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JOURNAL ARTICLE

Low density lipoprotein receptor-related protein-1 expression in the testis: regulated expression in Sertoli cells

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The low density lipoprotein receptor-related protein (LRP-1) is a multiligand receptor capable of mediating endocytosis of a wide array of ligands that relate to both lipoprotein metabolism and proteinase regulation. Many of its ligands are proteinases, proteinase-inhibitor complexes, and lipoproteins known to be contained within the luminal fluid of the seminiferous tubules or in the interstitial spaces of the testis. Immunocytochemical analysis was performed to characterize the pattern of expression of LRP-1 in cells of the rat testis. Immunoperoxidase staining localized LRP-1 to the cytoplasm of Sertoli cells. The distribution and intensity of the Sertoli cell staining was found to vary according to the stages of the cycle of the seminiferous epithelium. Staining was weak in the basal cytoplasm of Sertoli cells during stages II-VIII and strong and granular in the supranuclear cytoplasm during stages XII-XIV and stage I of the cycle. Immunogold labeling showed gold particles associated with the basal and adluminal plasma membranes, with endocytic vesicles, and with endosome membranes. Labeling was also observed on the plasma membrane and membranes of the endocytic apparatus in macrophages and Leydig cells in the interstitial space. Infusion of ¹²⁵I-labeled LRP-1 antibody into seminiferous tubules followed by radioautography showed silver grains overlaying the adluminal plasma membrane of Sertoli cells at time 0 and in endocytic vesicles and endosomes in the supranuclear region of Sertoli cells 10-minutes postinjection. When the ¹²⁵I-labeled LRP-1 antibody was injected into the interstitial space, silver grains overlayed the basal plasma membrane and coated endocytic pits of Sertoli cells at time 0 and, at 10 minutes, the grains labeled endosomes located in the basal pole of Sertoli cells. ¹²⁵I-labeled LRP-1 antibody also labeled the plasma membrane and the endocytic apparatus of macrophages and Leydig cells. The absence of immunogold labeling and radioautographic silver grains within lysosomes of Sertoli cells, Leydig cells, and macrophages suggests that internalized LRP-1 is recycled back to the cell surface. The presence of LRP-1 in the endocytic compartment of these cells is consistent with its functioning in the clearance of proteases involved in seminiferous tubule remodeling and/or the uptake of cholesterol-bound lipoproteins necessary for the biosynthesis of testosterone. In conclusion, the results of these studies demonstrated for the first time the presence of LRP-1 receptor in the endocytic compartments of Sertoli cells and interstitial cells of the rat testis.

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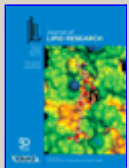
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