Influence of nonsteroidal anti-inflammatory drugs on progesterone production by cultured bovine luteal cells

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Abstract

The objective of the present study was to determine the influence of nonsteroidal anti-inflammatory drugs (NSAIDs) representing different chemical groups on progesterone (P₄) production by cultured bovine steroidogenic luteal cells. The cells were enzymatically isolated from corpora lutea collected on days 8-12 of the estrous cycle. After 24 h preincubation they were incubated for 24 h with medium only (control) or stimulated with bovine luteinizing hormone – LH (100 ng/ml; positive control) or increasing concentrations (10⁻⁸ to 10⁻⁴ M) of acetylsalicylic acid, indomethacin, ibuprofen, naproxen, piroxicam, phenylbutazone, dipyrone or nimesulide. Concentrations of P₄ in the culture media were determined by enzyme immunoassay. LH significantly increased P₄ secretion, while acetylsalicylic acid and indomethacin did not affect the production of this hormone. A significant increase in P₄ secretion was observed after administration of dipyrone at all concentrations, piroxicam at concentrations of 10⁻⁸, 10⁻⁷ and 10⁻⁵ M, phenylbutazone and naproxen at concentrations of 10⁻⁷ and 10⁻⁶ M and ibuprofen at concentrations of 10⁻⁴ and 10⁻³ M. Nimesulide did not affect P₄ production at concentrations of 10⁻⁸ – 10⁻⁵ M, while at a concentration of 10⁻⁴ M it inhibited P₄ secretion. The results obtained indicate that NSAIDs may change the production of P₄ in bovine luteal cells, however, these changes are dependent on the substance used.

Key words: cattle, corpus luteum, NSAIDs, progesterone

Introduction

Nonsteroidal anti-inflammatory drugs (NSAIDs) are one of the most widely used therapeutic agents in human medicine and are becoming increasingly frequently used in veterinary medicine. Structurally, NSAIDs can be classified into salicylate or carboxylic acid derivatives including the pyrazolones or enolic acids, propionic acids, indoles, fenamates and oxicams. These chemically different drugs have anti-inflammatory, analgetic and antipyretic effects, which are associated with inhibition of cyclooxygenase (COX) involved in prostaglandin (PG)s production (Vane 2000). However, disparities exist in the potency