GENDER DIFFERENCES IN PROGESTERONE-INDUCED GASTRIC SMOOTH MUSCLE RELAXATION

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Abstract - Previous research has reported gender differences in various gastrointestinal (GI) disorders, being more prevalent in women compared to men. The aim of the present study was to explore the sex-associated differences in the progesterone-induced effect on gastric muscle contraction through nitric oxide (NO)/cyclic guanosine monophosphate (cGMP) pathway. Experiments were done on single gastric smooth muscle cells (GSMC) freshly isolated from male and female Sprague-Dawley rats. Contraction of GSMC to acetylcholine (ACh), muscarinic agonist, was measured via scanning micrometry in the presence or absence of progesterone. NO and cGMP levels were measured using specifically designed enzyme-linked immunosorbent assay (ELISA) kits. Acetylcholine induced less contraction in female cells compared to male cells. Pretreatment of GSMC with progesterone reduced contraction in both sexes but to a greater extent in female compared to male. Moreover, progesterone increased both NO and cGMP levels in both male and female cells but to a greater extent in female cells. Most importantly, pre-incubation of muscle cells with either L-NNA (NO synthase inhibitor), or ODQ (guanylylcyclase inhibitor) blocked the progesterone inhibitory action on muscle contraction and abolished the reported sex differences. In conclusion, progesterone induces greater activation of NO/cGMP pathway and gastric muscle cell relaxation in female gastric muscle cells compared to male cells.

Keywords - Contraction, Progesterone, Gastric, Gender, Smooth Muscle, NO/cGMP.