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Regulation of Sulfated Glycoprotein-1 and Cathepsin D Expression in Adult Rat Epididymis

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Endocytosis, whereby proteins are internalized from the epididymal lumen to be eventually degraded in lysosomes, is one of the major functions of the epididymal epithelial cells in maintaining a proper luminal milieu conducive for sperm maturation. In the present study, using light microscope immunocytochemical methods, we examined the regulation of 2 lysosomal enzymes, sulfated glycoprotein-1 (SGP-1) and cathepsin D, in adult rat epididymides fixed in Bouin fixative and embedded in paraffin. After orchidectomy (O) with or without testosterone (T) supplementation, efferent duct ligation (EDL), or hypophysectomy (H), lysosomes of principal cells were intensely reactive with the anti-SGP-1 antibody, as were narrow, clear, and basal cells, with staining patterns similar to that of control animals. These experimental procedures also had no effect on cathepsin D expression in all cell types, except for clear cells of the corpus and cauda epididymidis, which after orchiedectomy and hypophysectomy, became intensely reactive, unlike their completely unreactive state in control animals. In O+T animals, as well as in EDL animals, clear cells remained unreactive. These data taken together suggest that expression of SGP-1 is not under the control of testicular or pituitary factors, as is also the case for cathepsin D expression by principal, narrow, and basal cells. However, specific inhibition of cathepsin D expression by testosterone or one of its metabolites appears to occur in clear cells of the corpus and cauda epididymidis. Furthermore, in addition to small, typical lysosomes, principal cells also revealed large supranuclear and infranuclear spherical structures that were immunoreactive with both anti-SGP-1 and anti-cathepsin D antibodies, suggesting their lysosomal nature. With electron microscopy, these structures appeared electron-lucent and contained membranous profiles embedded in an electron-dense, granular background. Such images suggest that the various experimental procedures adversely affect the expression of several other lysosomal enzymes in principal cells, leading to a lysosomal phenotype similar to that observed in various lysosomal storage diseases.

Key words: Light microscopy, orchidectomy, ligation, hypophysectomy, immunocytochemistry

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