



# Effects of rearrangement of the cows in production groups on milk cortisol concentrations

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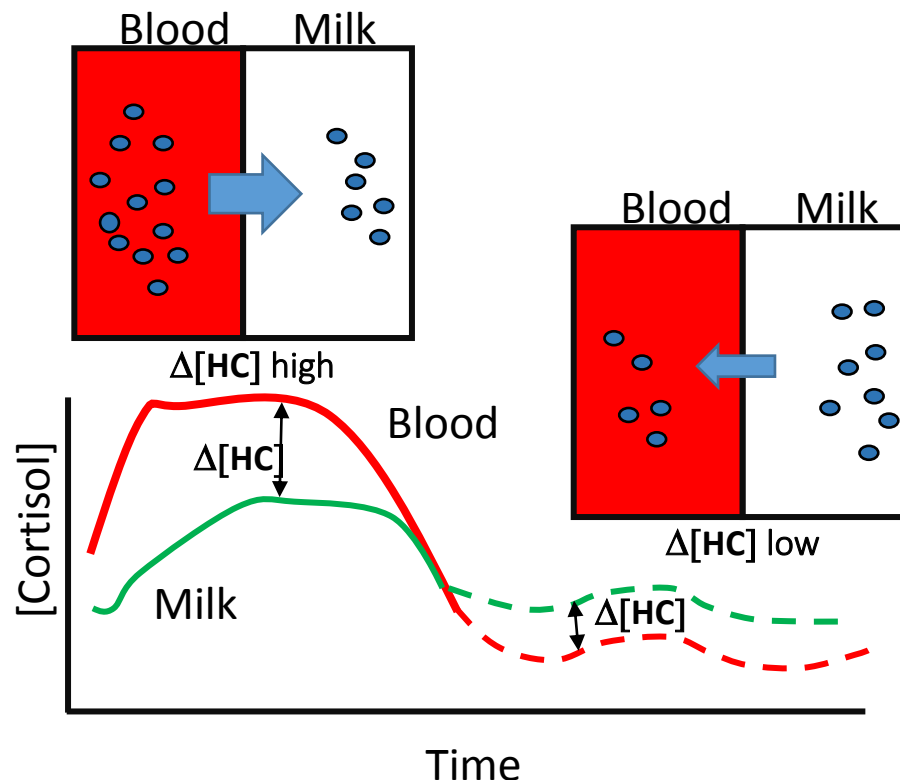


## Is Cortisol a Useful Biomarker for Stress?

- Controversial results in scientific papers
- Can Cortisol be considered a “Golden Standard”?
- Several questions to answer:
  - Which matrix
  - How many samples/How frequent
  - From ALL animals / From a percentage of the whole herd
  - ... ?
- Many other questions (WG1 Meeting in Bern...)

# Why Cortisol in Milk?

## Transfer of Cortisol (HC) Across the Blood/Milk Barrier



## What do we measure?

- Cortisol in milk: 97% in water fraction
  - Fat should be removed
- Possibly indicative of “free” cortisol

## When do we take a sample?

- Repeatedly
- Milk parlour
- Potentially automatizable

## Aims of the Study

**First trial:** to evaluate physiological variations in milk cortisol and its diurnal in dairy cows.

**Second trial:** to investigate the effects of rearrangement of the cows in production groups on milk cortisol concentrations.



## Experimental

Both trials performed in the same commercial dairy farm in Northern Italy

Animals at first or second parituration

Same feeding and management conditions

## First trial

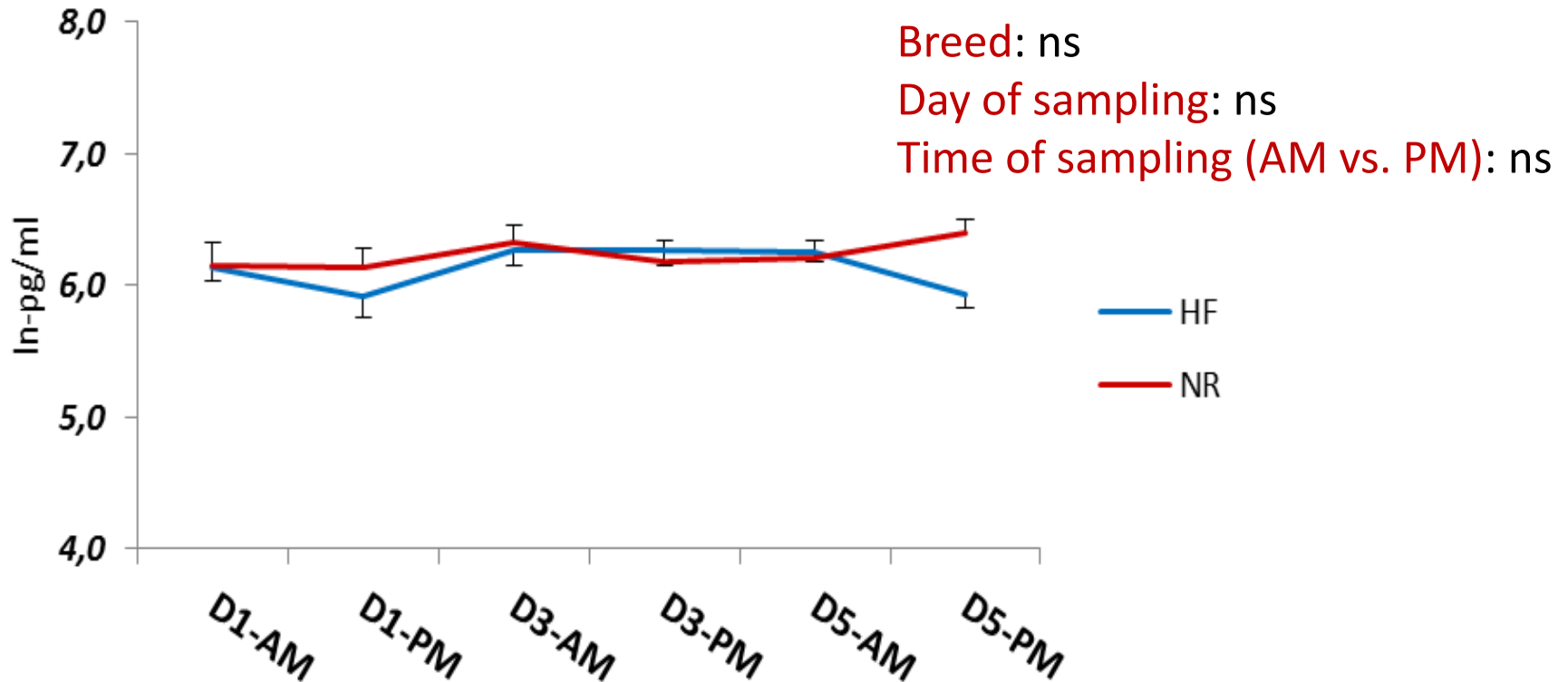
### Animals:

10 Norwegian Red (NR) cows and 10 Holstein Friesian (HF) cows remained in the same group all the experimental period.

### Sampling protocol:

- individual milk sample collected at the morning (6:00 am) and at the afternoon (6:00 pm) milking for 3 consecutive days.

## Milk cortisol in the first study



## Second Trial

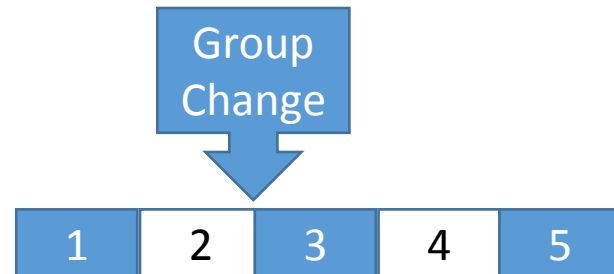
### Animals (N=40)

5 NR and 13 HF cows: from “post partum” group to “high production” group

10 NR and 7 HF cows: from “high production” group to “low production” group

### Sampling protocol:

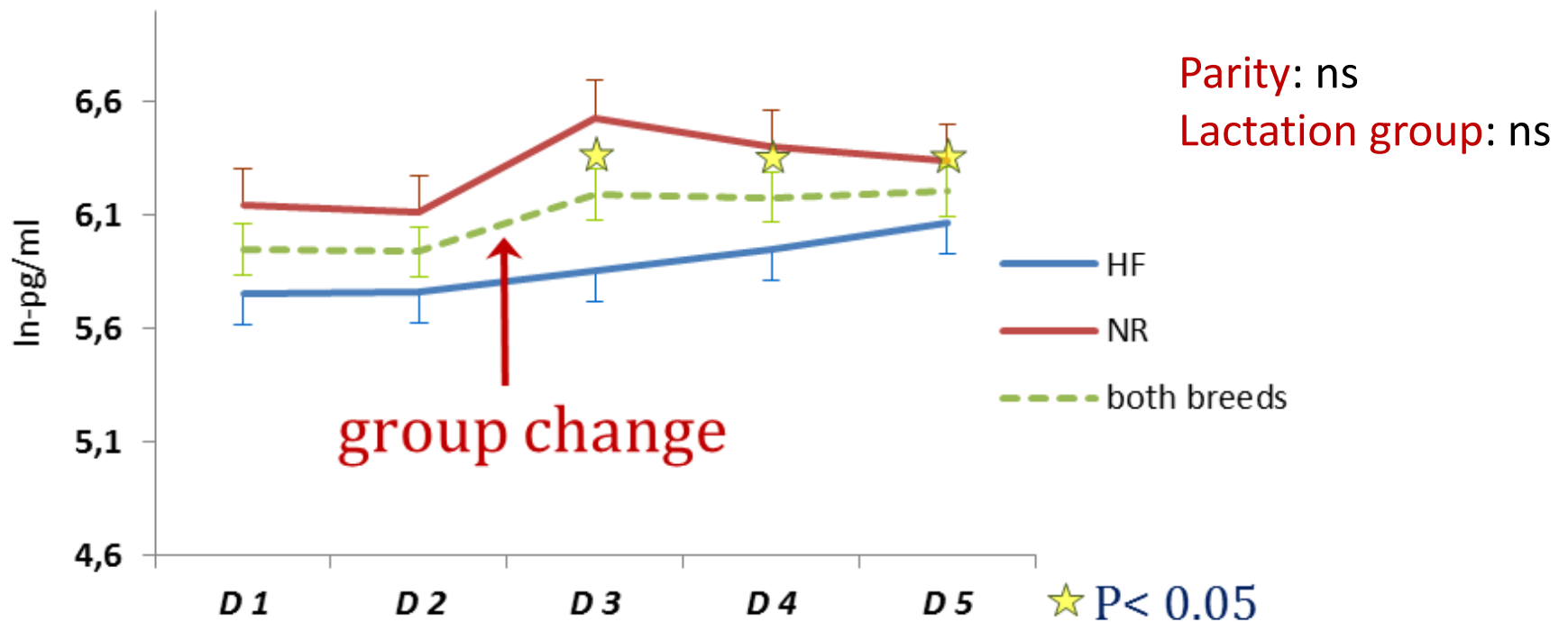
individual milk samples:  
evening milking (6:00 pm)





	Mean, ln(pg/ml)	SE	
<b>Breed</b>			
HF	5,88	0,11	A
NR	6,31	0,10	B
<b>Day of sampling</b>			
D1	5,95	0,11	a
D2	5,94	0,11	a
D3	6,19	0,11	b
D4	6,18	0,11	b
D5	6,21	0,11	b

## Milk cortisol in the second study



# Conclusions

## Trial 1:

Milk cortisol concentrations:

- do not significantly vary during consecutive days
- more variable in the afternoon than in the morning milking

## Trial 2:

Milk cortisol concentrations:

- are significantly higher after the relocation of cows (D3, D4, D5)
- the two breeds responded differently to the challenge
- can milk cortisol be used in dairy cows to assess short term stimulation of the HPA axis ?