts, MARIANO G. BUFFONE COLLABORATION, DARIO KRAPF COLLABORATION — The mammalian sperm is composed of a head that stores the DNA and a flagellum that propels the cell and which is composed of three compartments: midpiece, principal piece, and end piece. Radially, a central axoneme is surrounded by the outer dense fibers (ODFs). In the midpiece the ODFs are wrapped by a mitochondrial sheath where mitochondria are localized in a unique helical structure, critical for sperm function. As in other cell types, the organization of the cell and its mechanical properties is likely dictated by the cytoskeleton architecture. However, the structure of the sperm cytoskeleton remains unknown. In order to investigate the actin cytoskeleton in the sperm flagellum, we have employed super-resolution imaging in three dimensions and atomic force microscopy (AFM). We succeeded in visualizing the structure of actin and actin-binding proteins in the sperm tail. Additionally, utilization of AFM assists to resolve the surface topology of the tail. We found that the mid-piece of murine sperm develops a cytoskeleton with a sinistral double-helix pattern. Also, actin-associated proteins spectrin and adducin are also found in these structures. Our findings illustrate a novel structure of actin filaments in a mammalian cell.

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