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The seminiferous tubules of mammalian testes: A different epithelium encased by a bandage structure of smooth muscle cell monolayers

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Mature seminiferous tubules (STs) of mammalian testes comprise the Sertoli cells and germ cells and are tightly surrounded by a special peritubular cell wall. Using biochemical, immunocytochemical and electron microscopical methods, we have determined that STs differ from all other epithelia by the absence of cytokeratin intermediate filaments (IFs) but are rich in vimentin IFs, do not contain major epithelial marker structures and molecules such as desmosomes or E-cadherin-based adherens junctions (AJs) but contain exclusively N-cadherin-based AJs. In Sertoli cells, we have found two new junction structures: (1) N-cadherin-based areae adhaerentes which often represent even very large areas connecting Sertoli cells with each other or with germ cells. (2) Special AJs arranged in closely and regularly spaced rows of tight junction-like structures and associated with 5-8 nm wide cytoplasm-to-cytoplasm channels (cribelliform junctions). The seminiferous tubule cells are attached to the peritubular wall by a well-developed basal lamina but lack hemidesmosomes and hemidesmosomal marker molecules. The peritubular wall is a stack system of layers of extracellular matrix (ECM) structures alternating with monolayers of very flat lamellar smooth muscle cells (LSMCs). These LSMCs represent differentiated smooth muscle cells (SMCs; positive for smooth muscle α-actin, the corresponding myosin light and heavy chains, α-actinin, tropomyosin, smoothelin, desmin, vimentin, filamin, talin, dystrophin, caldesmon, calponin and protein SM22α). The cells are laterally connected often in overlapping protrusions by AJs containing cadherin-11 as the predominant cadherin, and also P-cadherin and rarely N-cadherin, anchored in cytoplasmic plaques containing β-catenin, proteins p120 and p0071, plakoglobin and protein myozap. LSMCs also contain typical SMC structures such as dense bodies, plasma membrane-associated focal adhesions and caveolae. Thus, we conclude that these LSMCs represent a specific SMC type and not just myoid cells or myofibroblasts as stated in the literature.

Biography

Lisa M Domke is currently a PhD student in the Helmholtz Group for Cell Biology of Professor Werner W Franke at German Cancer Research Center, Germany. She has prepared her Master's thesis with one of the pioneers in cancer research, Professor Dr. Robert A Weinberg at the Massachusetts Institute of Technology (MIT) in Cambridge, USA. The nature of her degree in Biotechnology has allowed her to learn various analytical as well as light and electron microscopical techniques and to work in different fields of life sciences.

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