

HEAT STRESS MODULATES ENDOPLASMIC RETICULUM STRESS AND HEAT SHOCK PROTEINS PROTECTIVE RESPONSE IN PERIPHERAL BLOOD MONONUCLEAR CELL IN EARLY PREGNANT COWS

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Introduction

Heat stress (HS) impairs reproduction rates, immune defenses and induces the occurrence of oxidative stress, which is a precursor and a major contributor to the occurrence of endoplasmic reticulum (ER) stress and heat shock proteins (HSPs) protective response.

We aimed to verify early pregnancy modulation in ER stress and HSPs response in peripheral blood mononuclear cells (PBMCs) from dairy cows, and whether this modulation is affected by HS.

Material and methods

Cows had their estrous cycle synchronized and assigned to a non-heat stress (NHS) or heat stress (HS) group. Blood samples were collected on Days 10, 14 and 18 following artificial insemination (AI).

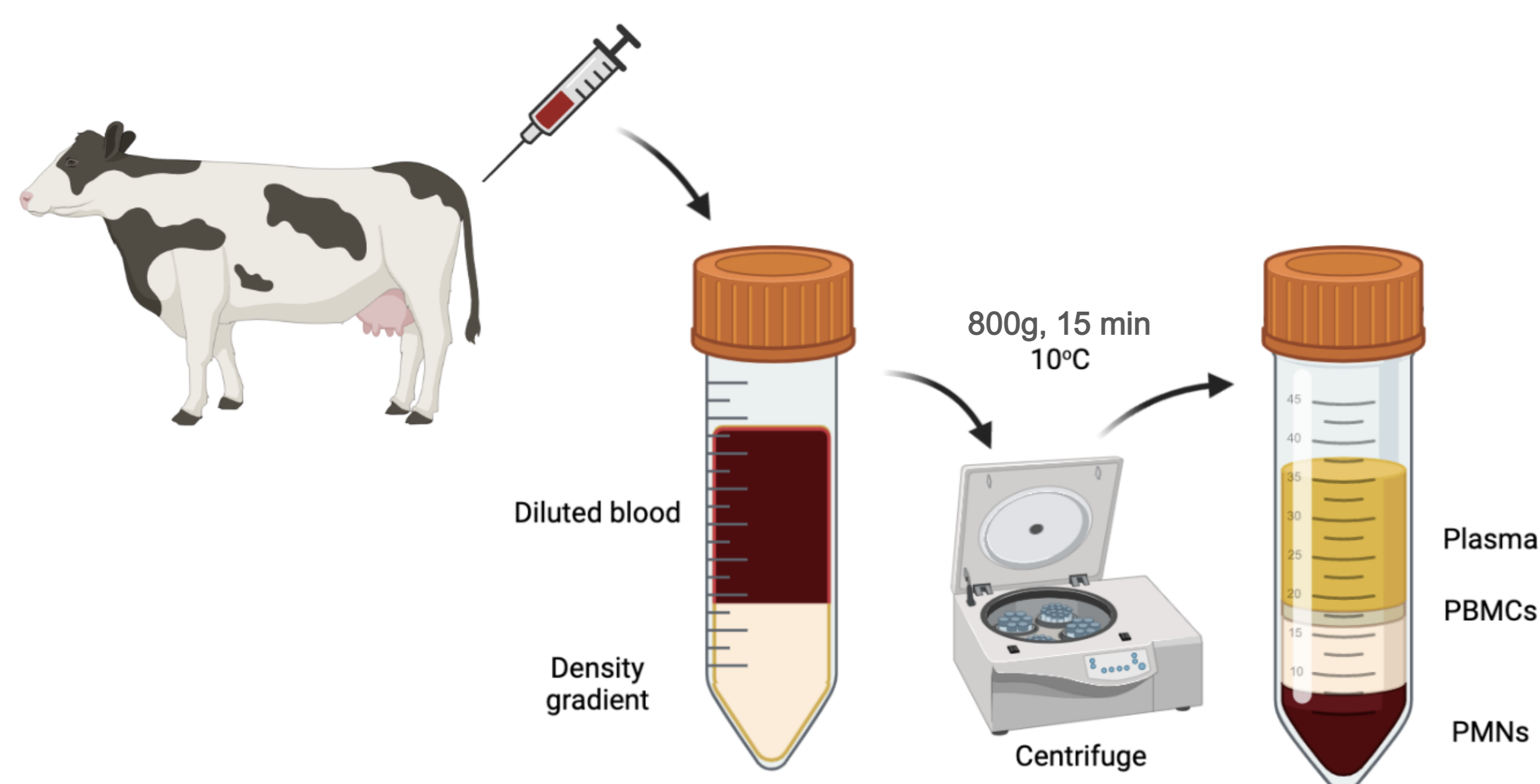


FIG 1 – Leukocyte isolation protocol.

Pregnant cows were pregnancy checked by ultrasound on Day 30 and confirmed on Day 60 post-AI. *HSF*, *HSP70*, *HSP90*, *HSPA5*, *ATF6*, *uXBP1*, *sXBP1* and *CHOP* were evaluated by RT-qPCR on Days 10, 14 and 18 in PBMCs.

Results

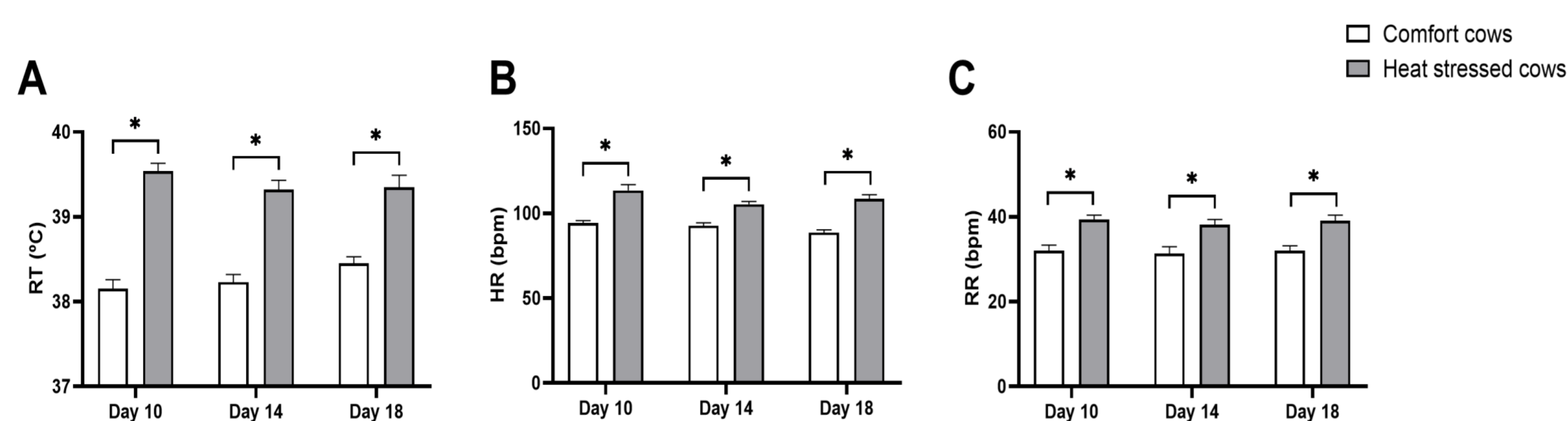


FIG 2 - Effect of season on rectal temperature (RT), heart rate (HR) and respiratory rate (RR) in cows under heat stress or non-heat stress conditions.

Conclusion

In conclusion, early pregnancy modulates ER stress and HSPs response in PBMCs from dairy cows, and this modulation in pregnant cows is affected by the occurrence of HS.

Non-pregnant cows Pregnant cows

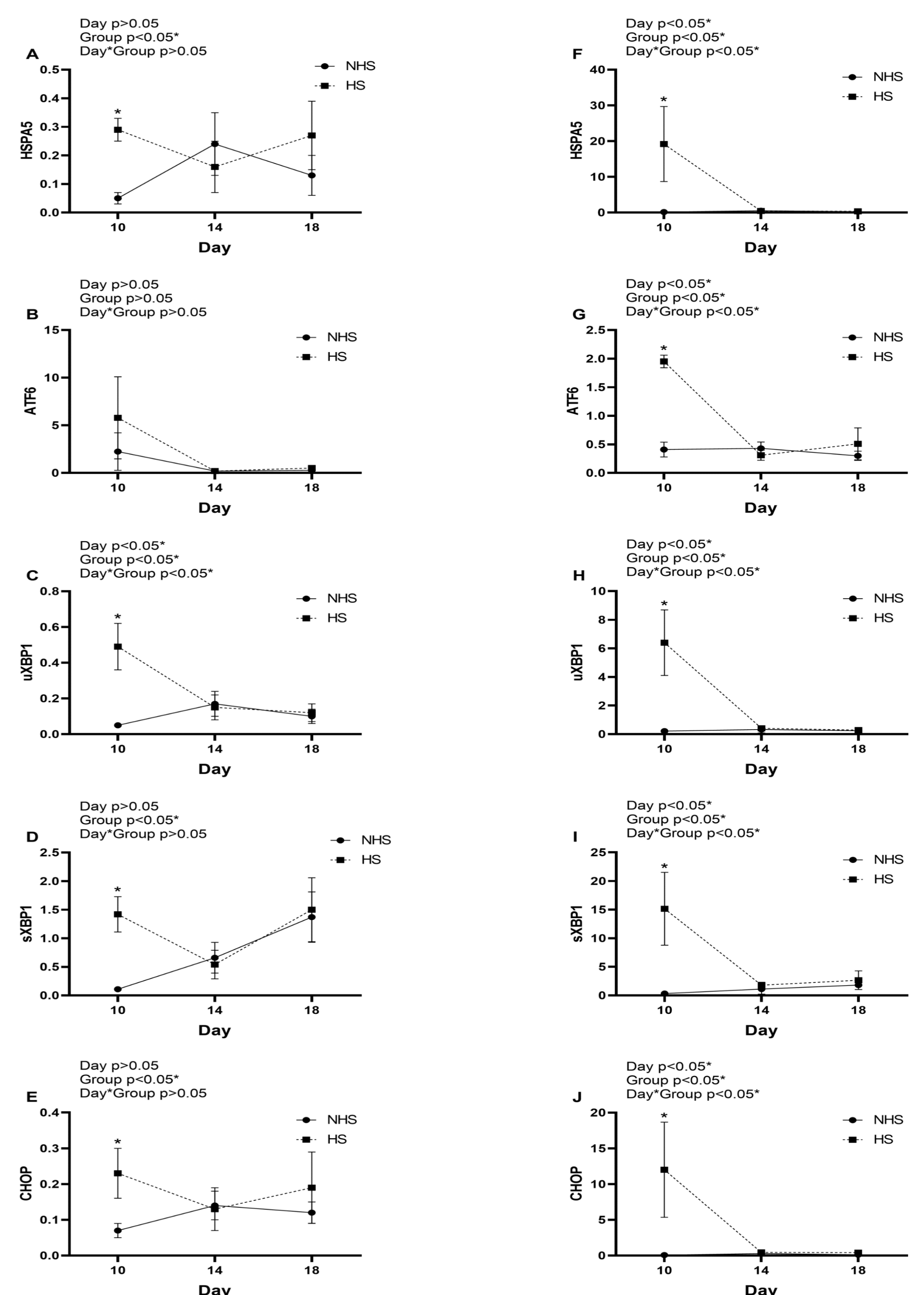
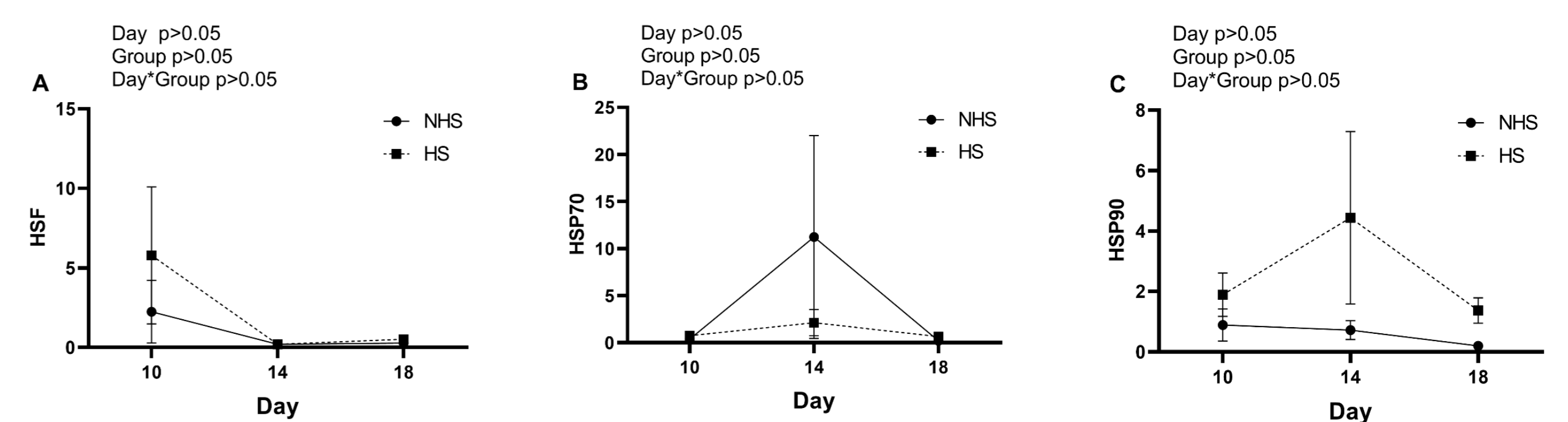


FIG 3- Endoplasmic reticulum stress marker genes in mononuclear cells of pregnant and non-pregnant cows under heat stress or non-heat stress environment on Days 10, 14 and 18 post-AI

Non-pregnant cows



Pregnant cows

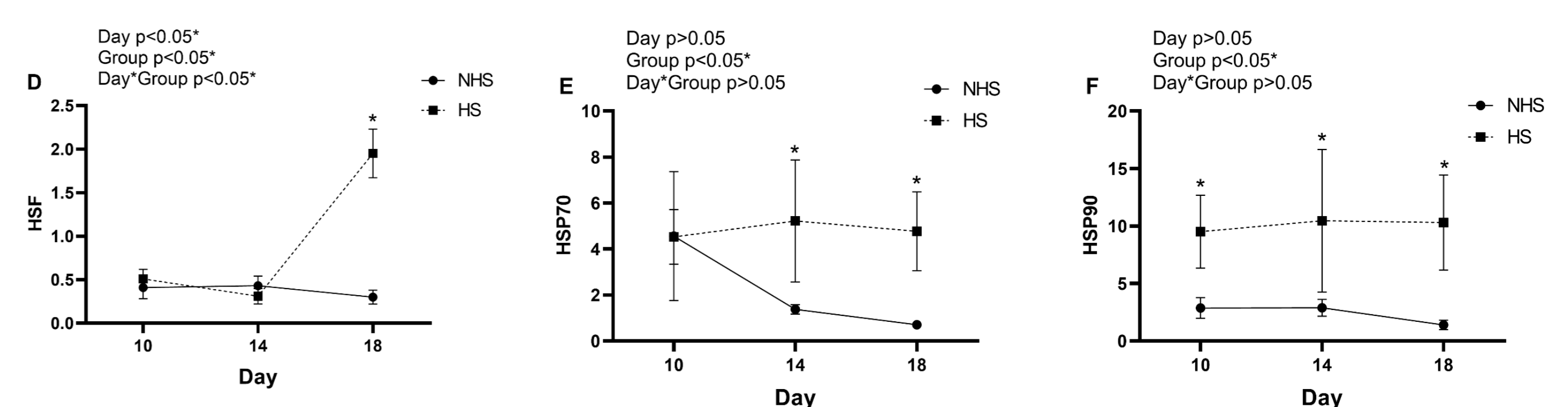


FIG 4 - Heat shock transcription factor and heat shock proteins genes in mononuclear cells of pregnant and non-pregnant cows under heat stress or non-heat stress environment on Days 10, 14 and 18 post-AI.