

Fat content in the diet affects early-embryo weight in sows with gene polymorphisms for leptin and melanocortin receptors

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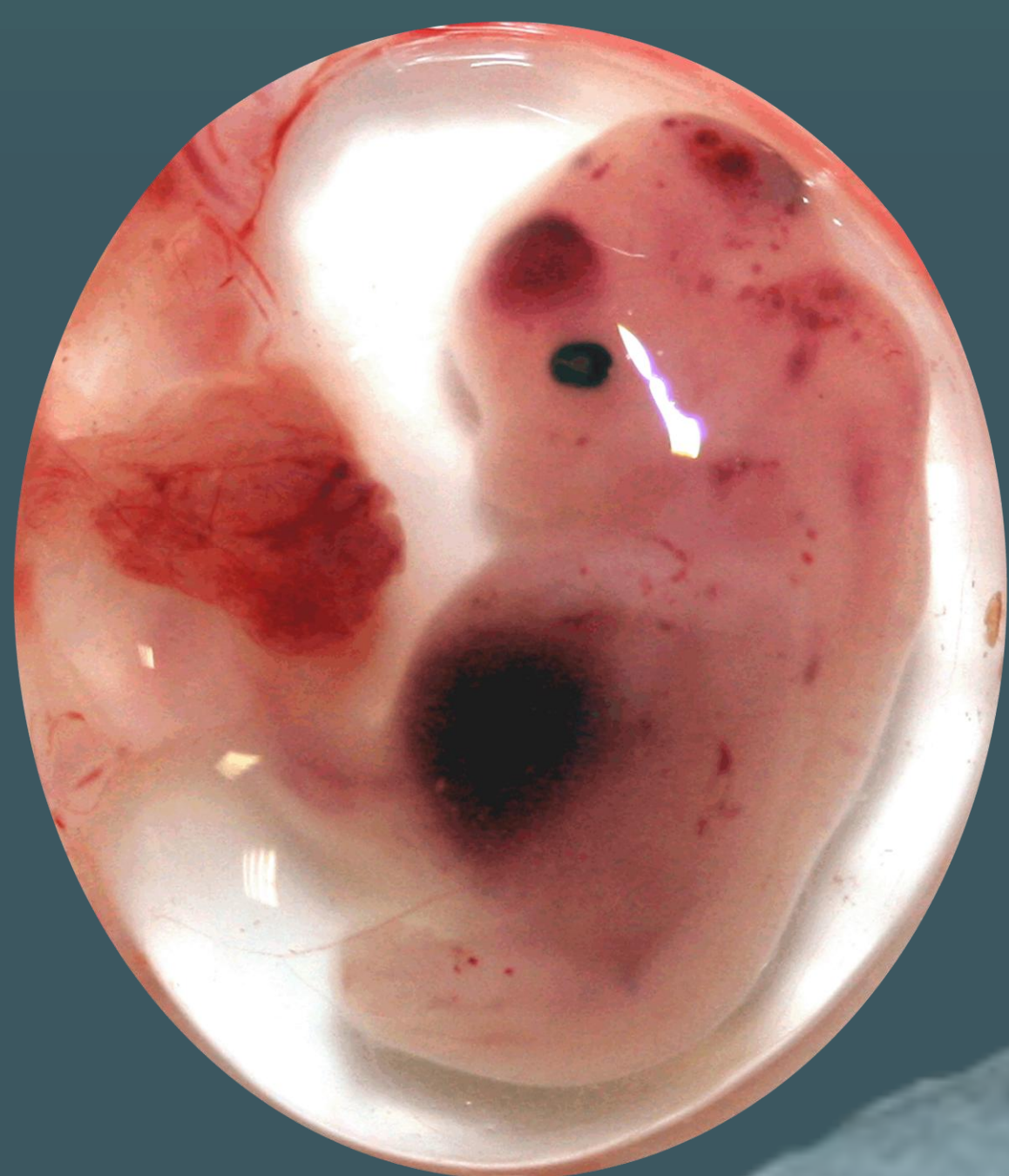


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INTRODUCTION

Obesity and nutritional habits are associated with incidence of infertility, early miscarriages and alterations of foetal growth. Current study aimed to determine possible effects of life-time fat feeding on rates of ovulation, embryo implantation and later incidence of embryo mortality and intrauterine growth alterations at early pregnancy stages. Iberian sows were used as a model, being a breed with a high potential for obesity due to gene polymorphisms in leptin and melanocortin receptors.



MATERIAL AND METHODS

Current study included 14 sows that were fed either with a standard diet having 2.8% of fat (group C, n=7) or with a fat-enriched diet (6.3%, group HF) from 18 weeks-old. At 47 week-old the animals became pregnant and at Day 25 of pregnancy, entire genital tracts were collected and weighed. Thereafter, ovulation rate was assessed and embryos were recorded, weighed and measured (longitudinal and transversal diameters of the embryos and their vesicles).

RESULTS

There were not found significant differences between groups in number of ovulations (13.6 ± 0.4 for C vs. 12.4 ± 1.0 for HF), number of conceptuses (8.0 ± 1.5 for C vs. 8.3 ± 0.9 for HF) and, therefore, in the rate of implantation and survival (58.1 for C vs. 66.0% for HF) (Fig. A).

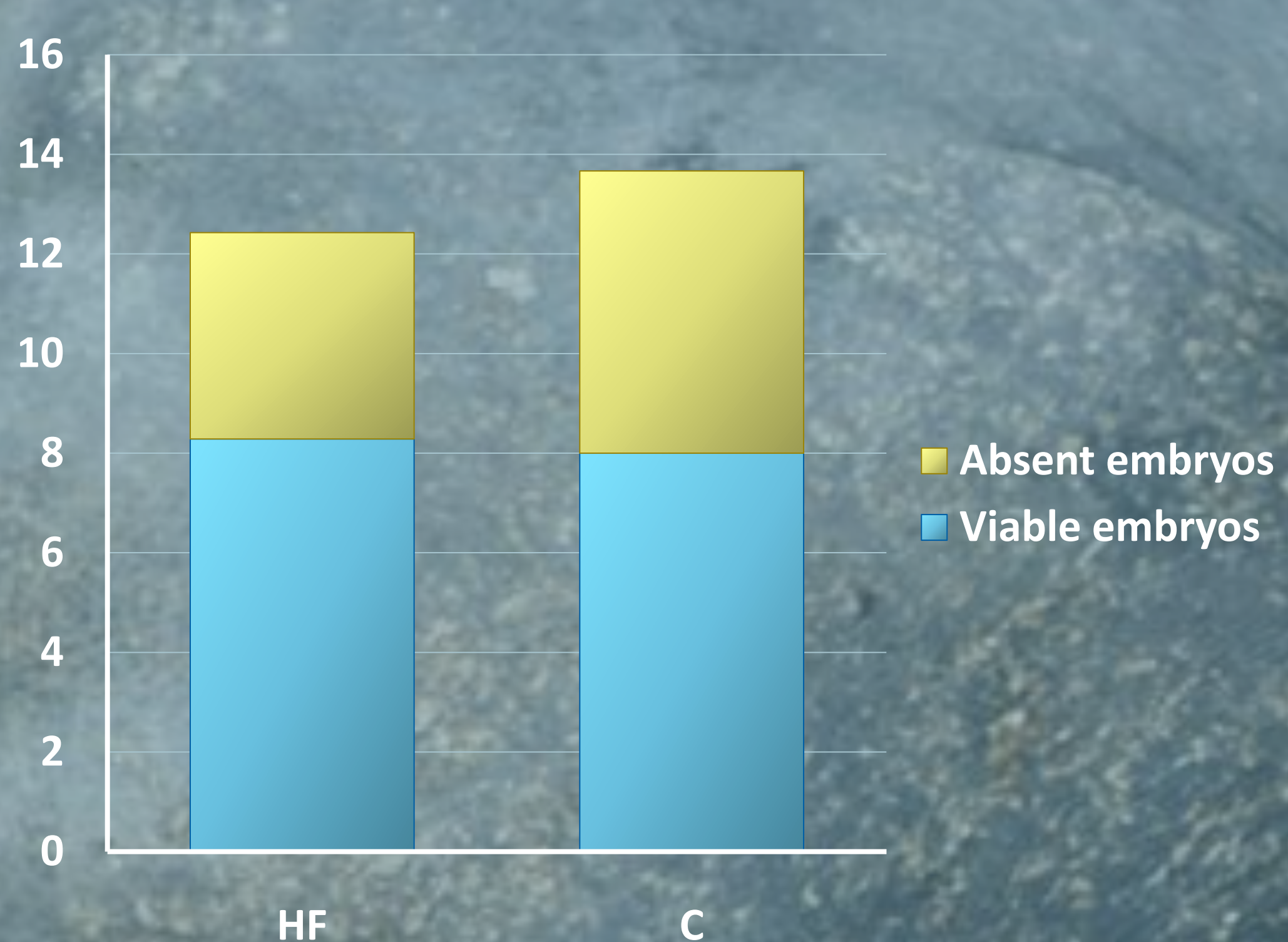


Fig. A: Mean number of viable embryos and absent embryos from the total number of ovulation sites in the high fat (HF) and the control group (C).



Fig. B: Mean weight (\pm SEM) of the uterus (UW), amniotic sacs (ASW) and isolated embryos (EW) in the high fat (HF) and the control group (C).

However, the weight of the uterus, having a similar mean number of conceptuses, was higher in HF sows ($2,714.8 \pm 199.6$ vs. $2,152.5 \pm 283.9$ g for C; $P < 0.05$). Individual assessment of the conceptuses showed that their sizes vesicles were similar between groups; however their weight was higher in HF group (3.7 ± 0.1 vs. 3.2 ± 0.1 g for C; $P < 0.05$). Such difference was mainly related to a higher weight of the proper embryo (1.2 ± 0.0 vs. 0.9 ± 0.1 g for C; $P < 0.0005$), having similar sizes in both groups, since the weight of the extra-embryonic annexes and the vesicle fluid did not reach statistical significance (Fig. B).

CONCLUSION

Feeding Iberian sows, which have a gene polymorphisms for leptin and melanocortin receptors related to obesity, with a fat-enriched diet is related with a higher weight of the embryos since early-pregnancy states.

