

## PSANZ 2011 ABSTRACT

### Genetic variability and antimicrobial resistance of *Ureaplasma parvum* in response to maternal erythromycin treatment: a study in pregnant sheep

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**Background:** Ureaplasmas are the most frequently isolated microorganisms from the amniotic fluid (AF) of pregnant women and can cause chronic infections that are difficult to eradicate with standard macrolide treatment. We tested the effects of erythromycin treatment on phenotypic and genotypic markers of ureaplasma antimicrobial resistance in sheep.

**Method:** At 50 days of gestation (d, term=145d) 12 pregnant ewes received intra-amniotic injections of *U. parvum* serovar 3 (erythromycin-sensitive,  $2 \times 10^4$  colony-forming-units). At 100d ewes received: erythromycin treatment (500 mg, q3h for 4 days, IM, n=6) or no treatment (n=6). Fetuses were delivered surgically (125d) and AF and chorioamnion were collected for: culture, minimum inhibitory concentration (MIC) and minimum biofilm inhibitory concentration (MBIC) testing; 23S rRNA sequencing; and detection of macrolide-lincosamide-streptogramin resistance (MLSr) genes.

**Results:** MICs of erythromycin, azithromycin and roxithromycin against AF isolates were low (range = 0.06 mg/L to 1.0 mg/L); however, chorioamnion isolates demonstrated increased resistance to roxithromycin (0.13 – 5.33 mg/L). 62.5% of chorioamnion ureaplasmas formed biofilms *in vitro* and mutations (125 nucleotides, 29.6%) were found in the 23S rRNA gene (domain V) of chorioamnion (but not AF) ureaplasmas. MLSr genes (*ermB*, *msrC* and *msrD*) were detected in 100% of chorioamnion isolates and only *msrD* was detected in AF isolates (40%).

**Conclusions:** 23S rRNA mutations and MLSr genes occurred independently of erythromycin treatment, suggesting that the anatomical site of infection and microenvironment may exert selective pressures on ureaplasmas that cause genetic changes and alter antimicrobial sensitivity profiles. These results have serious implications for treatment of *in utero* infections.