**Abstract**

**Oxytocin Receptor Genotype Is Predictive of the Duration of the First Stage of Labor**

Abstract Type: Original Research  
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**Introduction:** Term labor occurs tens of millions of times a year yet is remarkably poorly understood. Significant differences in labor progress exist that may at least partially stem from definable genetic variation. A strong association between beta 2-adrenoceptor (β2AR) genotype and progress of labor has been demonstrated. Like the β2AR, the oxytocin receptor (OXTR) is expressed in the pregnant uterus where its activation modulates contractility. We tested the hypothesis that genetic differences in OXTR are predictive of labor progress in a population model.

**Methods:** We conducted a secondary analysis of delivery data from 1229 women enrolled in an NIH-funded investigation of the effect of genetics on preterm labor and who had a vaginal delivery after 34 weeks gestation. We obtained timed cervical exams, demographic and treatment data from the patients’ electronic medical records. DNA was genotyped for three common OXTR polymorphisms. A mixed effects model was created in NONMEM to evaluate the effect of genetic differences in OXTR on labor progress.

**Results:** The multivariate model for labor progress suggested that parturients who express OXTR rs2228485-T have faster latent labor (P<0.0001), while patients with OXTR rs53576-A transition to active labor later than other patients (P<0.0001). There is strong linkage disequilibrium between OXTR rs2228485-T and OXTR rs53576-A, which holds true in all ethnic groups. In this dataset with a high percentage of Hispanics, Hispanic ethnicity predicted later transition to active labor. Larger fetal weight was associated with later transition and prolonged active labor (P<0.0001) (Figure 1).

**Discussion:** OXTR genotype may join β2AR genotype as a candidate gene to contribute to a haplotype for labor progress. The three OXTR polymorphisms studied may have epigenetic effects that Result in differences in receptor expression or modulation. Future studies of human uterine OXTR expression and modulation of contractility will help to clarify these issues.

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