8th Symposium ECBHM, 28-30 August 2013, Bern, Switzerland

HAEMATOLOGICAL PROFILES OF CALVES BELONGING TO HERDS WITH BOVINE NEONATAL PANCYTOPENIA HISTORY IN AND AROUND WALLONIA (BELGIUM).

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Bayrou C. , Jolly S., Cassart D., Rao A.-S., Lebrun M., Desmecht D., Rollin F., Hanzen C., Théron L.

THE BNP PROJECT

- ✓ Epidemiology, clinical and anatomo-pathological findings
- ✓ ***Detection of SUBCLINICAL calves in BNP herds***
- ✓ Alloantibodies detection by flow cytometry cell sorting
- ✓ 2013-2014: new tools & genetics

BOVINE NEONATAL PANCYTOPENIA

- Syndrome of the **young calf**
  severe and often-lethal
- Reported in several European countries since **2006**
  ↑ cases between 2008 and 2010
- Farm Incidence rate
  between **1%** and **5%**
- Until now up to **≈5000** cases noticed
  ➔Animal health concern in western world





BOVINE NEONATAL PANCYTOPENIA

Neonate-maternal incompatibility

- ✓ Dams: vaccine-induced alloreactive antibodies

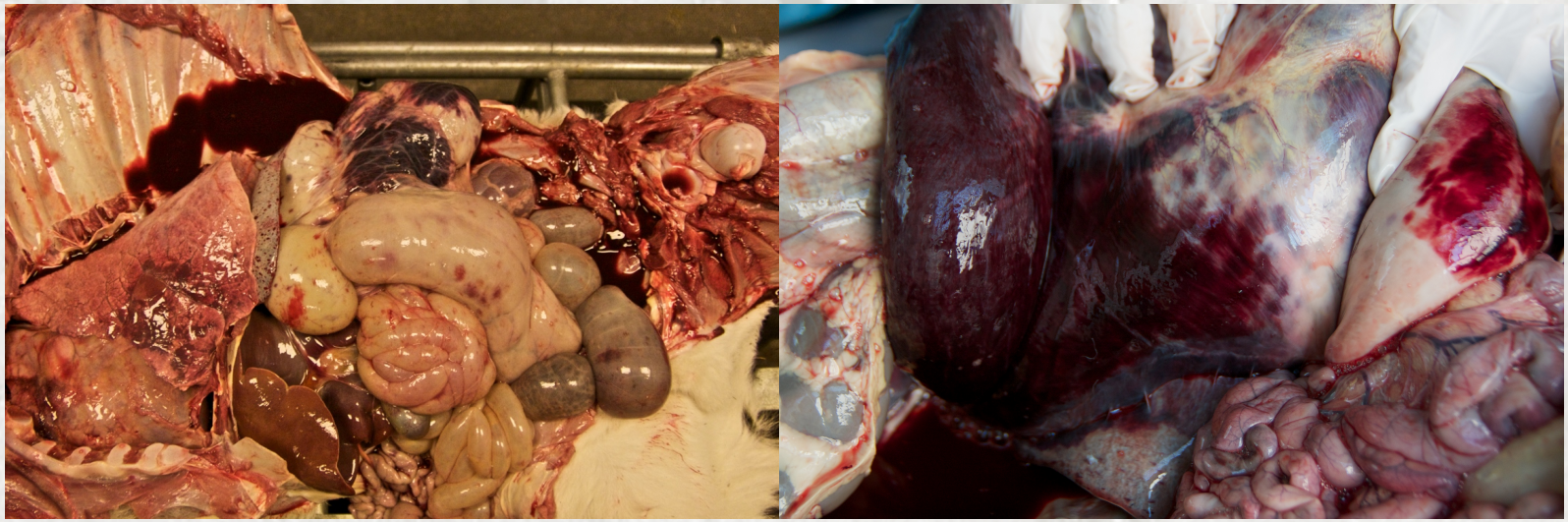
- ✓ Calf: whether they match with cell surface MHC-I antigens
  - ➢ inherited from the father
  - ➢ mostly expressed on peripheral and bone marrow leukocytes

BOVINE NEONATAL PANCYTOPENIA

- Young calves **under 4w** (range 10-20 days)
- Both **genders** and different **breeds**
- Well grown and no history of previous ill health
- The **clinical** form characterized by…

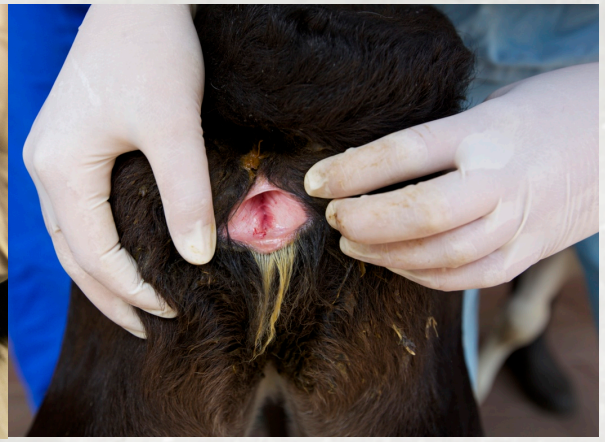
BOVINE NEONATAL PANCYTOPENIA

External and internal bleedings



BOVINE NEONATAL PANCYTOPENIA





Petechiae and **ecchymosis**



BOVINE NEONATAL PANCYTOPENIA

Melena or
haematochezia

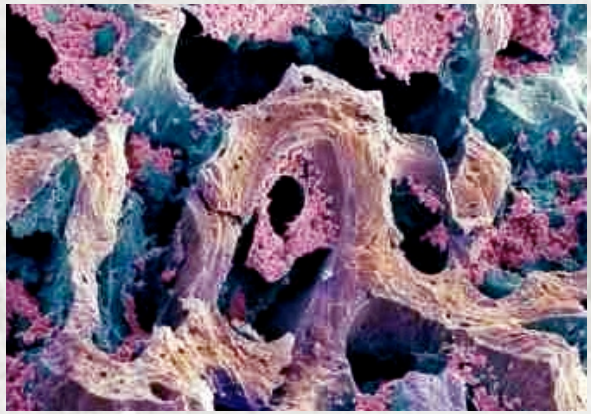
Occasionally
hyperthermia

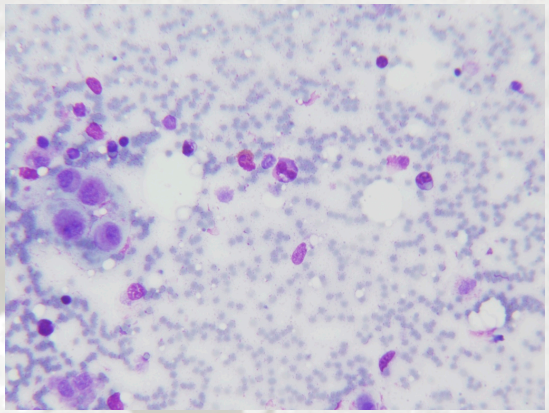
Prostration and
sudden death!

BOVINE NEONATAL PANCYTOPENIA

Marked **panleukopenia**

Severe **thrombocytopenia**





Partial or total destruction of the bone marrow

➔**panmyelophtisis**

Questions

- Which are the haematological characteristics of BNP calves versus healthy ones?

- Is there any subclinical case in known BNP farms?





AIM OF THE SUDY

- ✓ Random sampling and haematological analysis in **BNP herds**
- ✓ Verify the hypothesis of **SUBCLINICAL BNP CASES**
- ✓ Better epidemiological picture at herd-level

MATERIALS & METHODS

- 100 calves:
  - ✓ **Blood samples**
    jugular vein
    EDTA tubes
  - ✓ **Complete haematological profile**
  - ✓ **Follow up**

- 12 different farms:
  In and around Wallonia (BE)
  BNP-history

- Between September 2009 and November 2012

RESULTS

CALVES

Breed:

44% BBCB
39% HF
14% crossbred
3% BdA

Age (<4w):

14,8 ± 4,02 days

Gender:

57% F
43% M

Colostrum:

75% mother
25% other dams

RESULTS

DAMS

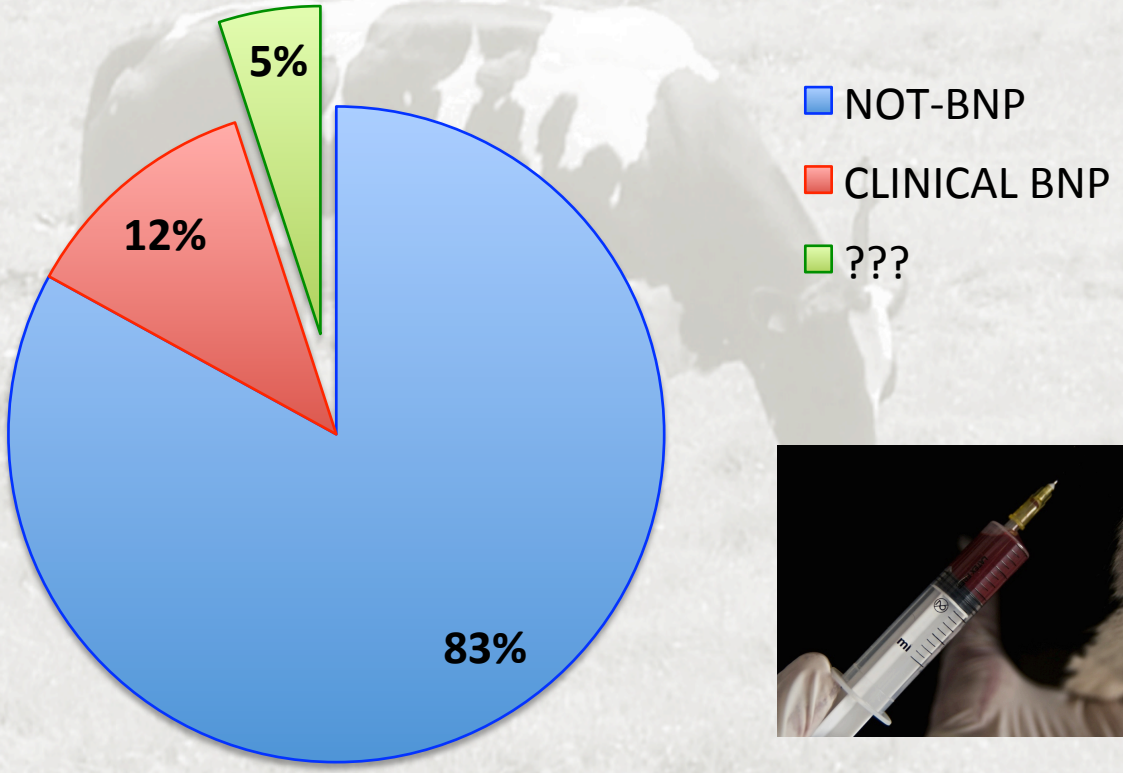
Parity:
2 ± 2,7 calving

BVDV vaccination:
82% PregSure BVD®
8% Other

RESULTS

HAEMATOLOGY

HAEMATOLOGICAL SUB-POPULATIONS IN CALVES' COHORT








RESULTS

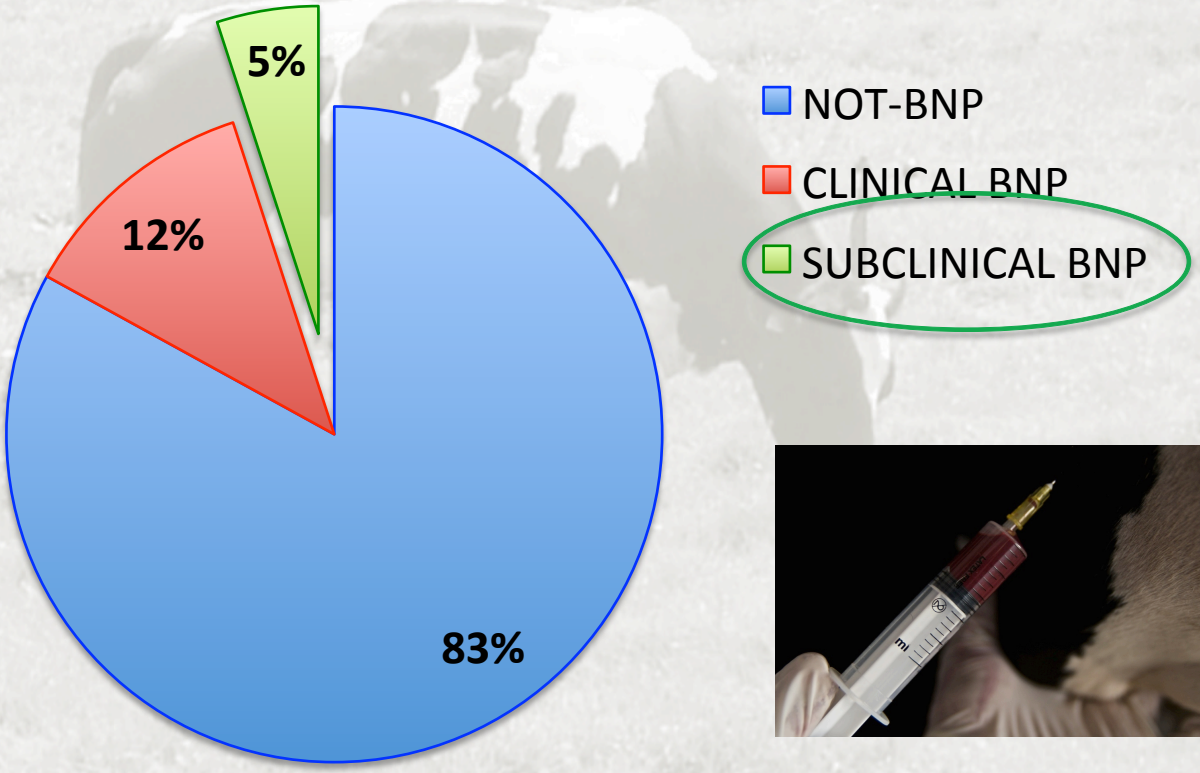
HAEMATOLOGY

	N	WBC (/µl)	RBC (M/µl)	Hb (g/dl)	Ht (%)	Neut (/µl)	Lympho (/µl)	PLT (/µl)
CLINICAL BNP	**12**	2253,00	3,30	4,48	14,59	780,11	1236,22	15257,78
	Min	100,00	0,90	2,20	4,00	0,00	40,00	2000,00
	Mean	**1170,00**	**3,26**	**4,35**	**13,15**	**31,00**	**800,00**	**10000,00**
	Max	9400,00	6,70	9,00	27,90	6682,00	3850,00	43000,00
	SD	2877,49	1,70	2,13	8,00	2213,87	1237,50	13694,83
???	**5**	960,00	5,73	6,72	21,76	536,00	346,40	41800,00
	Min	200,00	4,70	5,30	17,50	0,00	40,00	25000,00
	Mean	**800,00**	**5,30**	**6,30**	**20,00**	**216,00**	**138,00**	**33000,00**
	Max	1800,00	6,97	8,30	26,50	1728,00	1188,00	64000,00
	SD	589,92	0,94	1,28	3,95	729,00	482,77	19175,51
NOT BNP	**83**	6984,42	7,73	9,30	29,74	3028,79	2628,87	685800,00
	Min	2400,00	3,80	4,10	15,30	408,00	204,00	97000,00
	Mean	**6300,00**	**7,72**	**9,20**	**29,00**	**2774,00**	**2223,00**	**665000,00**
	Max	27500,00	11,98	15,50	50,00	11700,00	8750,00	1313000,00
	SD	3298,43	1,72	2,35	6,85	1872,45	1717,31	289805,53

RESULTS

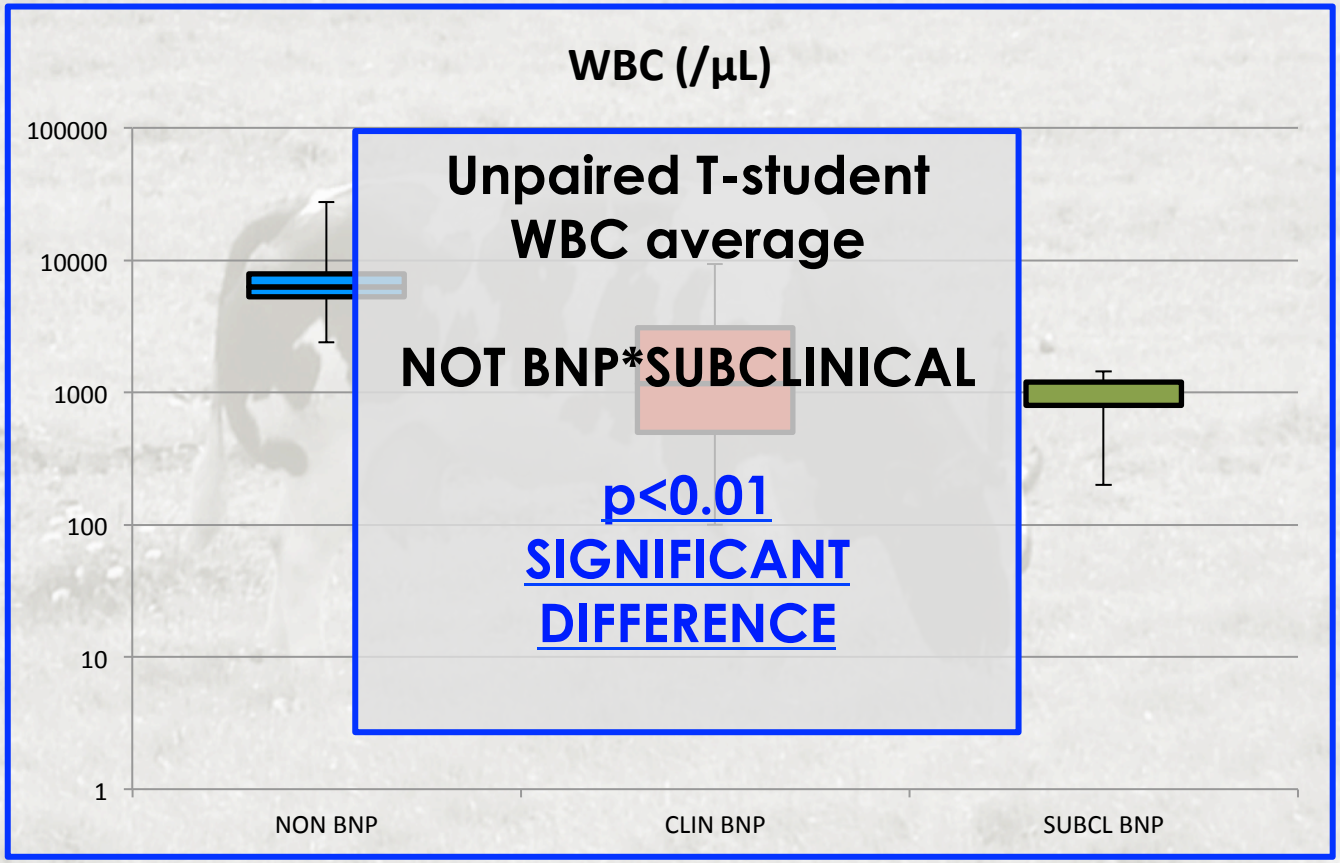
HAEMATOLOGY

HAEMATOLOGICAL SUB-POPULATIONS IN CALVES' COHORT



RESULTS

HAEMATOLOGY



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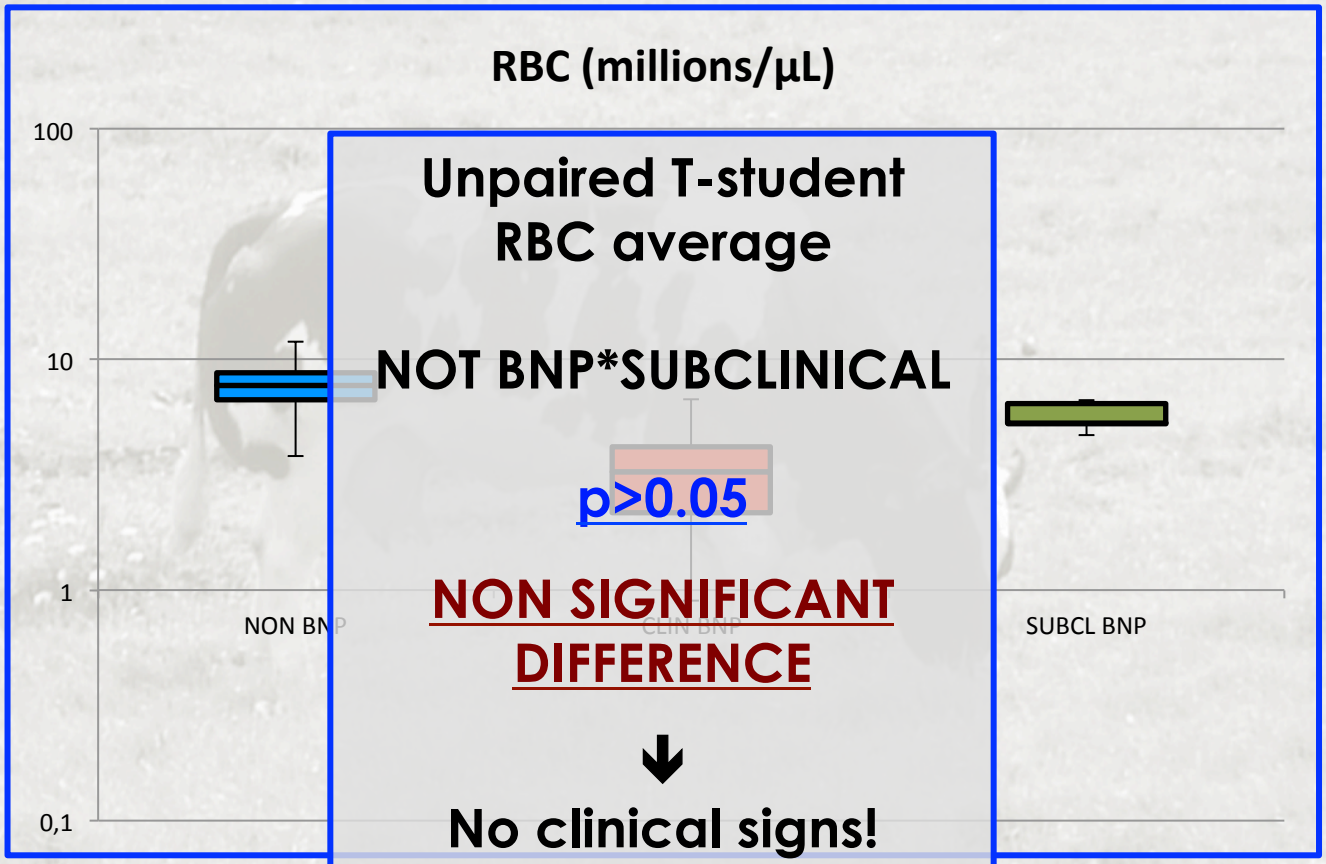
HAEMATOLOGY



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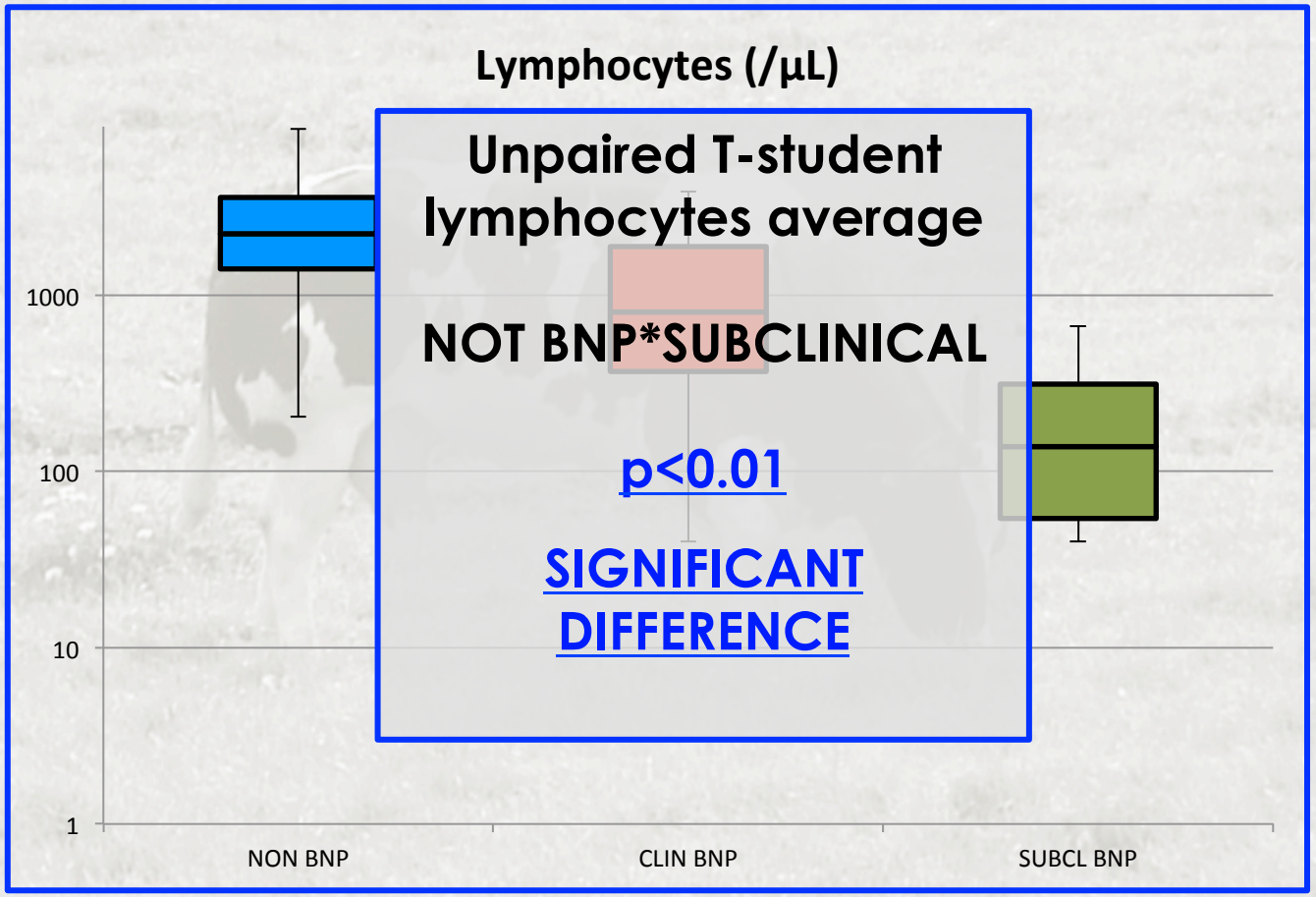
HAEMATOLOGY



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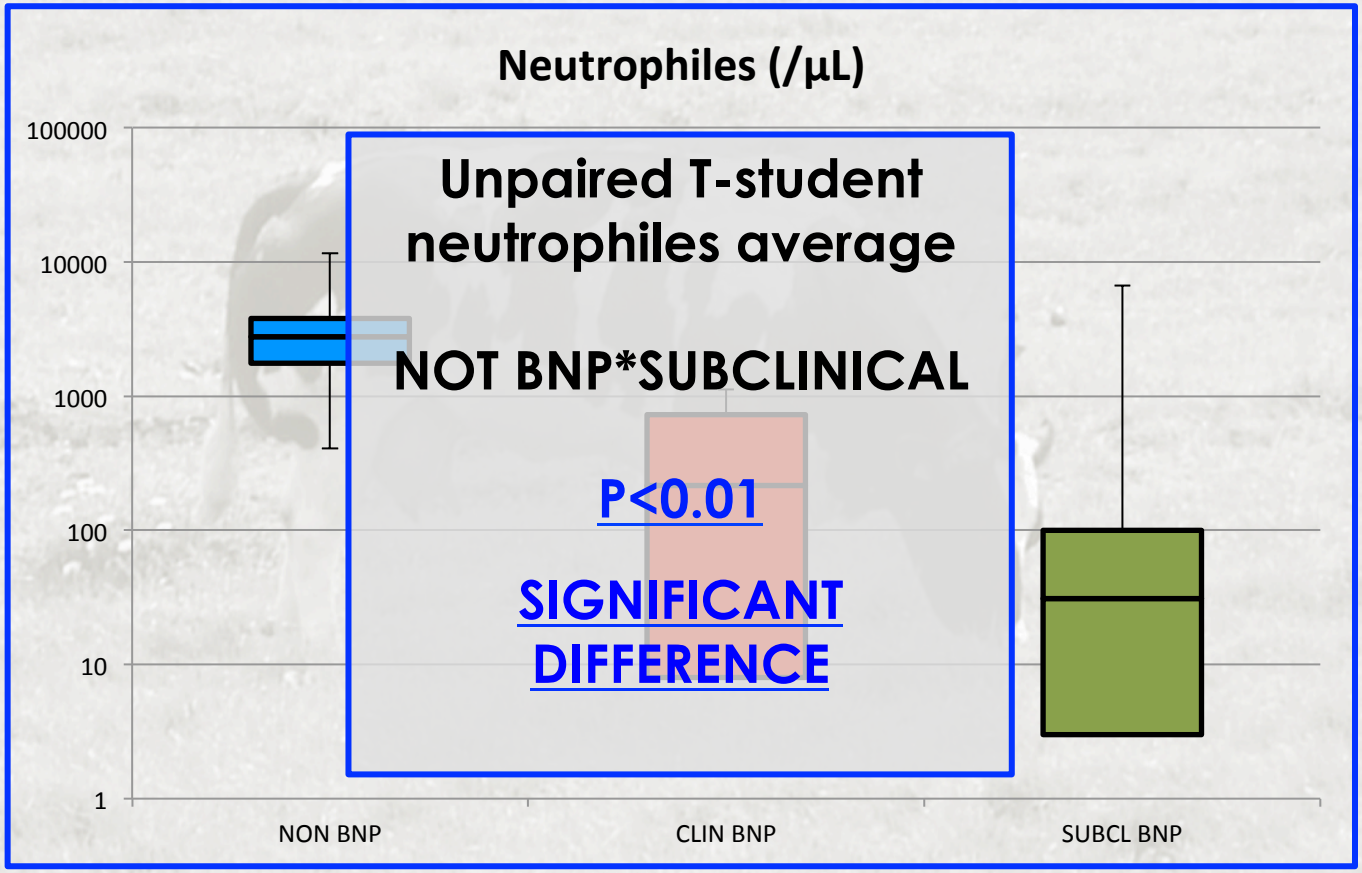
HAEMATOLOGY



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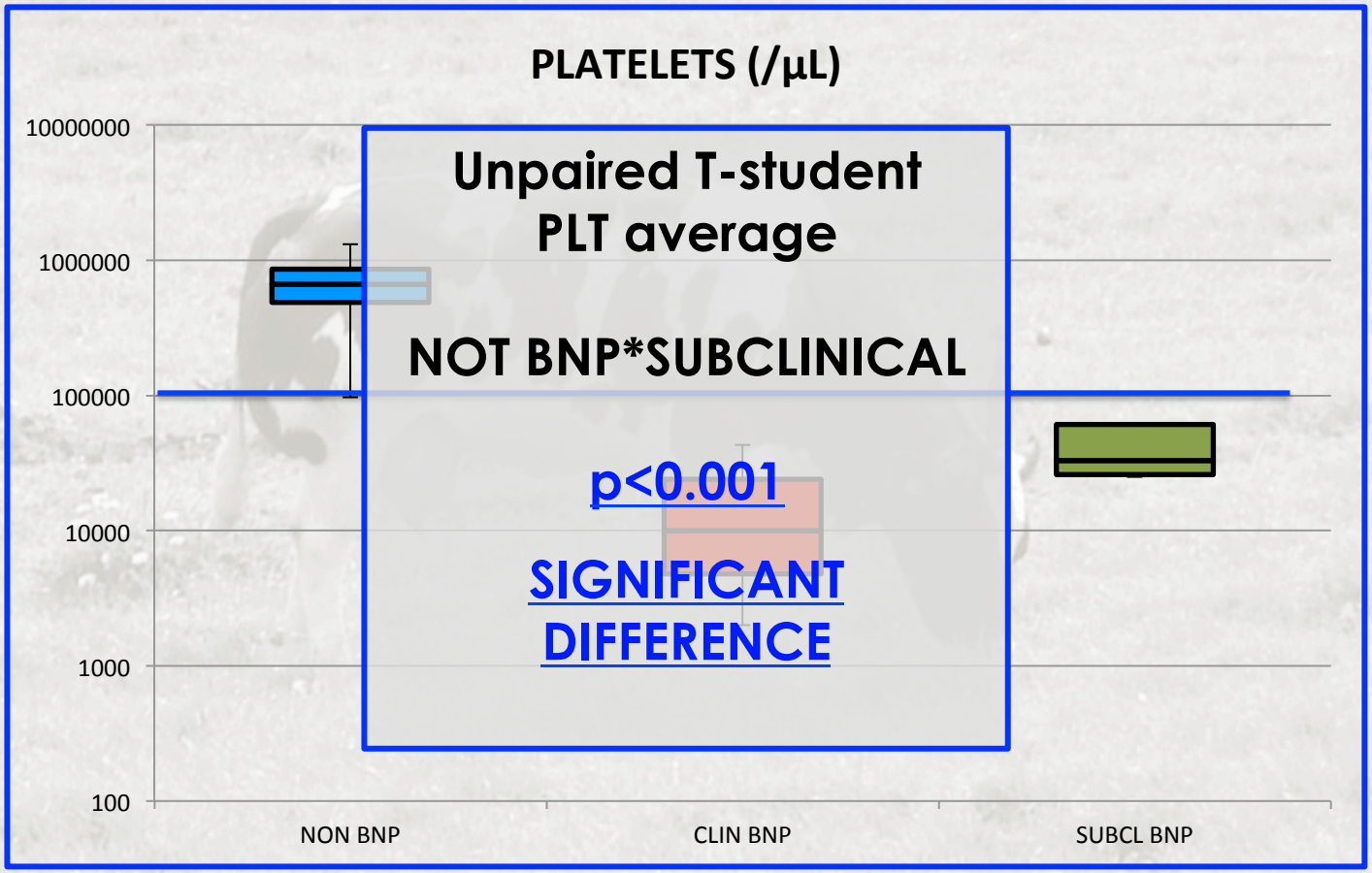
HAEMATOLOGY

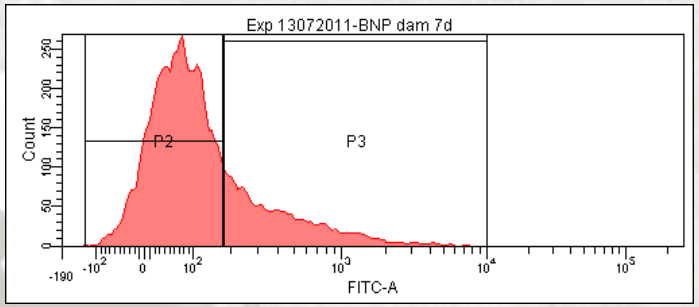


RESULTS

✓Follow up **SUBCLINICAL** calves:

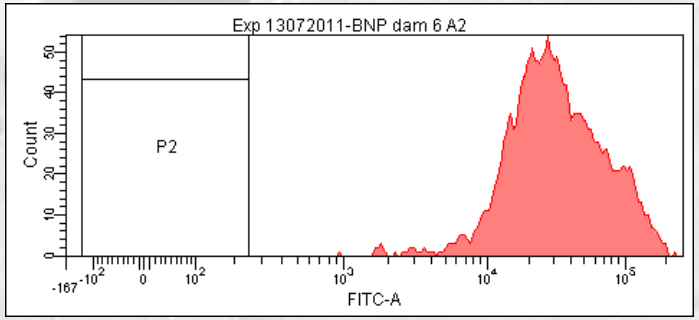
4 → healthy

NORMAL BLOOD PARAMETERS AFTER 15-20 DAYS



1 → CLINICAL

DEAD in 72h



DISCUSSION

- ✓ Bias of our study:
  - ➢ **Small number** of calves
  - ➢ **Only BNP** and **BVDV-vaccined** herds
  - ➢ **2** different **analysers**
    - Cell-Dyn Abbott 3500
    - Beckman Coulter LH750

- ✓ But…we've answered our questions!
  - ➢ Significant **haematological ≠ NOT-BNP** and **CLINICAL** calves
  - ➢ **5%** of **SUBCLINICAL** BNP calves
  - ➢ **20%** risk of become **CLINICAL**

CONCLUSION

- ✓Better epidemiological picture of BNP
- ✓Better management

for each CLINICAL calf

➔**COLOSTRUM** management

➔**HAEMATOLOGICAL** profiles of calves with the **same father**

if modified parameters

➔preventive blood transfusion





Thank you for your attention!