Anti-Müllerian hormone (AMH) plasma concentration and eCG-induced ovulation rate in prepubertal ewe lambs as predictors of fertility at the first mating

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In sheep, delays in the age at first lambing give rise to unproductive periods and important economic losses. The objective of this work was to determine if the AMH plasma concentrations and the ovarian response to eCG before puberty is related to sexual precocity in sheep. Plasma samples were taken from 76 Rasa Aragonesa ewe lambs aged 109±18 days (Mean±SD) for AMH determination by ELISA. At the same time 600 IU of eCG was applied and ovulation rate (OR) recorded by laparoscopy 6 days later. Ewes were first joined to rams at 312±18 days. Correlations among OR, AMH, age and weight were assessed (Spearman's; ρ). Differences in AMH were tested by ANOVA and percentages by generalised linear models for categorical variables. A logistic model was fitted and the ROC curve analysed to evaluate AMH as a predictor of ovulation. AMH plasma concentrations were highly correlated with OR (ρ=0.37; P<0.001), but not with age or weight. Differences in AMH were highly significant between non-ovulating ewe lambs (43.0 pg/ml) and ewes presenting an OR of either 1-2 (111.9 pg/ml) or >2 (163.1 pg/ml; P<0.0005 for both). Ewes with AMH concentrations before puberty higher than 23 pg/ml (optimum cut-off point to predict ovulation) displayed higher fertility at the first mating opportunity than ewes with AMH levels of ≤23 pg/ml (+27.9%, P<0.005). Similarly, fertility was higher in ovulating than in non-ovulating prepubertal ewes (+31.5%, P<0.0001). The present data suggest that both the ovarian response to eCG and the AMH plasma concentration could be reliable markers of the ovarian maturity status in ewe lambs. These results may be useful in the selection of replacement ewes at a very precocious age in terms of predicted fertility at the first mating. Financed by MICINN (PET 2008-76). B. Lahoz was supported by an INIA fellowship.