

The use of plasma AMH in sheep as an endocrine marker of the ovarian response to FSH in MOET programs

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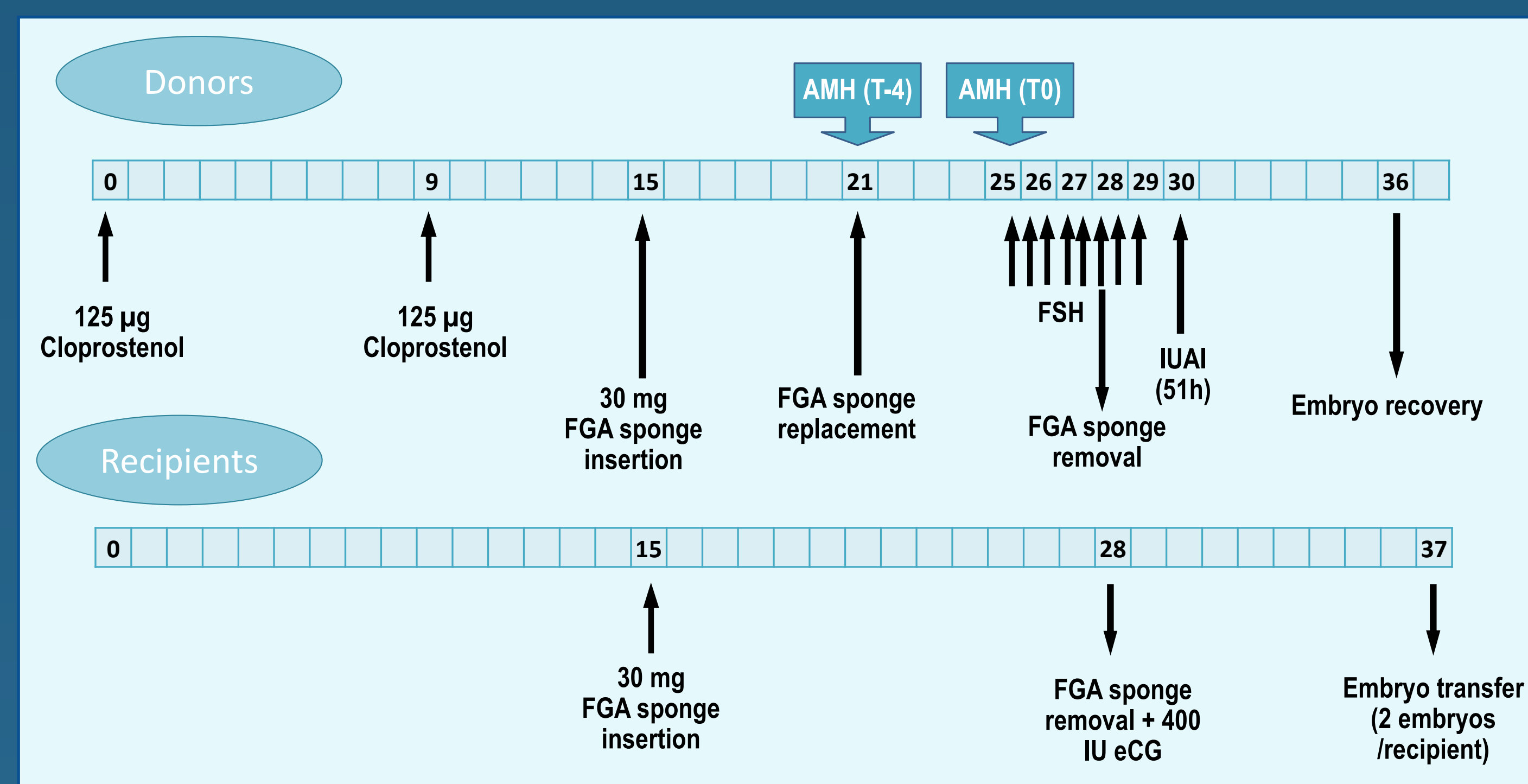
The performance of MOET (Multiple ovulation and embryo transfer) programs in sheep is limited, mainly due to variable ovarian responses to FSH superovulation treatments. Anti-Müllerian hormone (AMH) has been demonstrated to be a good predictor of the ovarian follicle population able to respond to gonadotropins in several mammalian species.

The objective was to evaluate the usefulness of plasma AMH measurement in ovine MOET programs.

MATERIALS AND METHODS

- 2 MOET trials.
- 24 adult healthy donor ewes in total superovulated with 200 mg NIH-FSH-P1 (Folltropin-V, Minitub Ibérica SL, Tarragona, Spain) applied in 8 decreasing doses.
- Blood plasma concentrations of AMH were determined at T-4 (FGA sponge replacement) and T0 (first FSH injection) using the AMH equine ELISA kit (AnshLab, Webster, TX, USA).
 - Sensitivity of the assay: 27.8 pg/ml
 - Intra-assay coefficient of variation: 4.8%
- The relationship between the individual plasma AMH concentration with ovulation rate, recovered and viable embryos, and lambs born per donor ewe were investigated.
- Pearson correlation coefficient and Kolmogorov-Smirnov test were used.

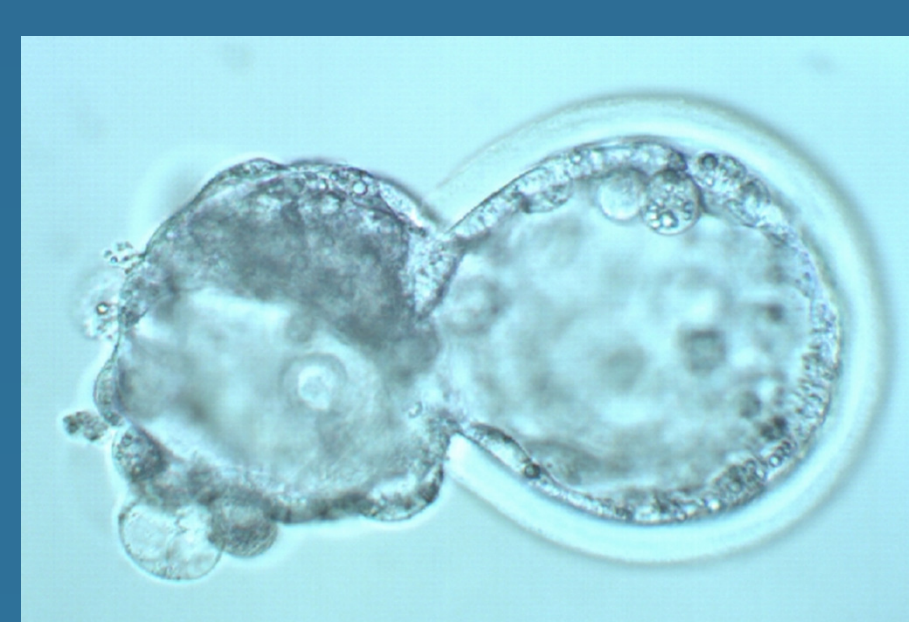
Figure 1. Experimental design



RESULTS

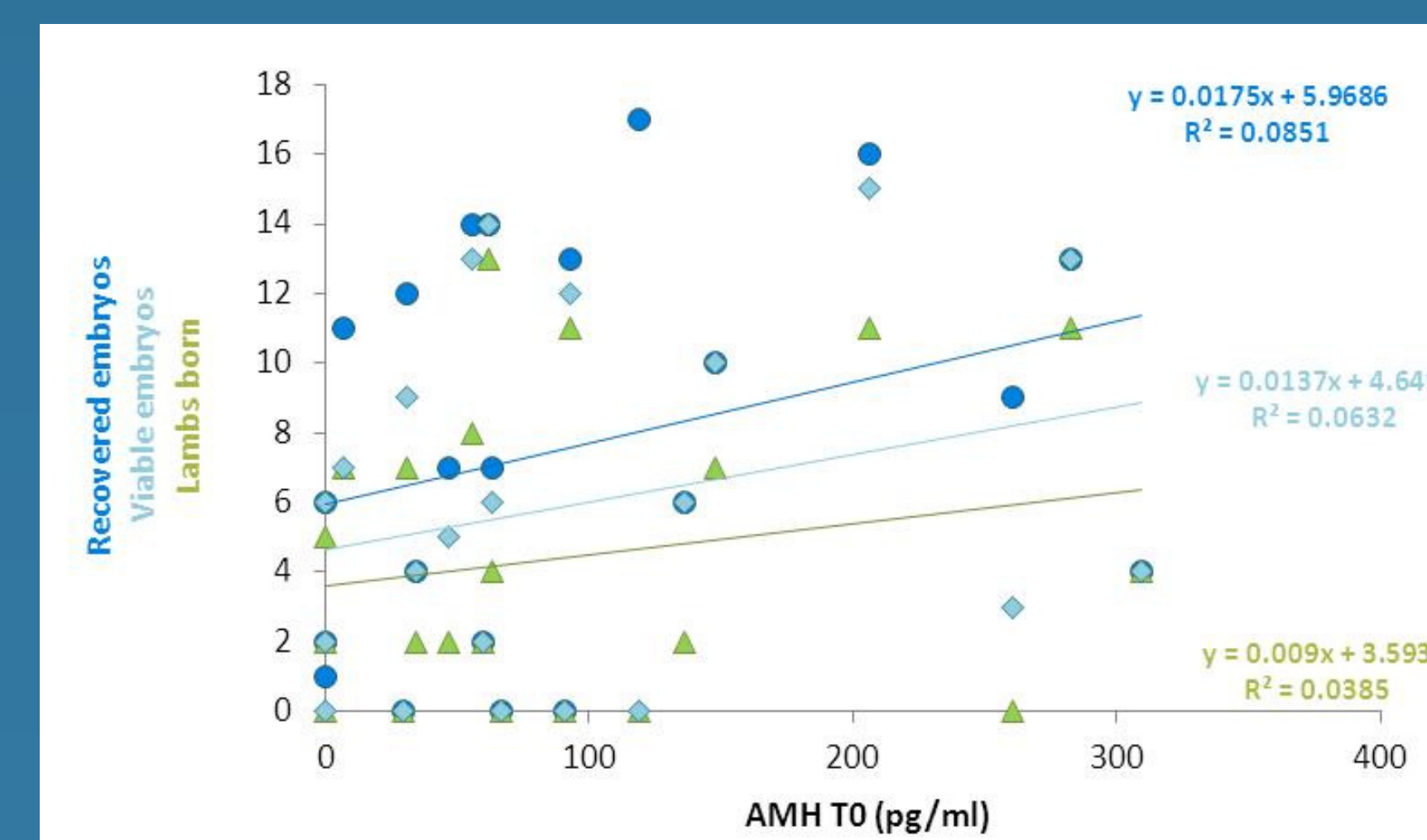
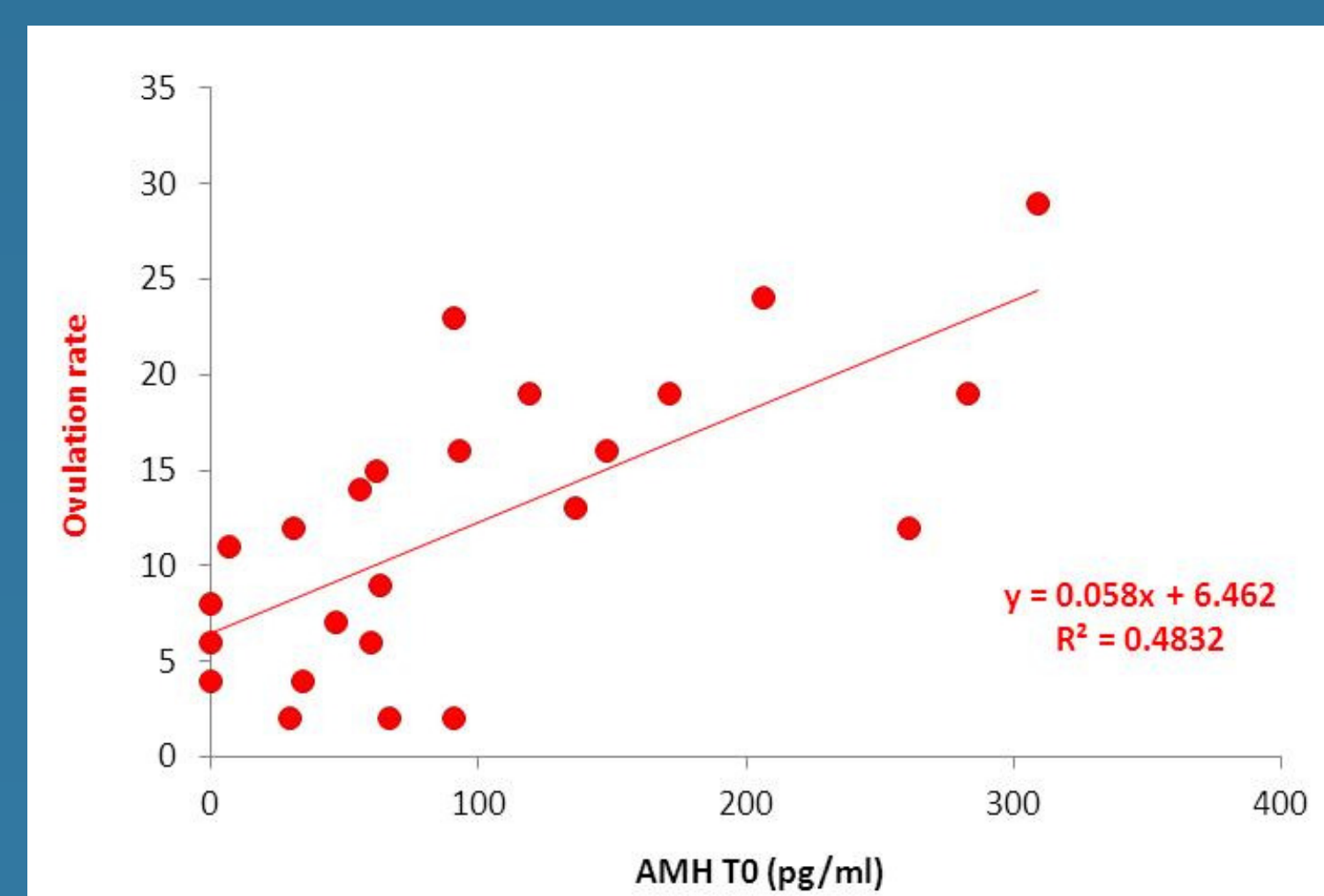
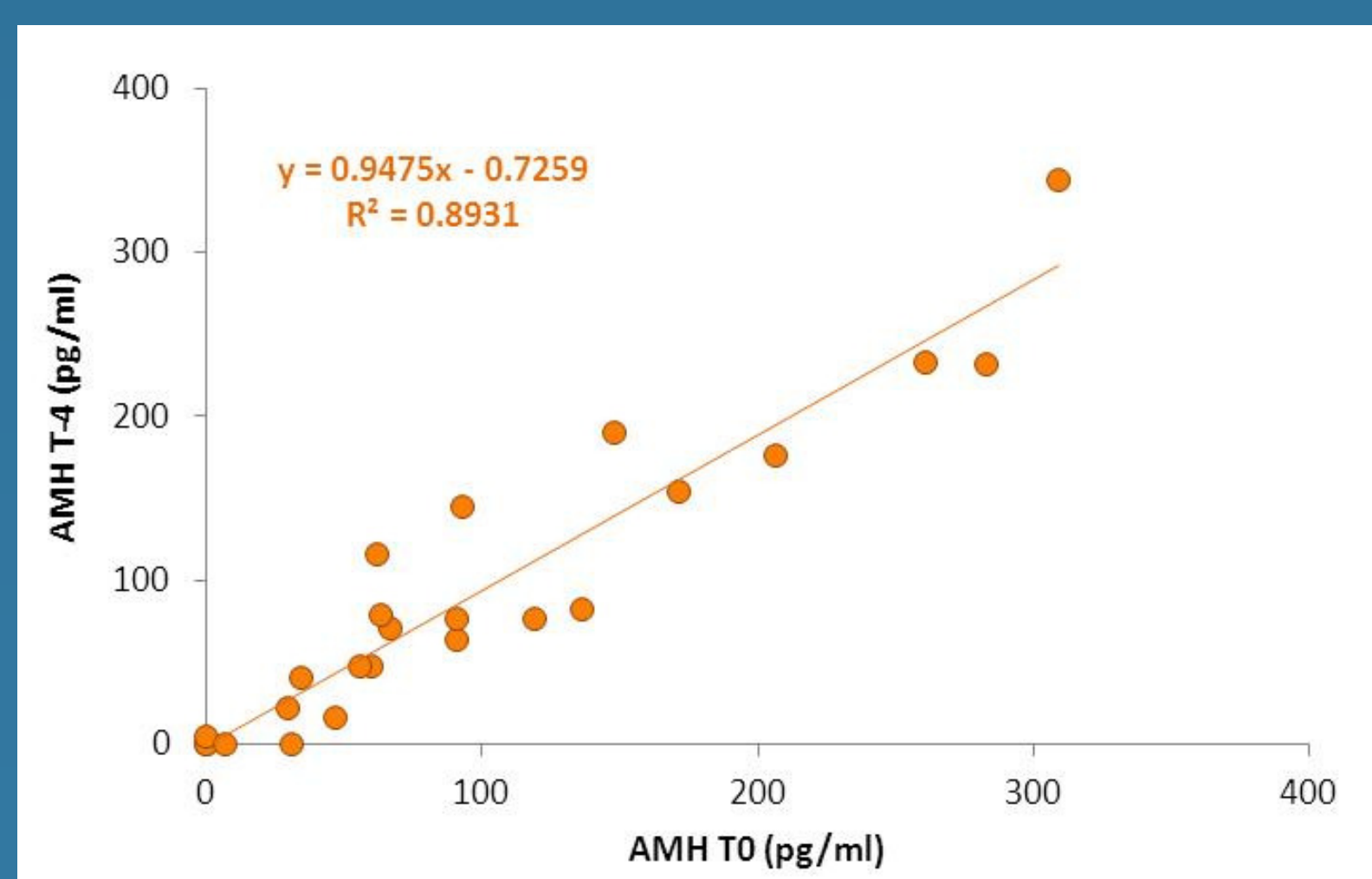
Table 1. Plasma AMH concentrations at T-4 and T0 (pg/ml) and MOET related variables per ewe and session (Means ± SEM and ranges).

	AMH T-4	AMH T0	Ovulation rate	Recovered embryos	Viable embryos	Lambs born
Mean ± SEM	93 ± 18	98 ± 18	12.2 ± 1.5	7.6 ± 1.2	6.0 ± 1.1	4.5 ± 0.9
Range	0 - 344	0 - 309	2 - 29	0 - 17	0 - 15	0 - 13



- The plasma AMH concentrations at T-4 were highly correlated with those at T0 ($r = 0.95$; $p < 0.01$).
- The AMH concentration at T0 was highly correlated with ovulation rate ($r = 0.70$; $P < 0.01$), but significance was not attained for AMH with recovered embryos ($r = 0.29$), viable embryos ($r = 0.25$) and lambs born ($r = 0.20$).
- The ovulation rate was also correlated with the number of recovered embryos ($r = 0.69$), viable embryos ($r = 0.59$) and lambs born ($r = 0.58$; $p < 0.01$ for both).

Figure 2. Relationship of plasma AMH concentrations at T0 with AMH at T-4, ovulation rate, recovered embryos, viable embryos and lambs born.



In conclusion, high individual variability was found between ewes both in plasma AMH concentrations and in MOET related variables. The AMH concentrations measured in blood plasma before the FSH treatment could be used to predict the ovulatory response per donor ewe, and so to improve the efficiency of MOET programs. Further studies are necessary to assess the individual repeatability as well as the relationship of AMH with other embryo-related variables.