

From scaffold to maestro: uncovering critical roles of the chromosome axis protein SYCP2 in meiosis

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During meiotic prophase, homologous chromosomes pair to form synaptonemal complexes (SCs), which facilitate recombination, leading the formation of chromosomal crossovers. SCs consist of aligned proteinaceous chromosome axes that are connected by transverse filament proteins. Previous studies established that SYCP2 serves as a key scaffold protein in axis and SC assembly. Our recent work suggests a model for SYCP2-mediated transformation of discontinuous cohesion cores into continuous, linear chromosome axes. Beyond this structural role, we uncover critical functions of SYCP2 in the control and coordination of recombination, meiotic checkpoints and meiotic prophase progression. These functions are relevant to the genesis of fertility defects, aneuploidies and the recently documented contribution of SYCP2 to drug resistance and enhanced recombination in various cancers.