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JOURNAL ARTICLE

Testicular capillary permeability: the movement of luteinizing hormone from the vascular to the interstitial compartment

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It has previously been shown in several species that pulses of luteinizing hormone (LH) in peripheral serum are followed within 10-20 minutes by pulses of testosterone. Whether or not LH pulses directly stimulate Leydig cells to produce the testosterone pulses would depend on the vascular permeability of LH within that physiologically relevant time. In the present experiments, the capillary permeability of the testicular microvasculature was characterized in adult rats, and the relative permeability to LH was determined. Adult male rats were prepared for in vivo micropuncture and testes were infused with 3H-water, 14C-urea, 14C-polyethylene glycol (PEG), and 3H-dextran directly into the testicular surface artery. Testicular interstitial fluid (TIF) and testicular venous plasma were collected at 5 minutes, 10 minutes, and 15 minutes after initiation of isotope infusion. Data were recorded as isotope concentration in TIF as a proportion of the isotope concentration in testicular venous plasma collected at the same time period. 3H-water movement into the TIF from blood was rapid reaching 50% of serum values within 15 minutes. 14C-PEG and 3H-dextran were largely excluded from the TIF, typically not exceeding 5-10% of serum concentrations. In subsequent experiments, 125I-LH was infused using the same protocol. 125I-LH concentrations in TIF were 3.6 +/- 2.0% of plasma concentrations 10 minutes after initiation of infusion. Preceding the 125I-LH infusion experiments with 5-day hypophysectomy or with LH pulses delivered either 10 minutes or 4 hours prior to the initiation of infusion did not alter the capillary permeability of 125I-LH. These data demonstrate the restricted availability of LH to the TIF. This implies that Leydig cells are not exposed to LH pulses through the TIF and raises the question whether LH pulses directly stimulate testosterone pulses.

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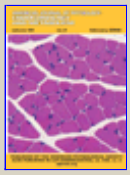

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