

Localization of Prostaglandin E₂ Receptors (Ep1-4) in Paired Upper and Lower Segment Human Myometrium with Advancing Gestation and Labor

Bernice Adu-Amankwa, Peta L Grigsby, Diane E Brockman, and Leslie Myatt

Dept. Obstetrics and Gynecology

Introduction: Prostaglandins (PGs) produced by intrauterine tissues play an important role in the initiation and maintenance of labor. PG receptors regulate myometrial activity via contractile (EP1, EP3 and FP) or relaxatory (EP2 and EP4) receptors. We hypothesize that the change from uterine quiescence to contractility at parturition may be due to the differential expression of relaxatory and contractile PG receptor isoforms. The aim of the current study was to localize expression of the relaxatory (EP2 and EP4) and contractile (EP1 and EP3) PGE₂ receptor isoforms in paired upper and lower segment human myometrium with advancing gestation, with or without labor. **Methods:** Paired upper and lower segment myometrial samples were collected at cesarean section at term labor (TL); term no labor (TNL); preterm labor (PTL) and preterm no labor (PTNL; n=5 in each group) and immediately frozen in liquid N₂. Myometrial sections were immunostained with anti-human EP1-4 polyclonal antibodies using VectaStain Elite ABC kit. **Results:** EP1-4 receptor isoforms were immunolocalized in both myometrial smooth muscle layers in the upper and lower segments. Both the upper and lower segment myometrium from preterm patients appeared to stain more intensely for all PGE₂ receptor isoforms compared to term myometrial samples. EP2 staining was more intense in the upper segment compared to the lower segment at TL. There were no differences in the staining intensity for EP4 between the lower and upper segments in any group. Minimal staining was observed for EP1 at TL, while EP3 staining appeared more intense in the upper segment compared to the lower segment at TL. At TL, the contractile EP3 receptor isoform stained more intensely in the upper segment compared to both the relaxatory receptor isoforms, while at TNL EP3 receptor stained more intensely in the lower segment compared to both the relaxatory receptor isoforms. **Conclusions:** This differential expression of PGE₂ receptors between the upper and lower segment myometrium and with labor may explain the ability of the uterus to change from a quiescent state to one of contractile activity during labor. Information such as this can be used in the future by physicians to control labor onset through the control of PG receptor expression in the myometrium.