Is hair cortisol related to different lifestyles in horses (*Equus caballus*)?

MATHILDE SAUVEROCHE

SUPERVISED BY LINA ROTH

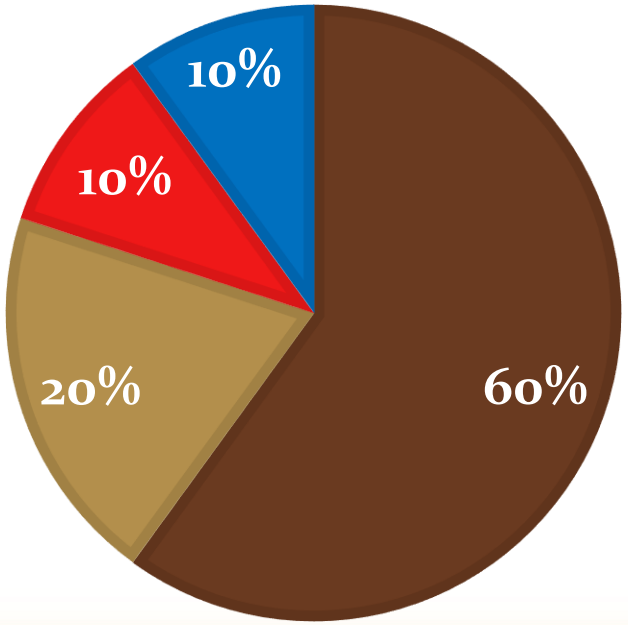
Introduction – Horse Behaviour

- Domestication: 6000 years ago
- “Natural” behaviours in horses:
  - Social: Group living
  - Grazing ++
  - Walking ++
- Management ➔ Affects behaviour

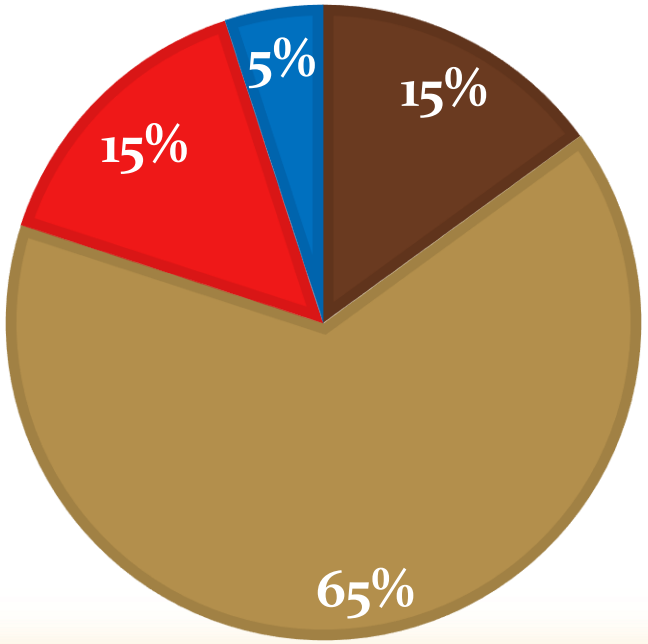
Introduction – Time budgets in different lifestyles

Eat / Stand / Lie / Other

FREE RANGING



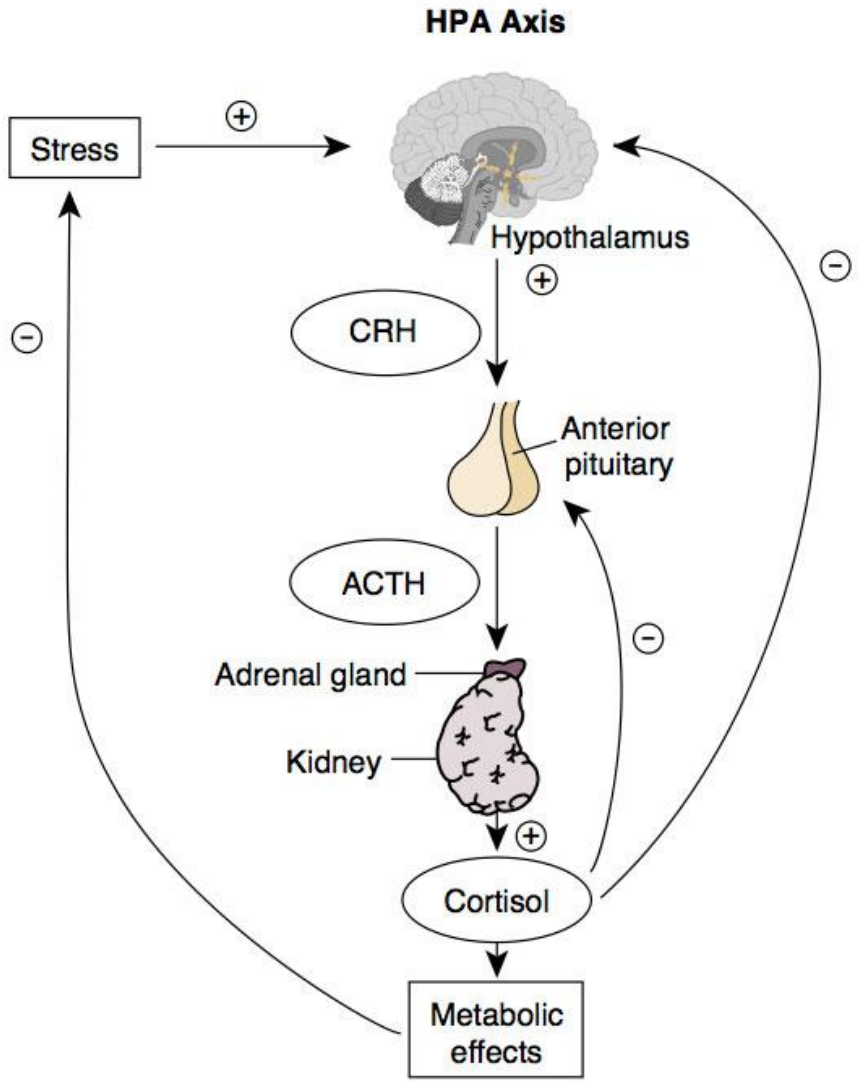
INDIVIDUAL STABLES



McGreevy, P. (2004). *Equine behavior: a guide for veterinarians and equine scientists*. Saunders, An Imprint of Elsevier Limited.

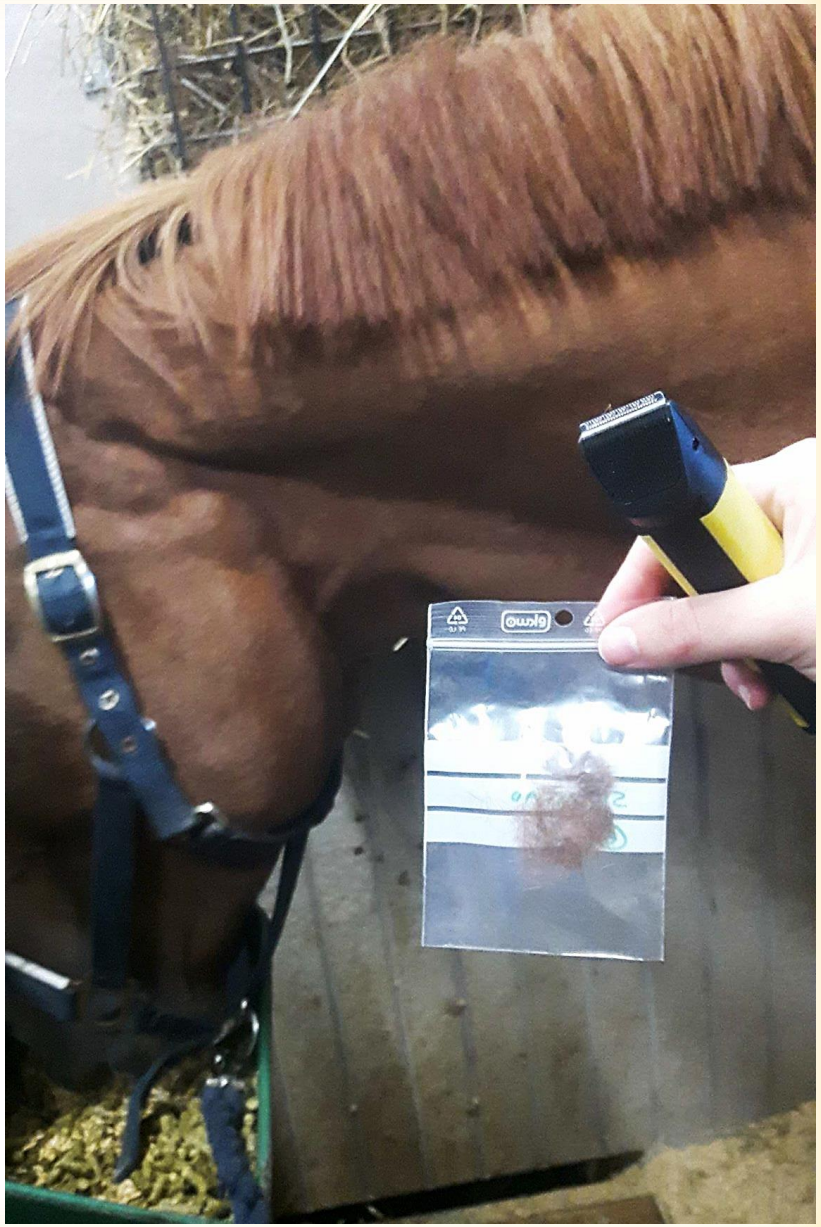
Introduction – Cortisol & Stress

- Hypothalamic-pituitary-adrenocortical axis = Hormonal pathway involved in stress response
- BUT also involved in other processes



Introduction – Cortisol & Stress

- Cortisol ➡ measure of stress in research
- How?
  - Blood plasma
  - Saliva
  - Faeces
  - Urine
  - Milk
  - Hair ➡
    - ➢ Non- invasive
    - ➢ Long term
    - ➢ Validated in many species



Aims

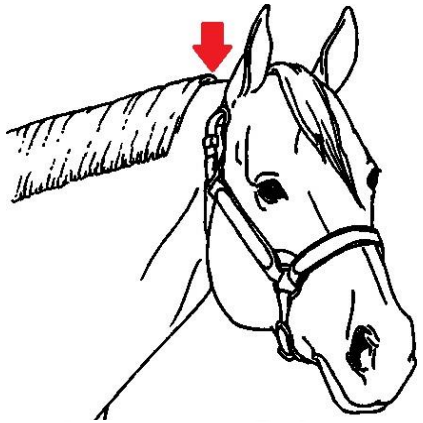
- Optimize a method to measure cortisol in horse hair
- Investigate if different lifestyles and management regimes influence behaviour and/or hair cortisol levels
- Analyse if personality influences hair cortisol concentrations

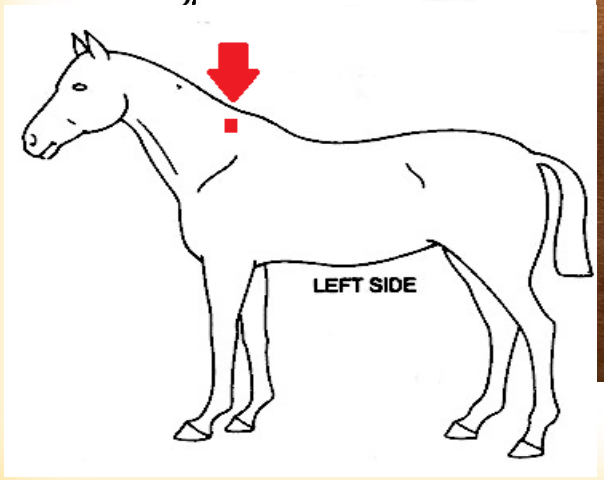
Methods

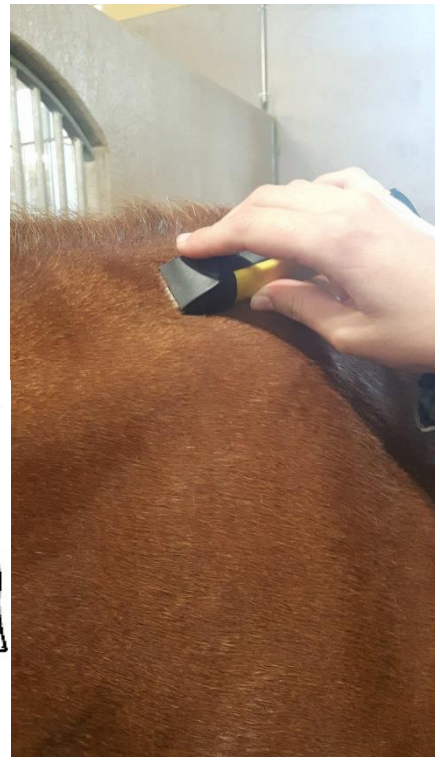
153 horses, 3 lifestyle groups:

- Free Roaming
- Riding School
- Trotter Racing

Hair cutting



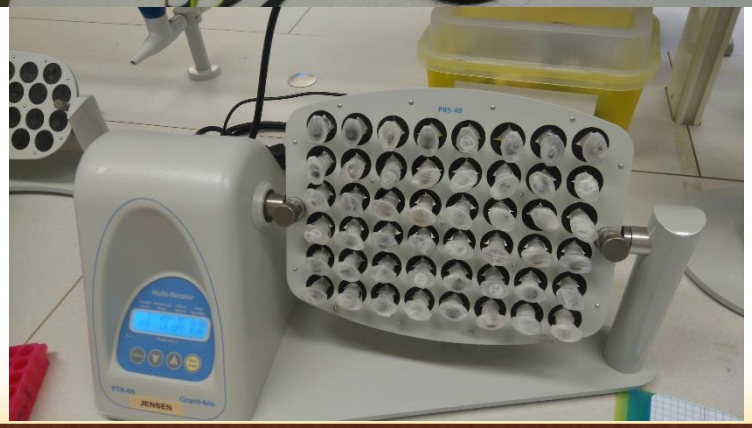




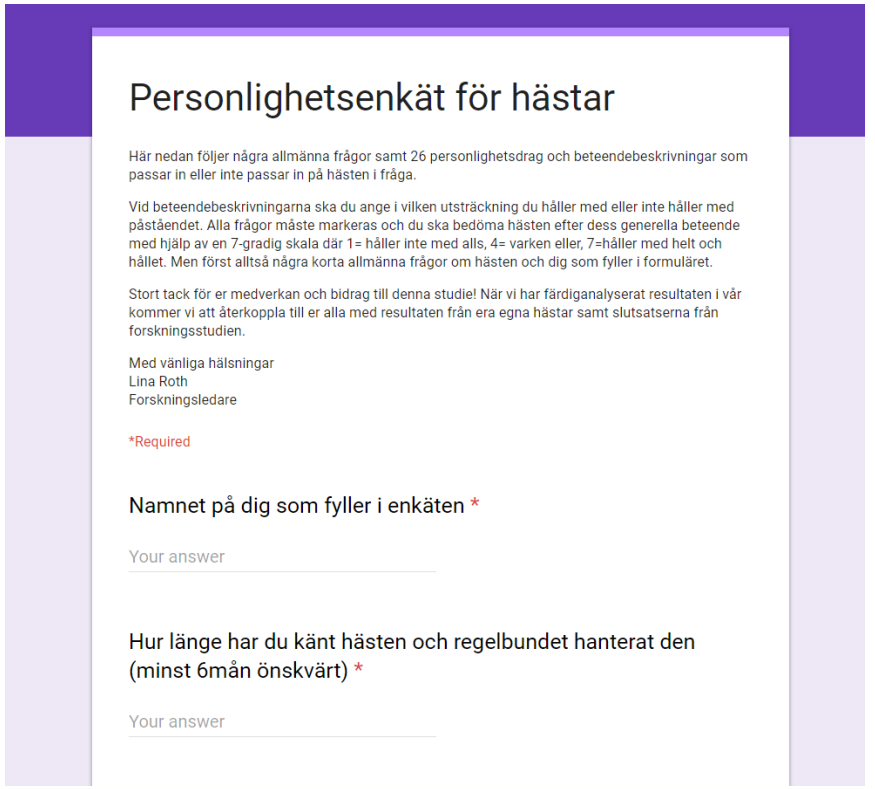
Behaviour observations

Methods

Laboratory analyses



Questionnaires: Personality & Lifestyle



Personlighetsenkät för hästar

Här nedan följer några allmänna frågor samt 26 personlighetsdrag och beteendebeskrivningar som passar in eller inte passar in på hästen i fråga.

Vid beteendebeskrivningarna ska du ange i vilken utsträckning du håller med eller inte håller med påståendet. Alla frågor måste markeras och du ska bedöma hästen efter dess generella beteende med hjälp av en 7-gradig skala där 1= håller inte med alls, 4= varken eller, 7=håller med helt och hållet. Men först alltså några korta allmänna frågor om hästen och dig som fyller i formuläret.

Stort tack för er medverkan och bidrag till denna studie! När vi har färdiganalyserat resultaten i vår kommer vi att återkoppla till er alla med resultaten från era egna hästar samt slutsatserna från forskningsstudien.

Med vänliga hälsningar
Lina Roth
Forskningsledare

*Required

Namnet på dig som fyller i enkäten *

Your answer

Hur länge har du känt hästen och regelbundet hanterat den (minst 6mån önskvärt) *

Your answer

Results - Cortisol

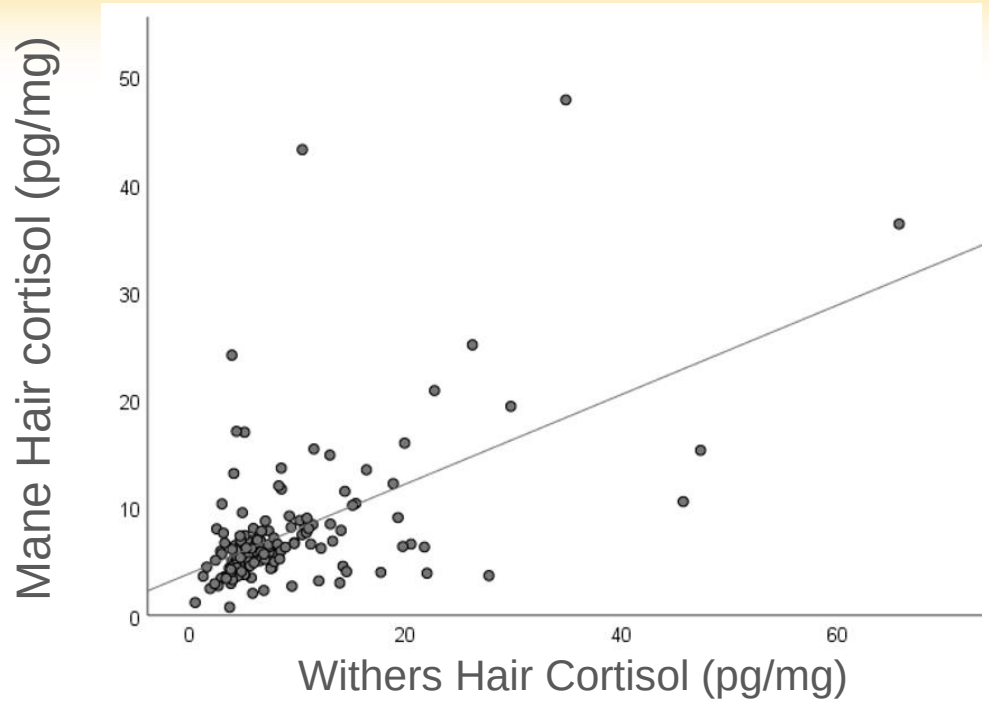
- Cortisol from both body locations:
  - Sign. positively correlated
  - Not significantly different

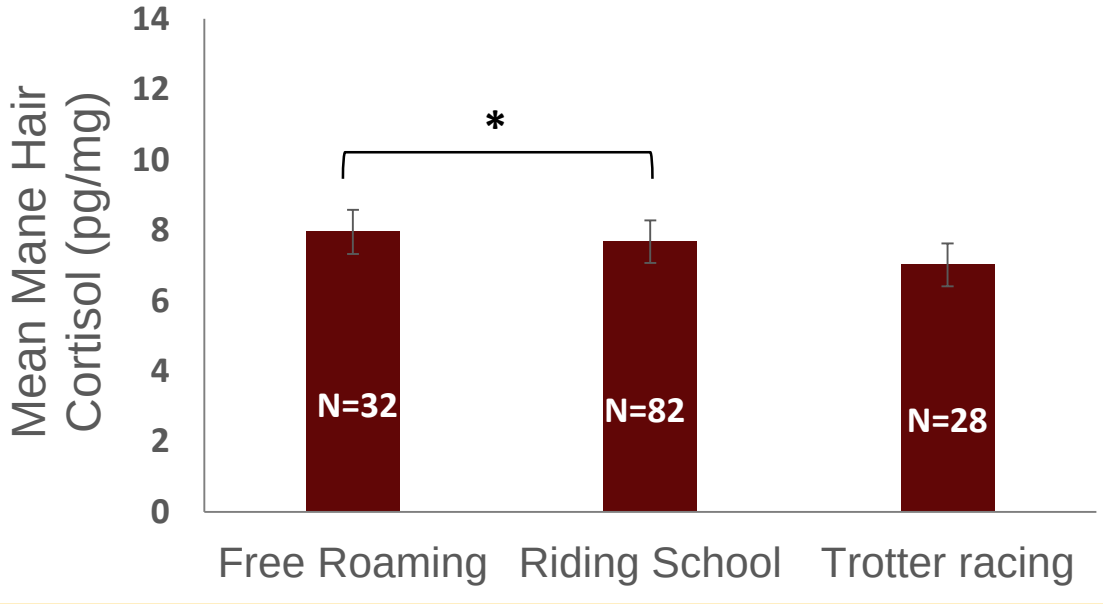
➔ Validates method

➔ In future: pluck mane

- Free roaming lifestyle group has higher cortisol levels than riding school group

➔No causation can be determined

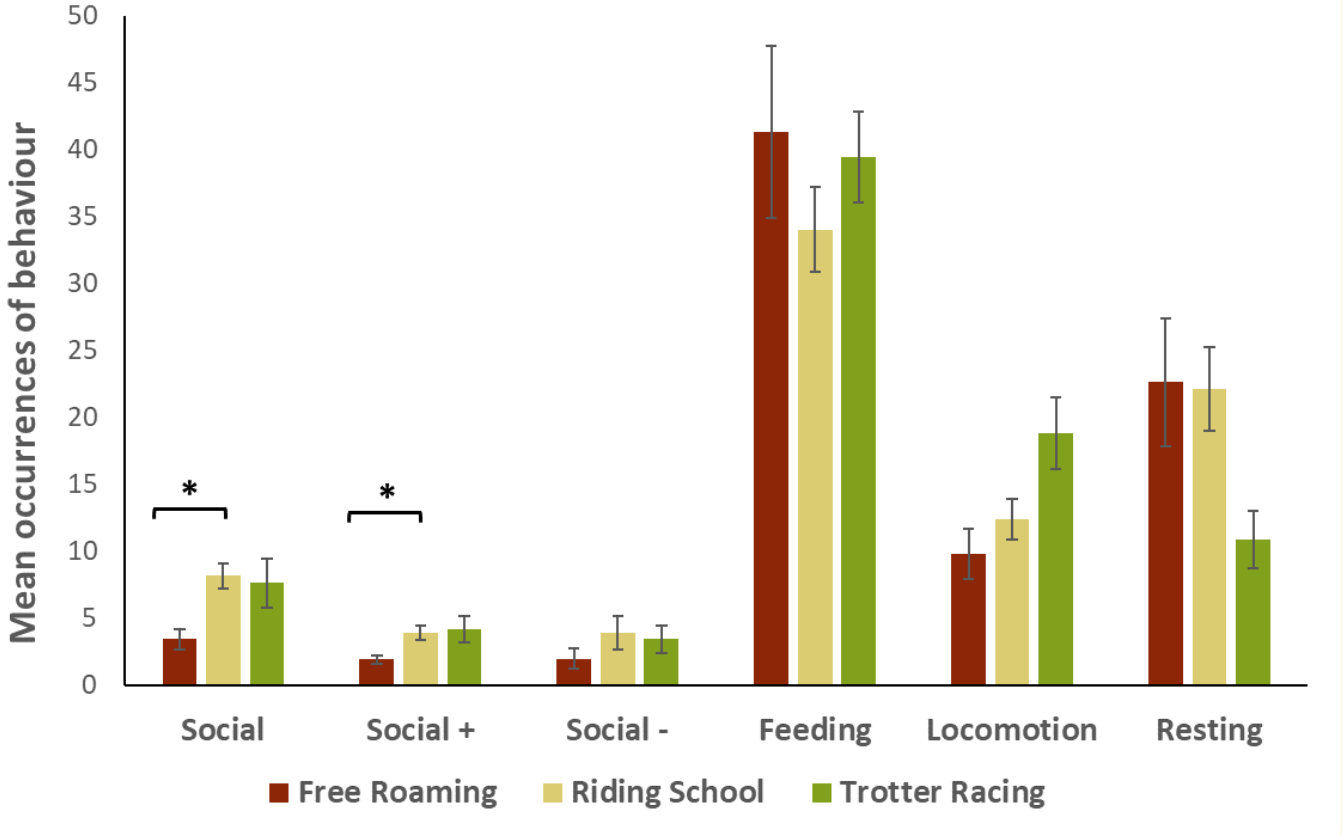




Results - Behaviour

- No stereotypical behaviours observed
  ➔No adverse management conditions

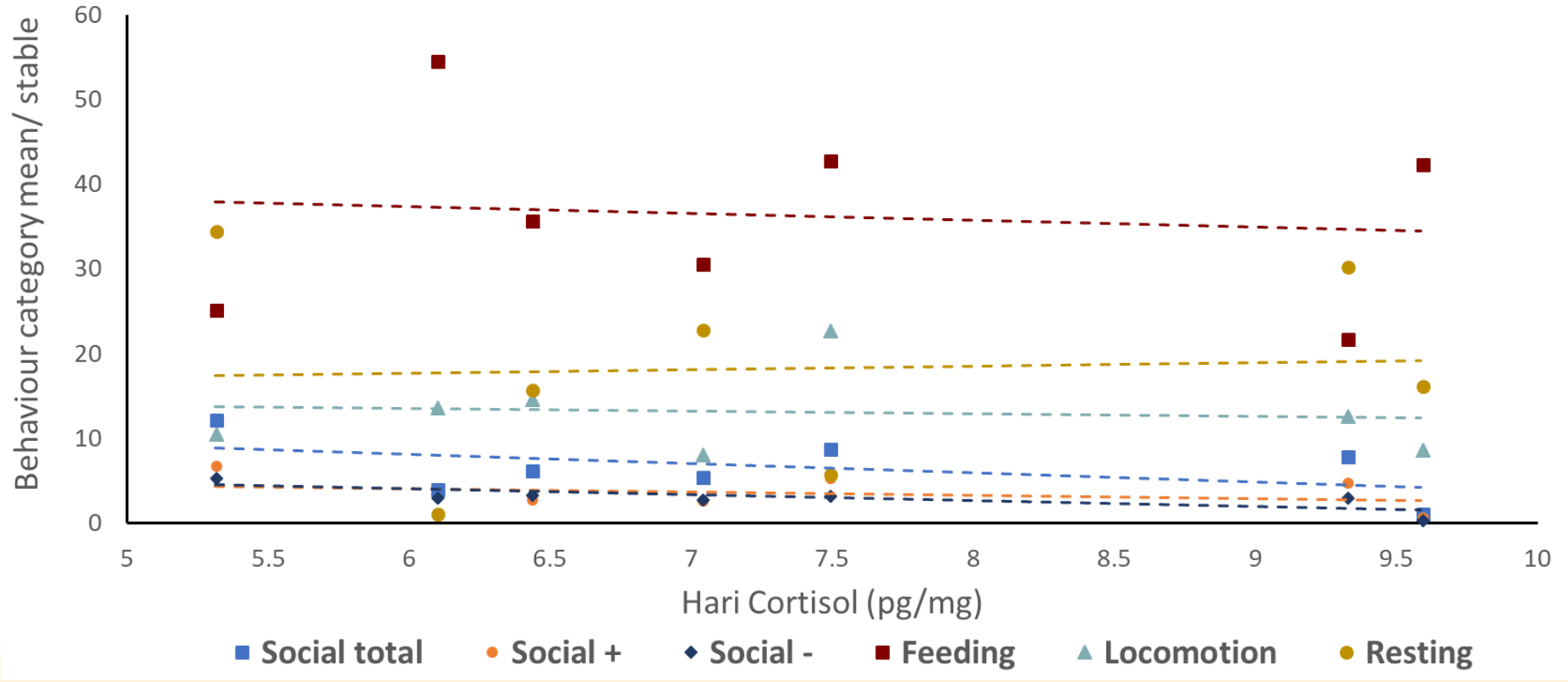
- Differences in behaviour
  ➔ Enclosure size?



Results - Behaviour

- No significant correlations between cortisol and behaviours

➔ Few data points, behaviour analysed in groups



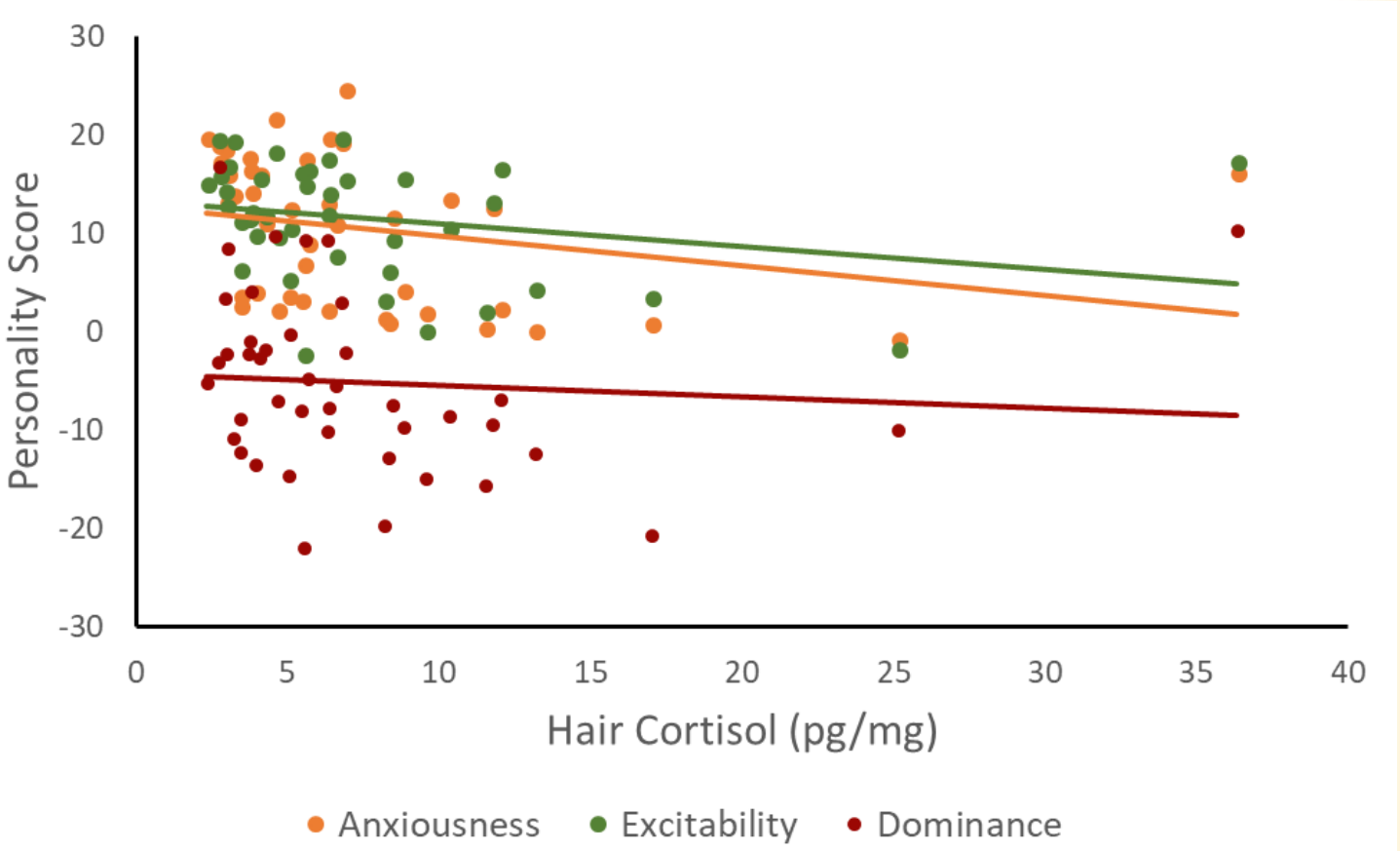
Results - Personality

Dominance, anxiousness and excitability:

- Significantly negatively correlated to cortisol levels
- Significantly positively correlated with each other

➔ Anxiety also negatively correlated with hair cortisol in humans

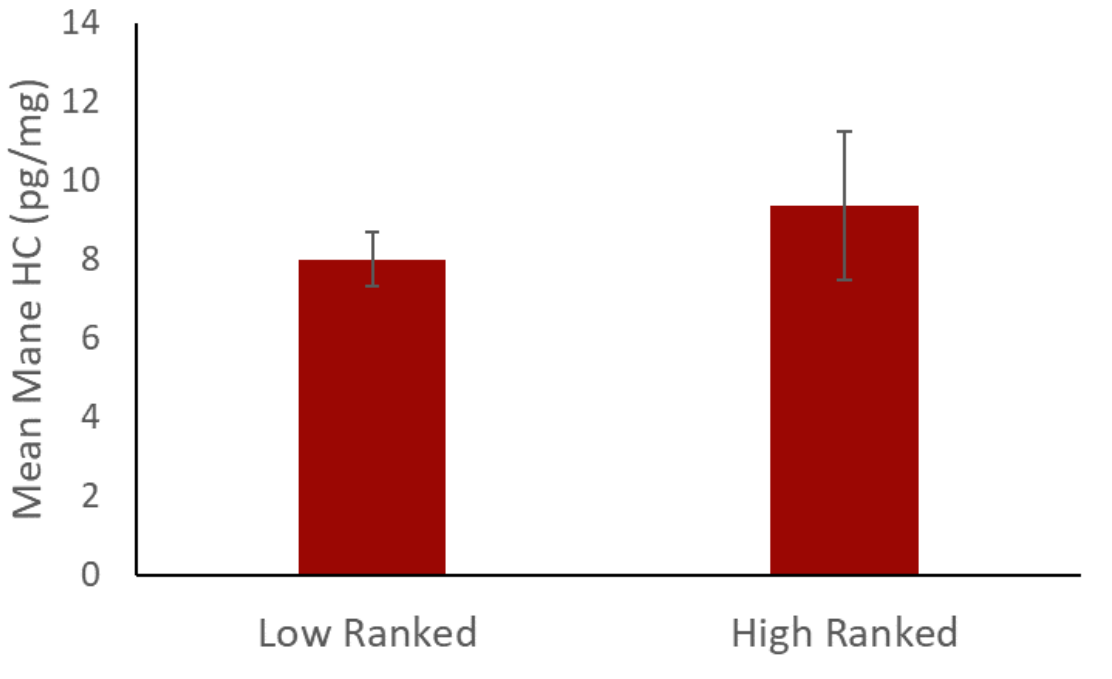
➔ Bias in assessment ?



Results - Hierarchy

- Rank score given in questionnaire
- No sign. Differences in hair cortisol found between low and high ranked horses

➔ Human bias ?

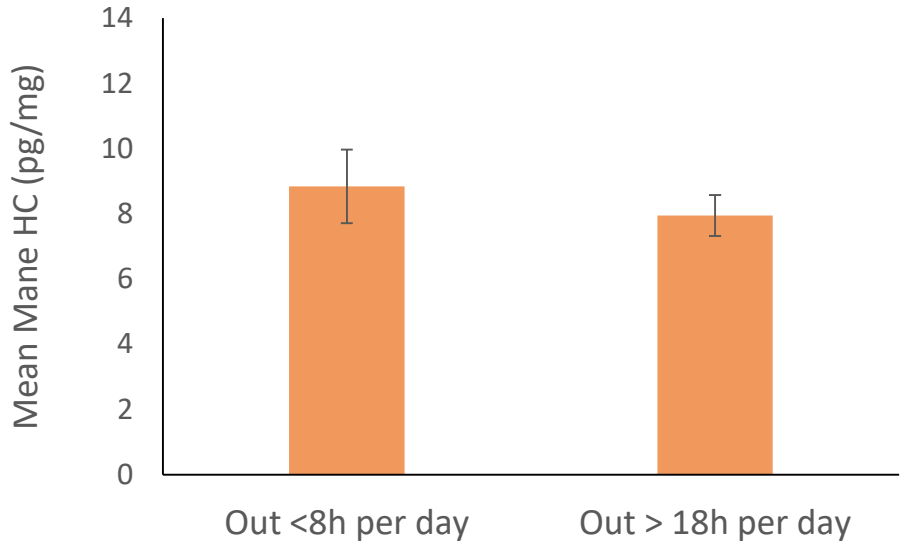


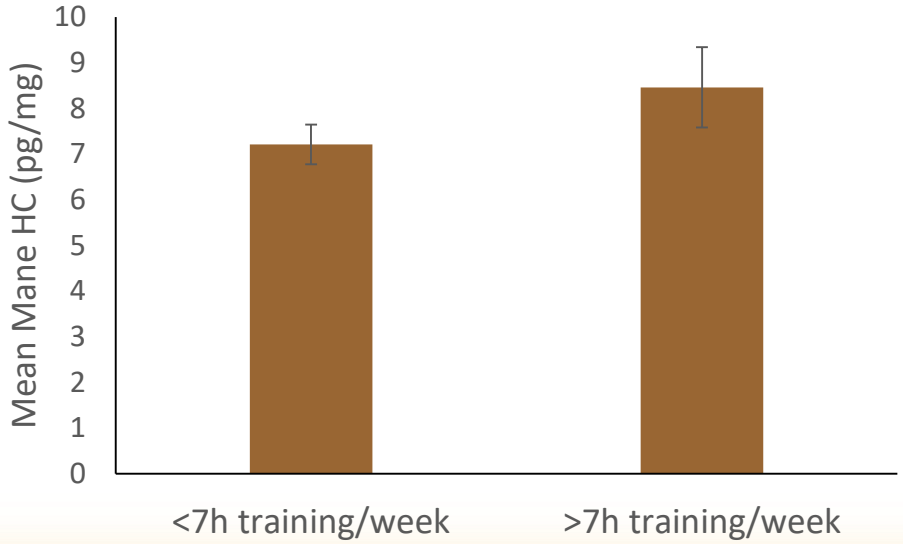
Results - Management

- No sign. Differences found with time spent outdoors

- Intensity of training did not affect cortisol concentrations

➔ More activity related information needed





Conclusions

- Method validated & optimized
- Low overall cortisol
- No causation for difference in cortisol between lifestyles
- Contradictive results but supported by other studies

  Horses show decrease in glucocorticoids when in:

  - Chronic stress
  - Chronic pain
  - Compromised welfare


Thank you !!
Stable owners & staff
Enya
Josefine
Andrea
Pelle
Lina
Henri
Ann-Charlotte
Ann-Sofie
Matthias
Students in Voltera