CHARACTERISATION OF PROSTAGLANDIN PRODUCTION IN THE NORMAL AND INFLAMED RAT TESTIS

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Prostaglandins E2 (PGE_2) and $F_{2\alpha}$ ($PGF_{2\alpha}$) play a role in Leydig cell function and in suppression of macrophage inflammatory functions. We predict that PGs also may play a role in interstitial fluid (IF) formation in the testis. Prostaglandin synthesis involves one of two distinct forms of cyclooxygenase (COX): constitutively expressed COX-1 and inducible COX-2. We recently demonstrated expression of both enzymes in macrophages, somatic and germ cells of the adult rat testis, and that COX-2 may the more important form in this organ. Adult male Sprague-Dawley rats were maintained on normal feed or 0.15% celebrex, a specific COX-2 inhibitor, for 5 weeks. Rats were subsequently treated with saline, or lipopolysaccharide (LPS; 0.1 mg/kg or 5 mg/kg), 6 h prior to collection of tissues. PGE_2 was measured by RIA in medium of cultured testis fragments and testicular cells from normal rats (± 10 μg/mL LPS, 24 h, 37ºC), and in testicular interstitial fluid. PGE_2 was constitutively produced by whole testis, Sertoli cells, Leydig cells and round spermatids, but not by resting macrophages or pachytene spermatocytes in culture. Stimulation with LPS upregulated PGE_2 in macrophage cultures, but not in other cells or whole testis. Normal PGE_2 levels in IF were 16–20 ng/mL; levels were not altered by low-dose LPS, but were reduced by high-dose LPS. Celebrex caused a reduction in IF PGE_2 levels in both the normal and low-dose groups, but not in the high-dose group. Celebrex elevated IF volume (25-50%) in all groups. Our experiments show cell-type specific regulation of PGE_2 production in the rat testis, and predict a role for COX-2 elicited PGs in the IF regulation and in post-meiotic cell function. Paradoxically, low-level inflammation does not alter testicular PGE_2 levels, as somatic and germ cells, which do not respond to LPS, appear to contribute most to the local levels of PGE_2.

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