The Male Mouse Meiotic Cilium Emanates from the Mother Centriole at Zygotene Prior to Centrosome Duplication

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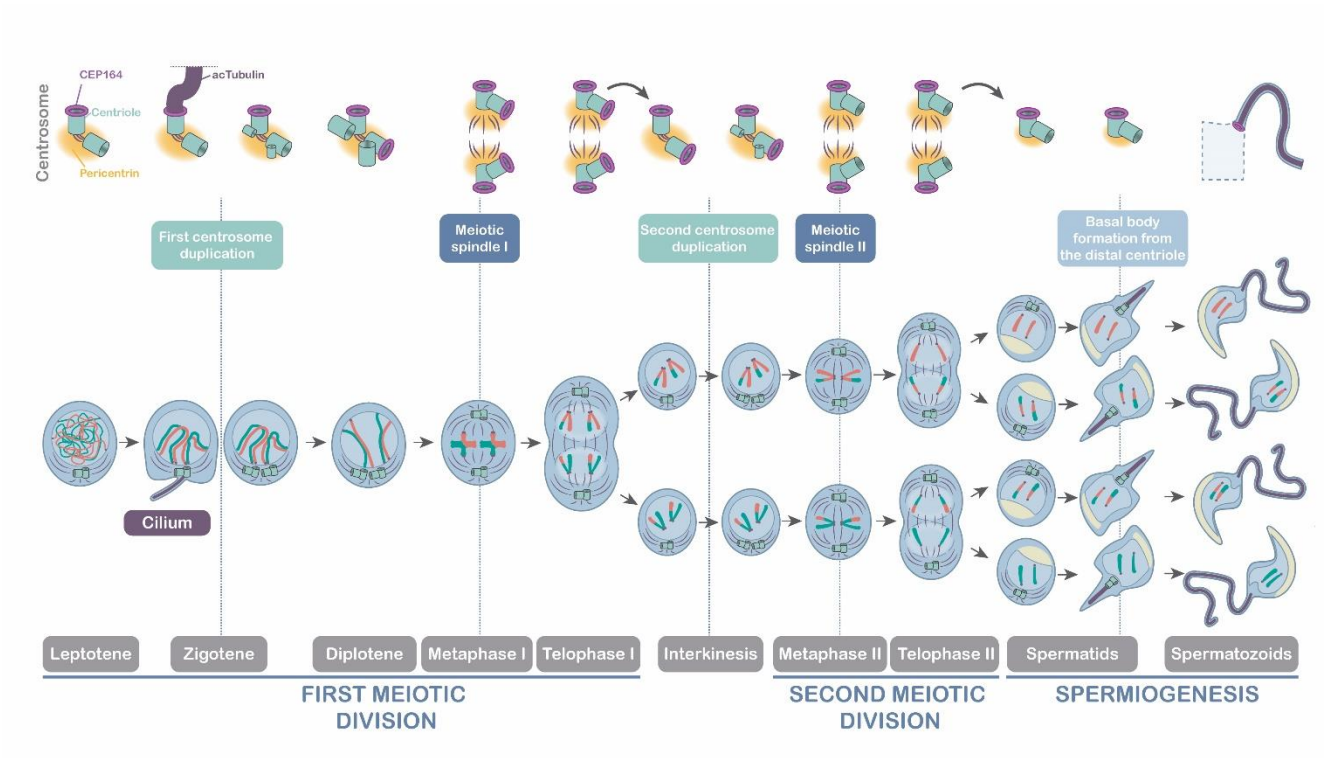
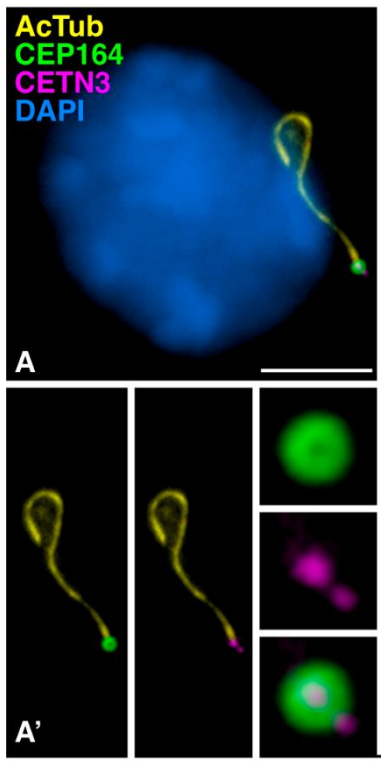
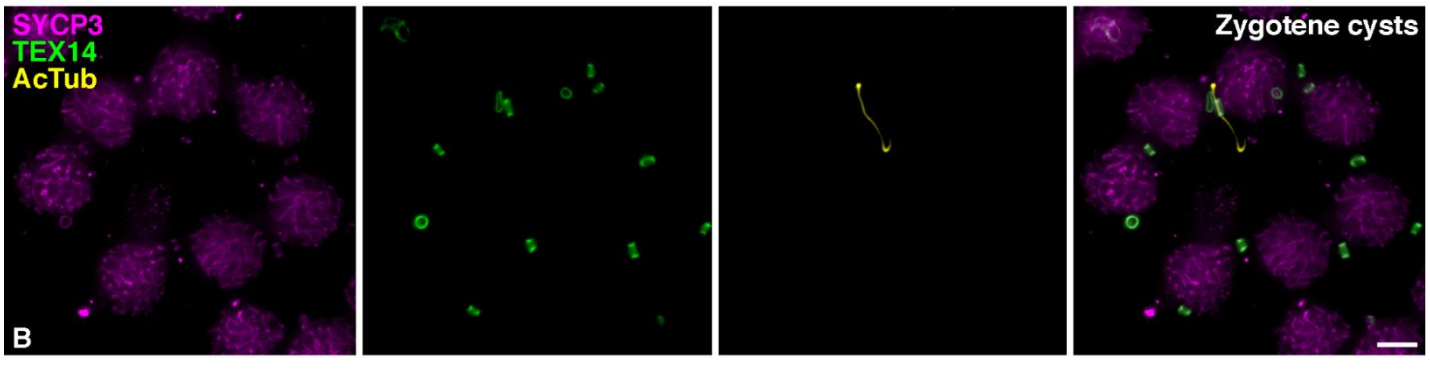




Cilia are hair-like projections of the plasma membrane with an inner microtubule skeleton known as axoneme. Motile cilia and flagella beat to displace extracellular fluids, playing important roles in the airways and reproductive system. On the contrary, primary cilia function as cell-type-dependent sensory organelles, detecting chemical, mechanical, or optical signals from the extracellular environment. Cilia dysfunction is associated with genetic diseases called ciliopathies and with some types of cancer. Cilia have been recently identified in zebrafish gametogenesis as an important regulator of bouquet conformation and recombination. However, there is little information about the structure and functions of cilia in mammalian meiosis. Here we describe the presence of cilia in male mouse meiotic cells. These solitary cilia formed transiently in 20% of zygotene spermatocytes and reached considerable lengths (up to 15-23 µm). CEP164 and CETN3 localization studies indicated that these cilia emanate from the mother centriole prior to centrosome duplication. In addition, the study of telomeric TFR2 suggested that cilia are not directly related to the bouquet conformation during early male mouse meiosis. Instead, based on TEX14 labeling of intercellular bridges in spermatocyte cysts, we suggest that mouse meiotic cilia may have sensory roles affecting cyst function during prophase I.



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