Progressive weaning reduces negative behavioral and biological effects in horses

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IMPACT of WEANING on WELFARE

Strongs links between foals and mares at birth

Under feral conditions:

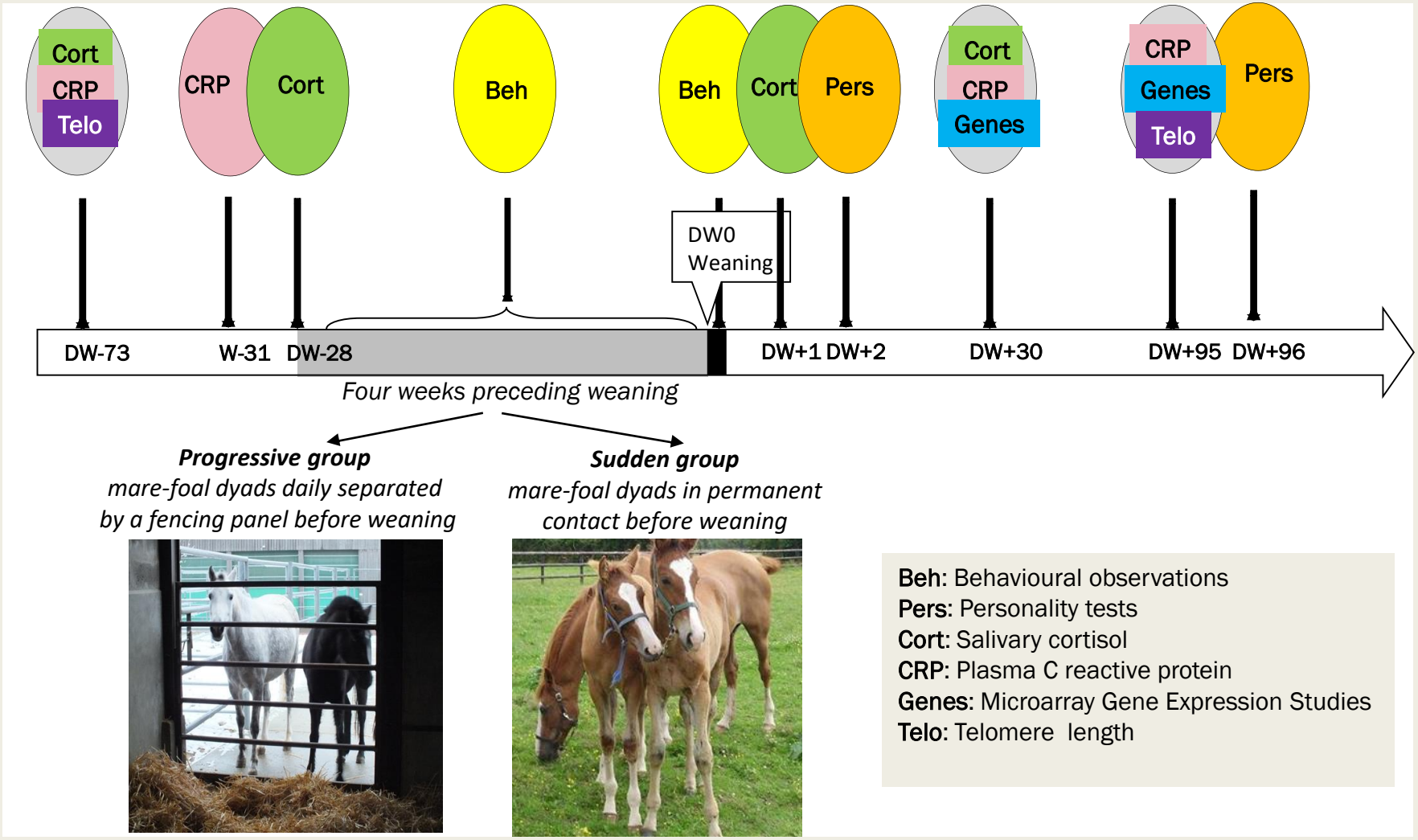
- Weaning appears after ~10 months
- Foals stay close to their mother until 2 years of age

Under rearing conditions:

- Weaning appears between 4 and 6 months
- Weaning is sudden and decided by humans

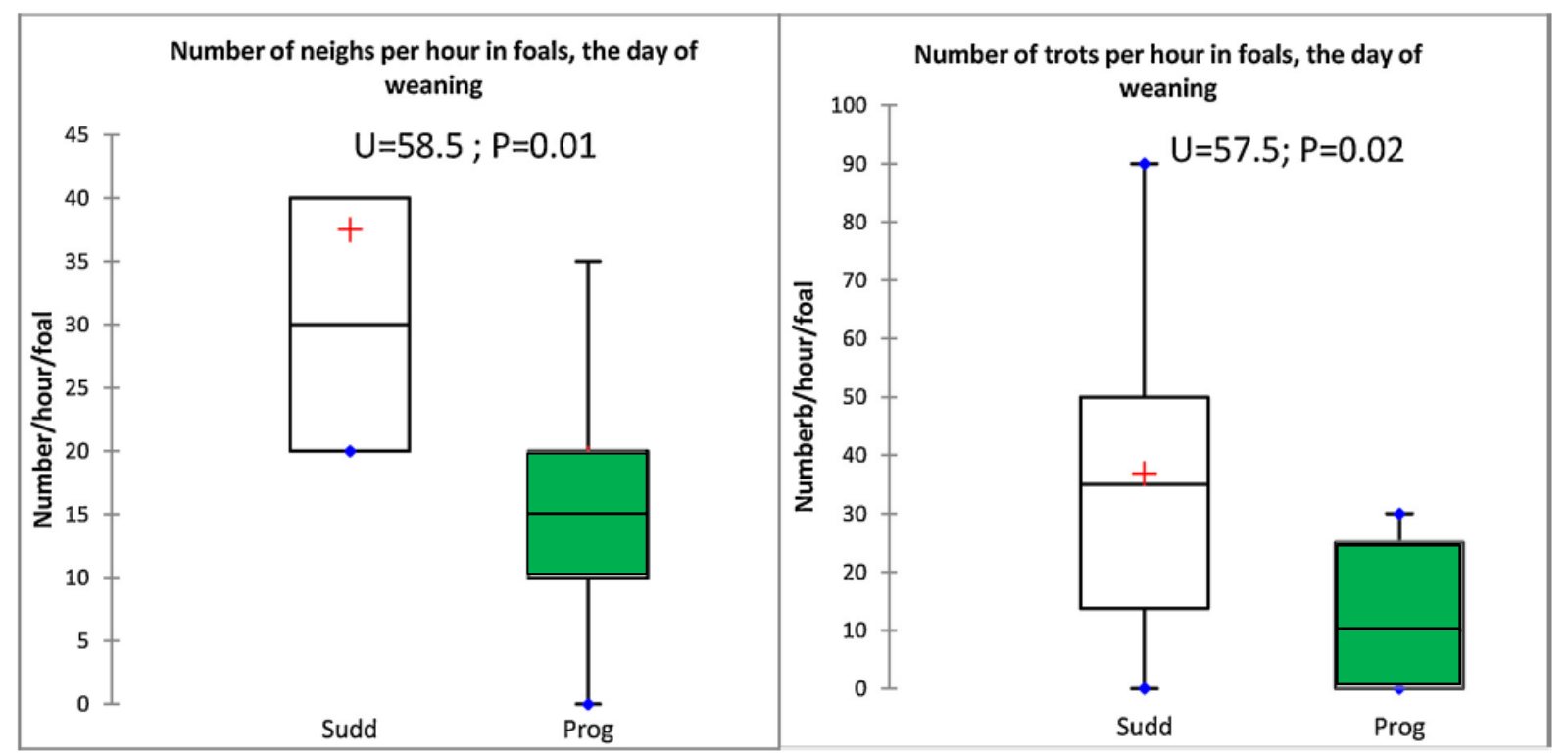
Stress, welfare alterations
Loss of weight
↑ vulnerability to diseases
Appearance of stereotypies

Experimental Design



Beh: Behavioural observations
Pers: Personality tests
Cort: Salivary cortisol
CRP: Plasma C reactive protein
Genes: Microarray Gene Expression Studies
Telo: Telomere length

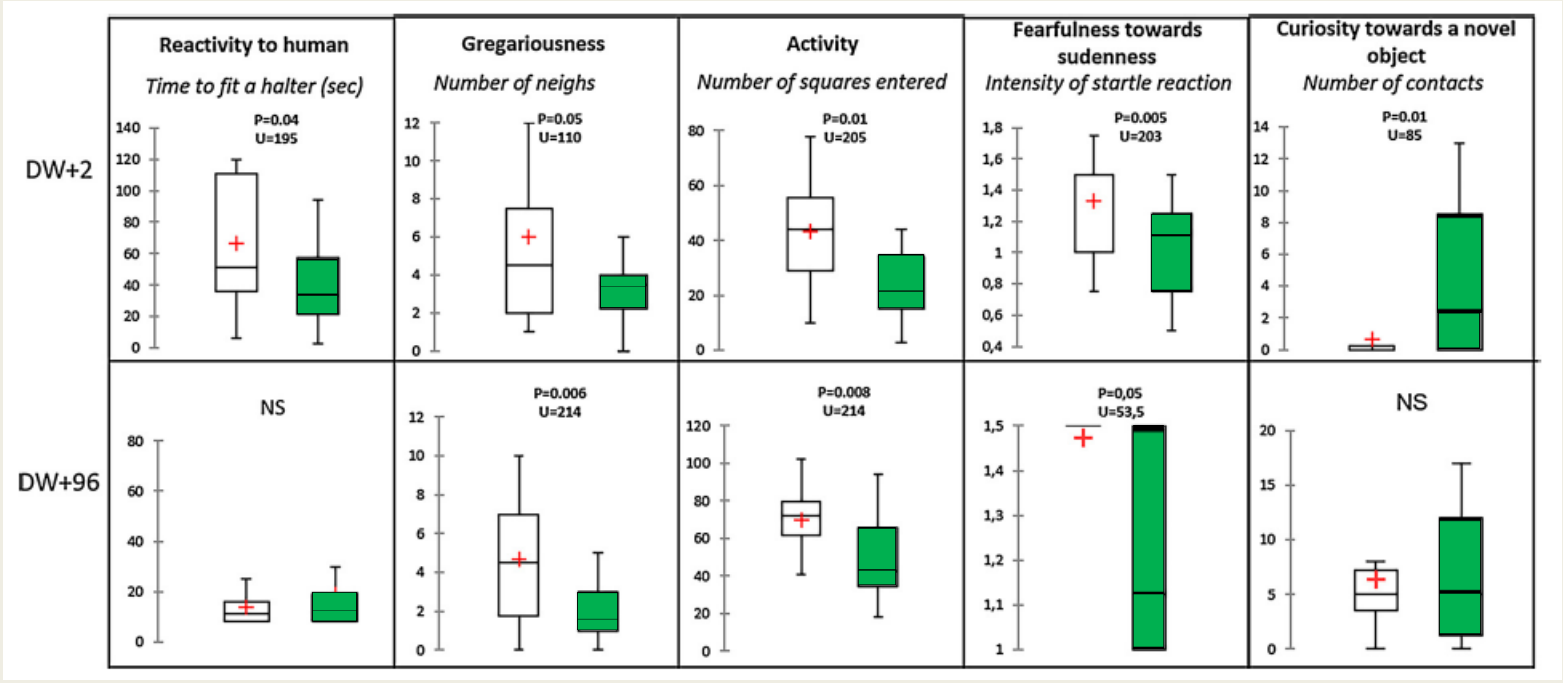
RESULTS:
Behavioral stress responses on day of weaning



Twice less neighs

Three times less trots

RESULTS:
Effects on foal personality



Less fearful of humans

Less gregarious

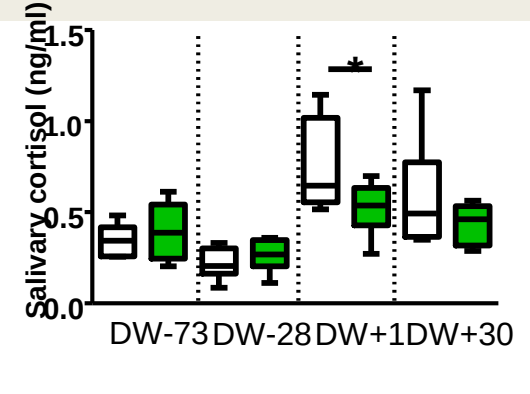
Less active

Less fearful new object

More curious

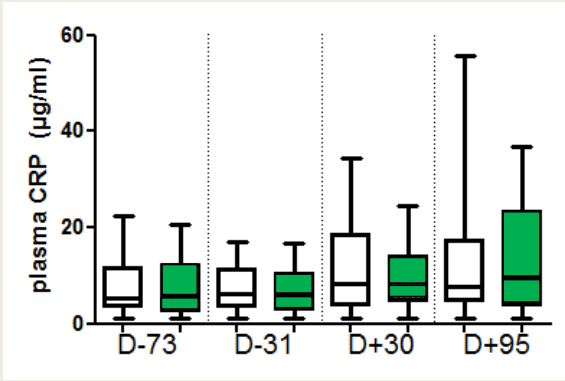
RESULTS:
Biological stress response

CORTISOL



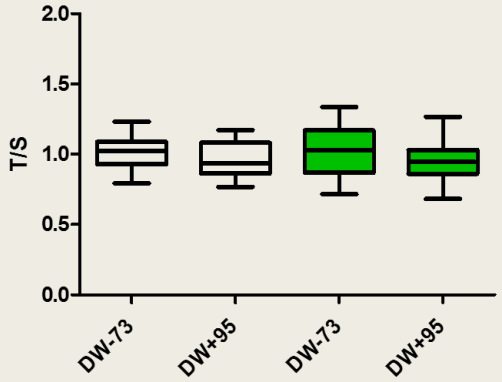
Less cortisol one day after weaning
no longer significant 30 days later

C REACTIVE PROTEIN



No effect of weaning method
No reliable results for Il-1, Il-6 and TNFa

Telomere length

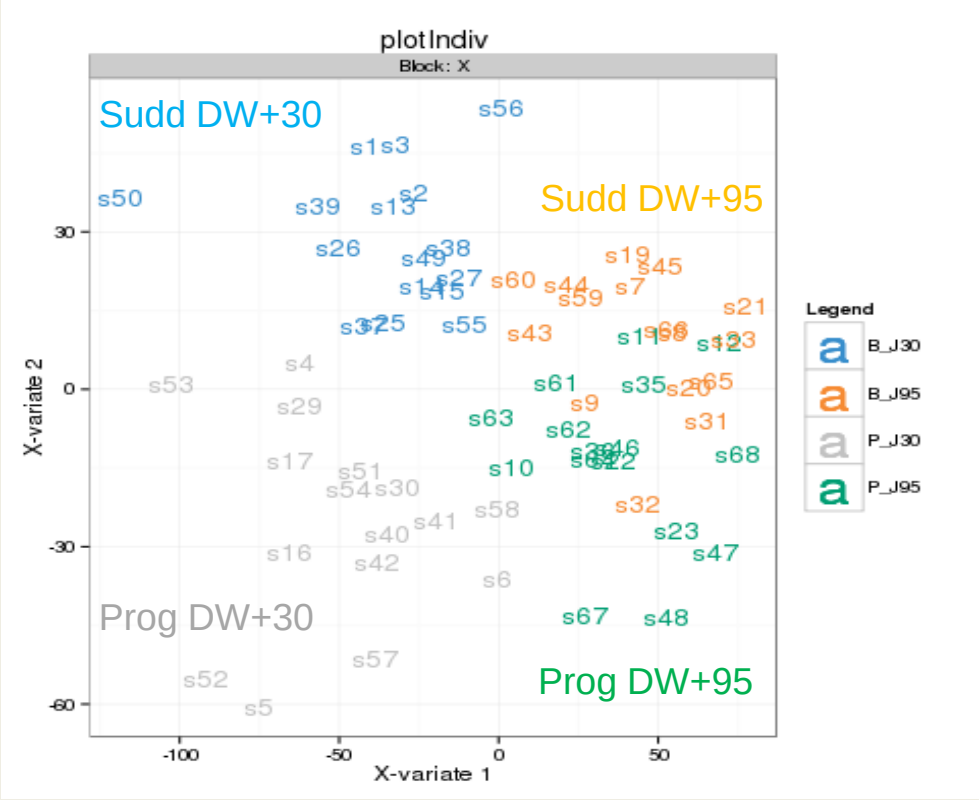


No effect of weaning method

Non significant decrease with age

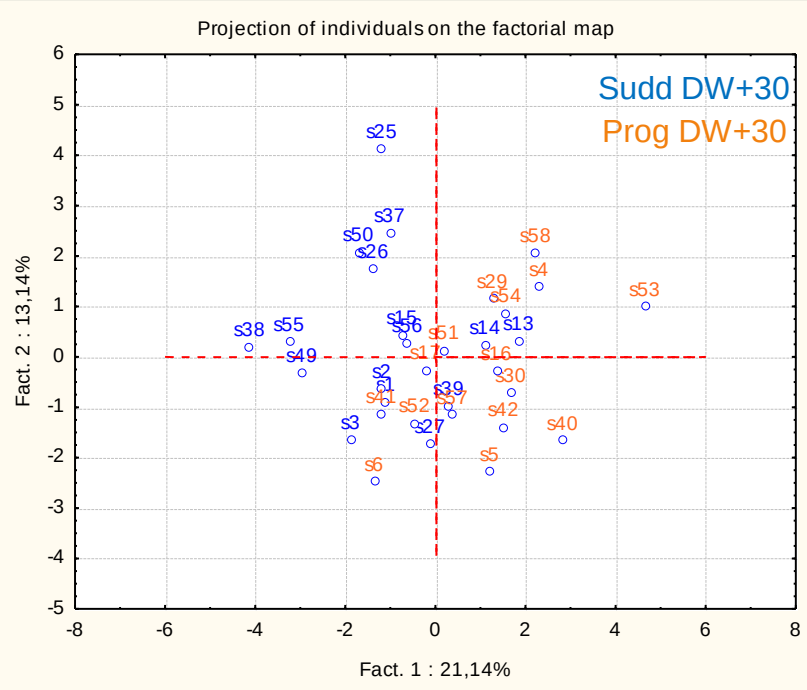
RESULTS:
Effects on gene expression (blood cells)

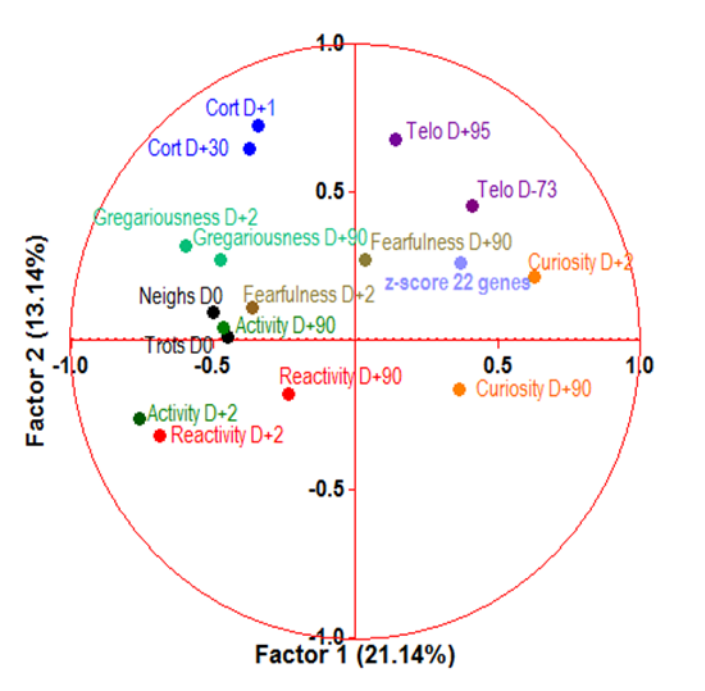
Sparse Least Square-Discriminant Analysis (SpLS-DA):
genes that contribute the most to discriminate experimental groups



22 discriminating genes on X-variate 2

RESULTS:
Data integration by Principal Component Analysis





Z score 22 genes= composite z score of the 22 genes's z score expression data

$$z - score = \frac{x - \mu}{\sigma}$$

x= gene expression value

CONCLUSION:

- Progressive weaning induced inquisitive, less fearful and less gregarious personalities at least in mid-term
- PCA analysis highlighted relationships between biomarkers and behavior/personality traits and revealed a healthier profile for Prog vs Sudd foals
- Progressive weaning was also found beneficial for mares (data not shown)

This work is now published :

Lansade L, Foury A et al, 2018, *Psychoneuroendocrinology* 97: 59-68

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Experimental Design

Progressive weaning: 18 foals and 18 mares n=9 dyads foal-mare

Experimental Design

Sudden weaning: 16 foals and 16 dams n=8 dyads foal-dam

8 months

No preparation

Definitive weaning