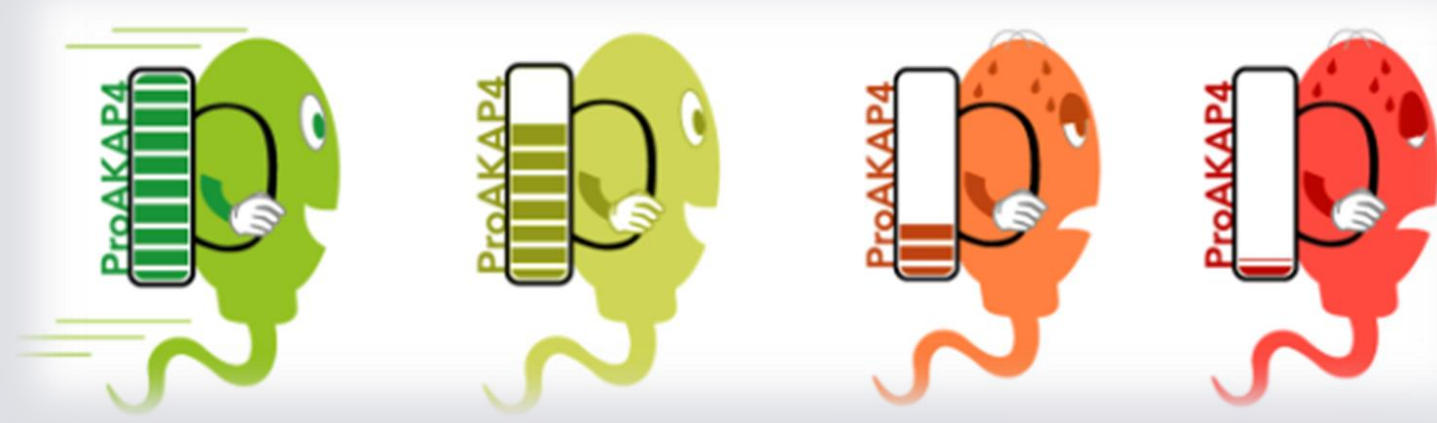


EVALUATION OF THE RELATIONSHIP BETWEEN PROAKAP4 CONCENTRATION AND SPERM MOTILITY IN FROZEN/ THAWED HORSE SEMEN

CARLA MORROS ARIZA Final degree project- June 2023

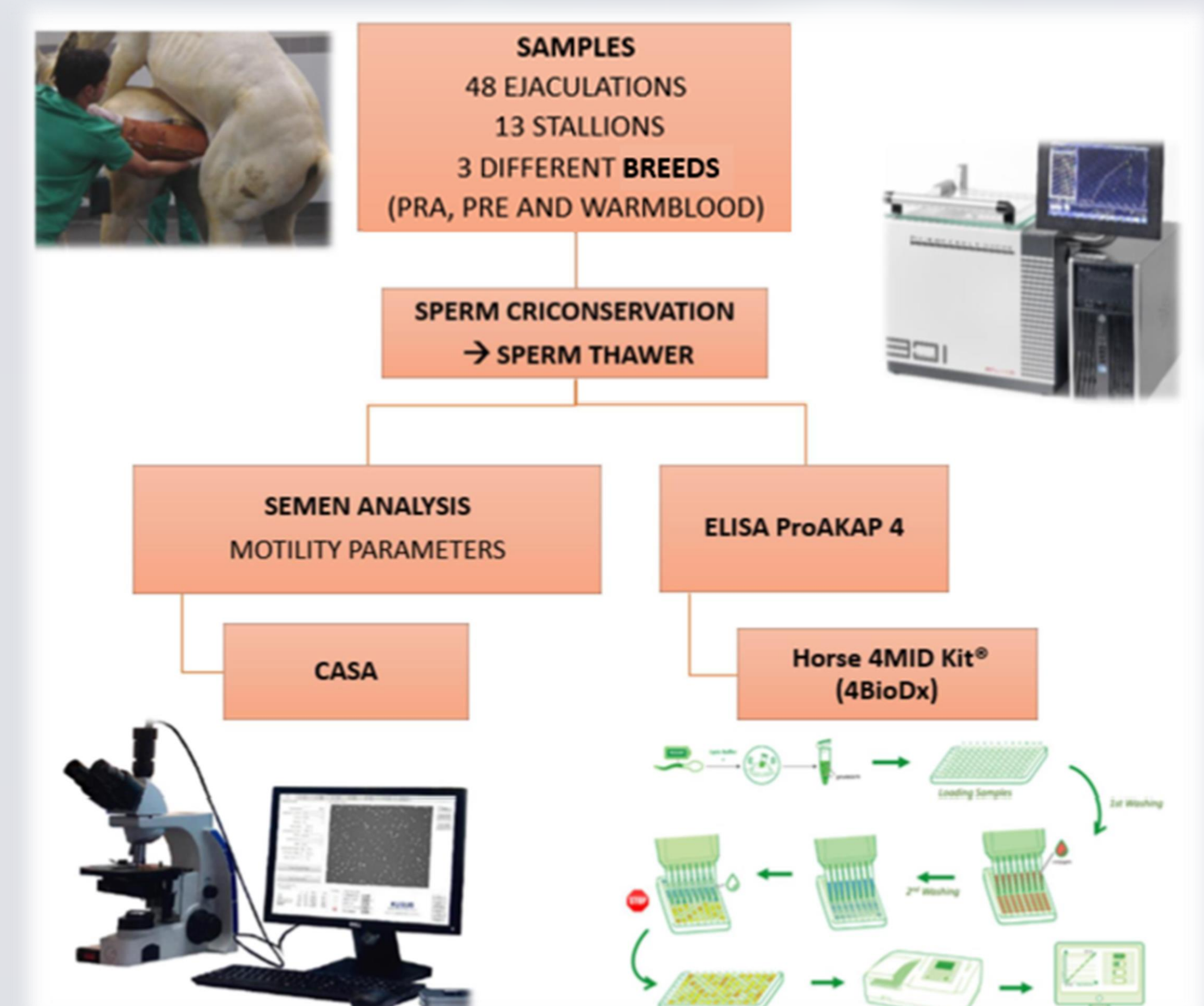
1.-INTRODUCTION

The biological marker proAKAP4, a protein specific to sperm is highly conserved in mammals and present only in the main part of the flagellum. ProAKAP4 that becomes AKAP4 ensures the prolonged mobility of sperm to the fertilization.



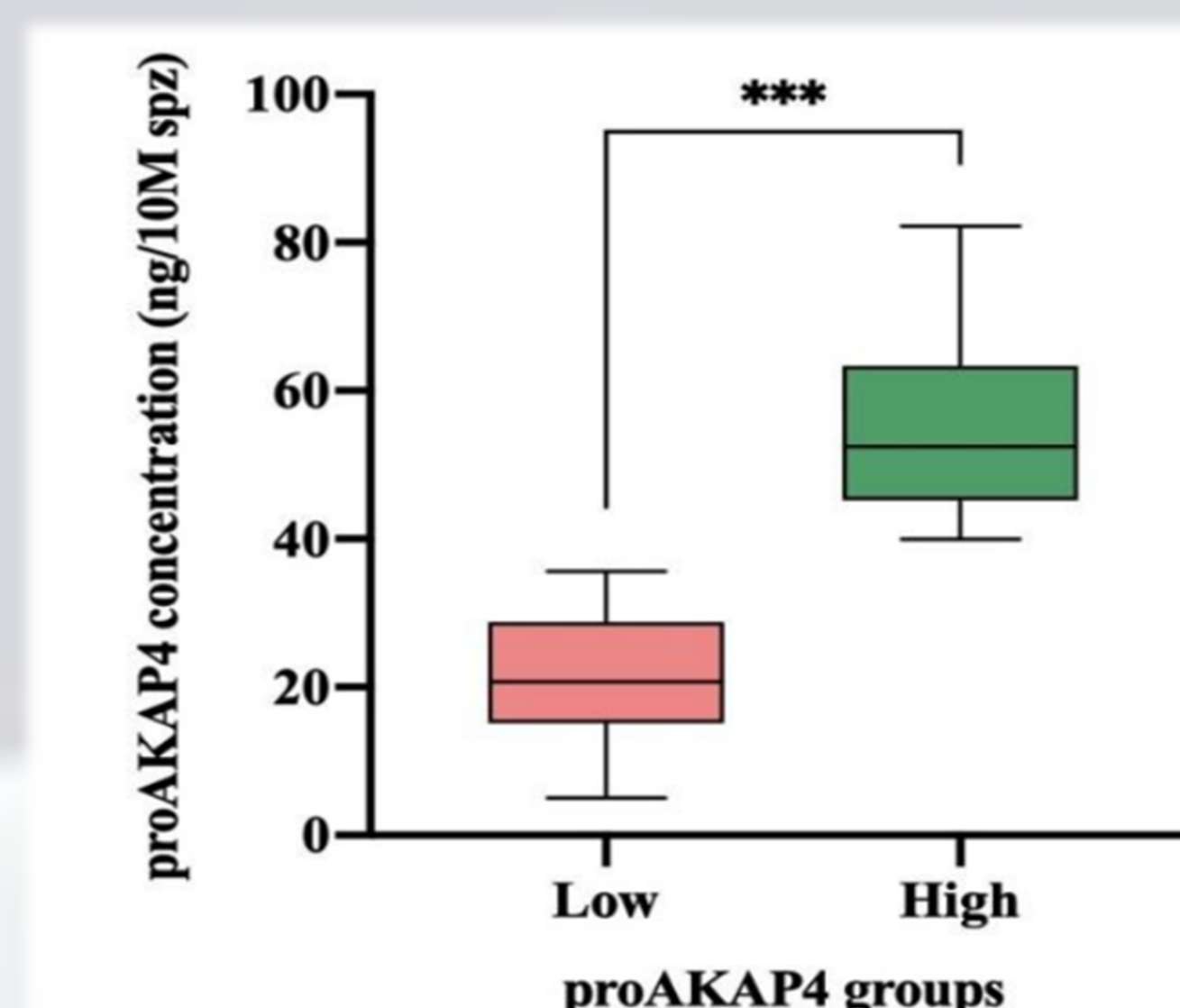
The purpose of this experimental final degree project is to assess the relationship between the concentration of the precursor anchor protein A-kinase 4 (proAKAP4) and the sperm motility in frozen/thawed horse semen

2.- MATERIAL AND METHODS



3. RESULTS and DISCUSSION

A) CLASSIFICATION OF FROZEN-THAWED HORSE EJACULATES ACCORDING TO PROAKAP4 CONCENTRATION

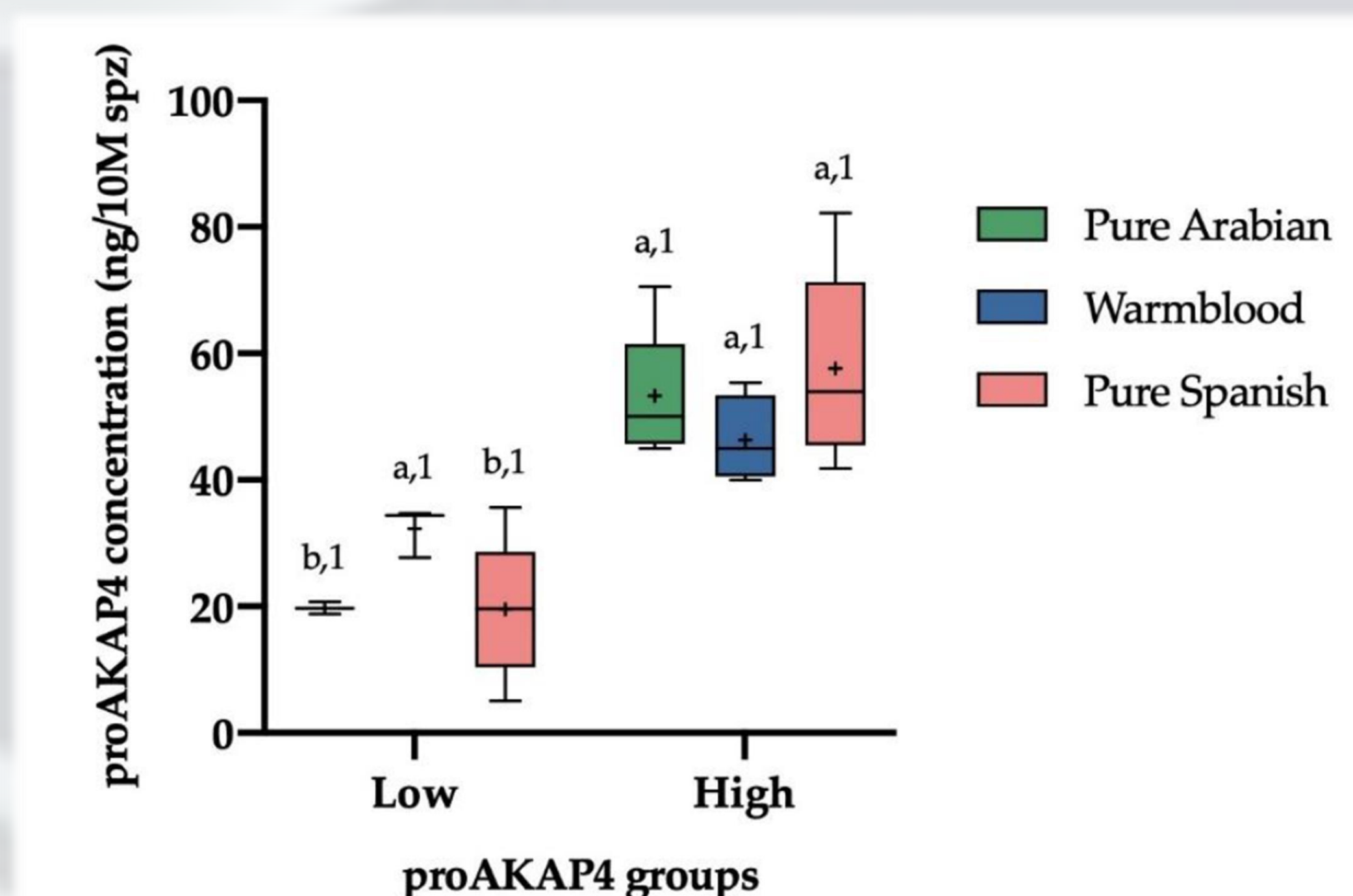


According to the ejaculate concentration of proAKAP4, 2 groups were generated ($p < 0.001$)

- Group1: **LOW [proAKAP4]** $\bar{x} = 21.20 \pm 1.94$ ng/10M spz
- Group 2: **HIGH [proAKAP4]** $\bar{x} = 54.79 \pm 2.35$ ng/10M spz

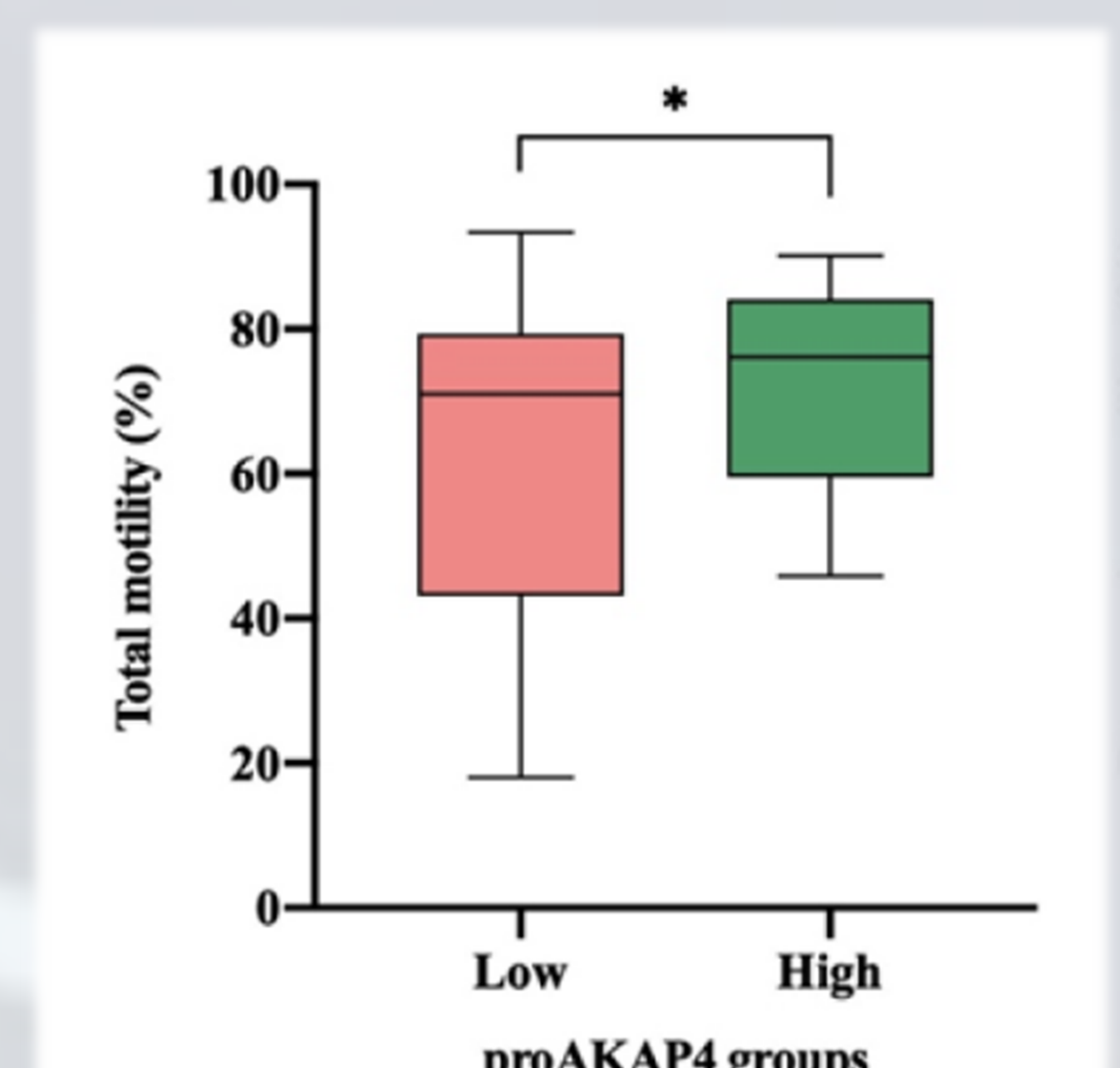
B) RELATIONSHIP BETWEEN PROAKAP4 GROUPS AND THEIR DISTRIBUTION IN DIFFERENT BREEDS

Considering the different breeds in our study → **There are NO SIGNIFICANT DIFFERENCES between BREEDS** ($p < 0.05$).



C) RELATIONSHIP BETWEEN PROAKAP4 CONCENTRATION AND SPERM MOTILITY IN EJACULATIONS OF FROZEN-THAWED HORSES EJACULATES

The percentage of total **MOTILITY** sperm was significantly **LOWER** ($p \leq 0.05$) in ejaculates with a **LOW ProAKAP4 CONCENTRATION** ($62.91 \pm 4.60\%$) compared to high concentrations ($73.06\% \pm 2.65\%$).



ProAKAP4 concentration shows a **POSITIVE CORRELATION** with **MOTILITY** (MT and MP) as well as with **KINETIC VELOCITY PARAMETERS** (VCL and VSL)

BREED	Group 1 Alta [proAKAP4]		Group 2 Baixa [proAKAP4]	
	Nº Ejaculates	\bar{x} [proAKAP4] (ng/10M spz)	Nº Ejaculates	\bar{x} [proAKAP4] (ng/10M spz)
PRA	6	53.31 ± 4.00	2	19.75 ± 0.96
PRE	15	57.64 ± 3.28	18	19.75 ± 19.51
WARMBLOOD	4	46.31 ± 3.41	3	32.28 ± 2.29

PRA: Pure arabian breed; PRE: Pure spanish breed

Parameters	proAKAP4 concentration (ng/10M spz)
MT (%)	0.31 ($p=0.03$)
MP (%)	0.31 ($p=0.03$)
VCL ($\mu\text{m/s}$)	0.29 ($p=0.04$)
VSL ($\mu\text{m/s}$)	0.34 ($p=0.02$)

MT(%): total motility; PM (%): progressive motility; VCL (m/s): curvilinear velocity; VSL (m/s): straight-line velocity.

5.- CONCLUSION

1. The concentration of proAKAP4 can be related to the sperm quality in frozen/thawed horse semen. Horse semen with a high concentration of proAKAP4 (>40 ng/10M) can be classified as good quality semen.
2. The concentration of proAKAP4 is positively related to total and progressive motility.
3. The determination of proAKAP4, through the kit 4MID®, allows a broader knowledge of the ejaculate of stallions after freezing/ thawing before insemination, thus increasing the gestation rates in mares with frozen semen.

