Changes in biochemical markers of bone metabolism in the young Lusitano horse

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61th Annual EAAP Meeting, Heraklion 2010

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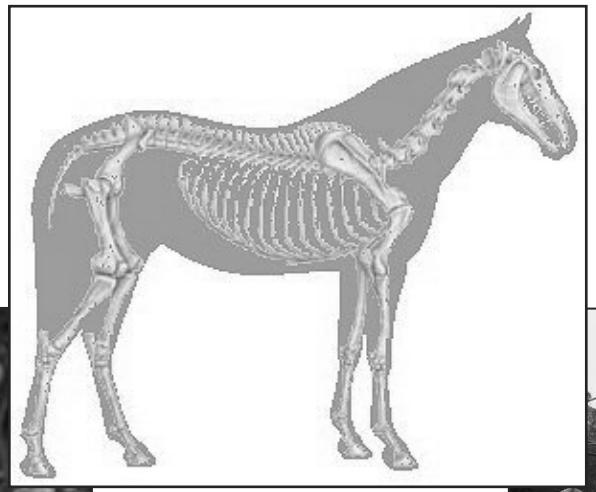
Introduction

Equine bone metabolism



Sports performance

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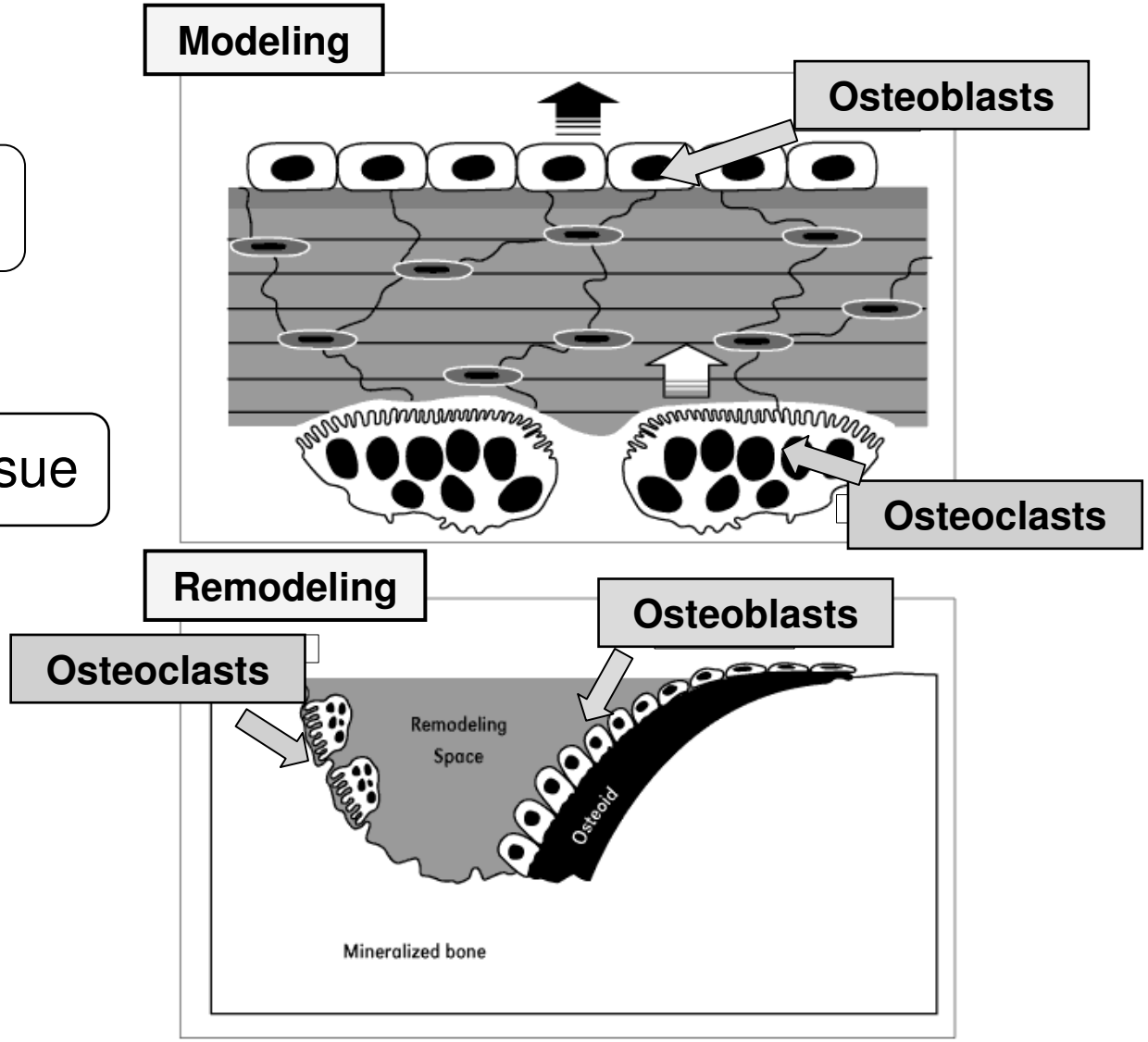
Introduction

Bone

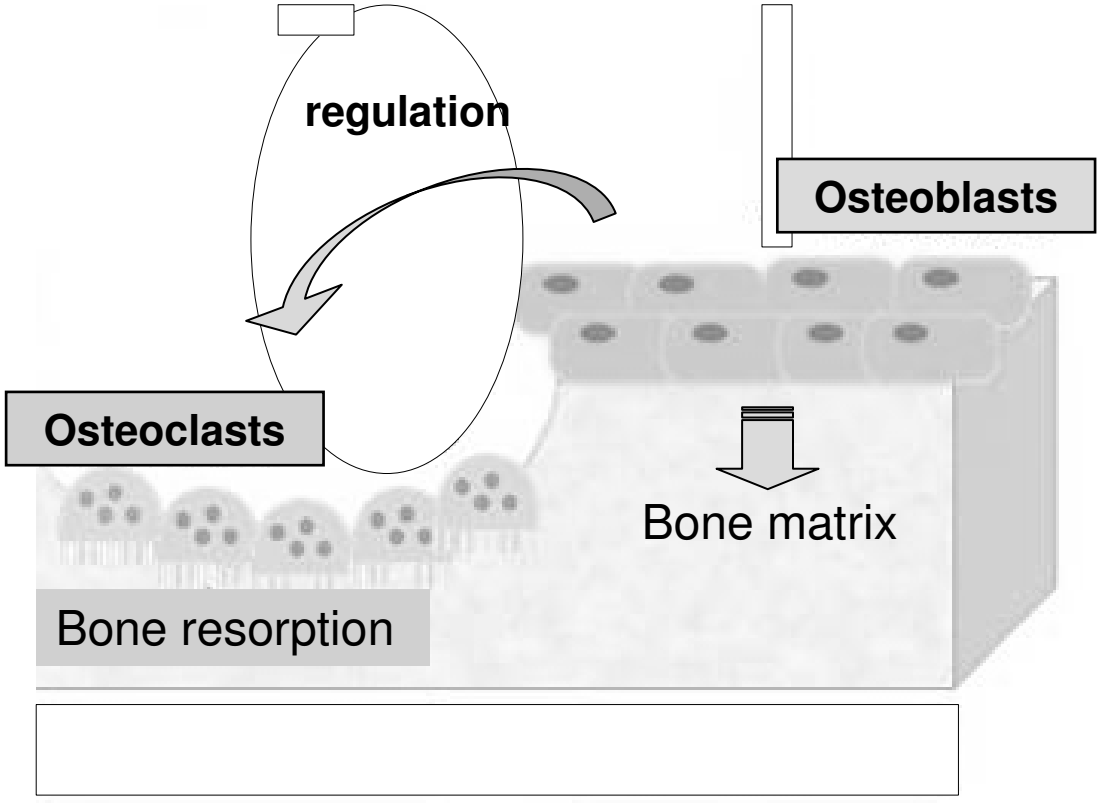
dynamic tissue



Adapted http://www.surgeongeneral.gov/library/bonehealth/chapter_2.html

Introduction

Bone formation



- **Collagen type I**

(main structural component of bone matrix)

- **Bone Alkaline Phosphatase**
- **Osteopontin**
- **Osteocalcin**

two non-collagenous matrix proteins

Adapted from Caetano-Lopes *et al.,* 2007

Introduction

Bone formation ⇅ **Bone resorption**

Bone formation ⇅ **Bone resorption**

http://www.vistaalegreatlantis.com/detail.aspx/Biscuit/3752/

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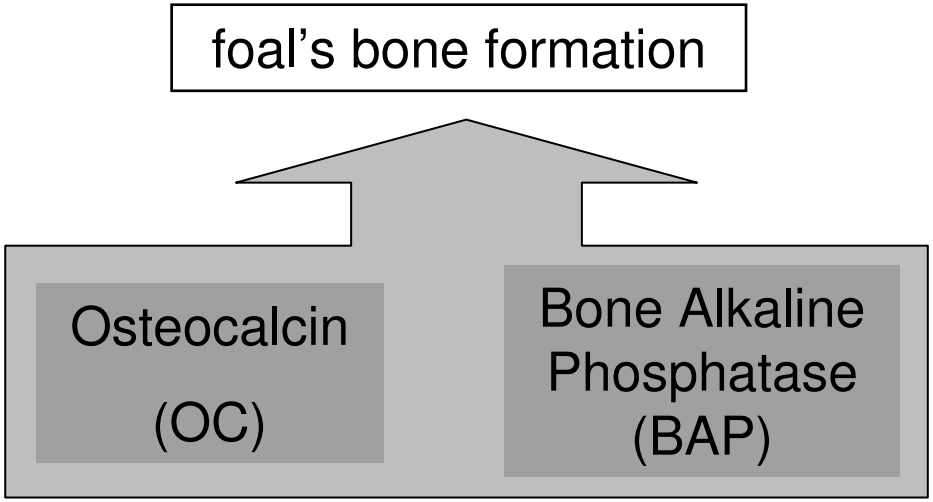

Objective

To characterize changes in OC and BAP plasma concentrations from birth to two years of age in the Lusitano horse, under extensive management conditions

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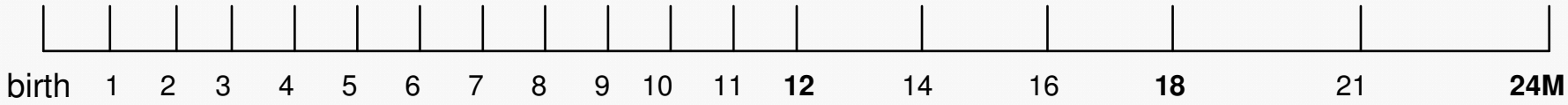
Materials & methods

- **28 Lusitano foals (three stud farms);**
  A (n=10); **B** (n=9); **C** (n=9)
- **born between Feb and May;**
- **periodically monitored from birth to two years.**

Blood samples



- **weighed;**
- **withers height and cannon circumference were measured.**

Materials & methods

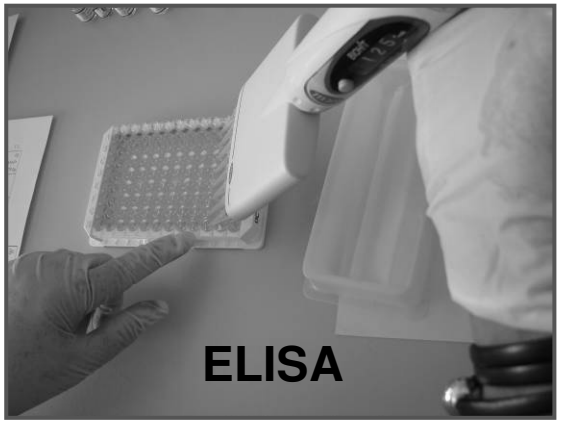
Until weaning:

- **all foals were kept on pasture with their dams;**
- **mares from A and B studs were supplemented once a day with compound feeds plus grass hay or cereal straw, according to pasture availability and stud farm practices;**
- **mares from C stud farm were rarely supplemented;**
- **weaning average age (225 ± 6d) ≈ 7.5 months;**

After weaning:

- **foals were group fed in paddocks during an adaptation period and returned to pasture afterwards;**
- **colts were separated from fillies around 1 year of age;**
- **supplementary feeds were given according to pasture availability and farm practices;**
- **exercise level was similar in the three stud farms, as they had daily free access to the pasture areas.**

Materials & methods



OC – MicroVue Osteocalcin **(Quidel Corporation, USA)**

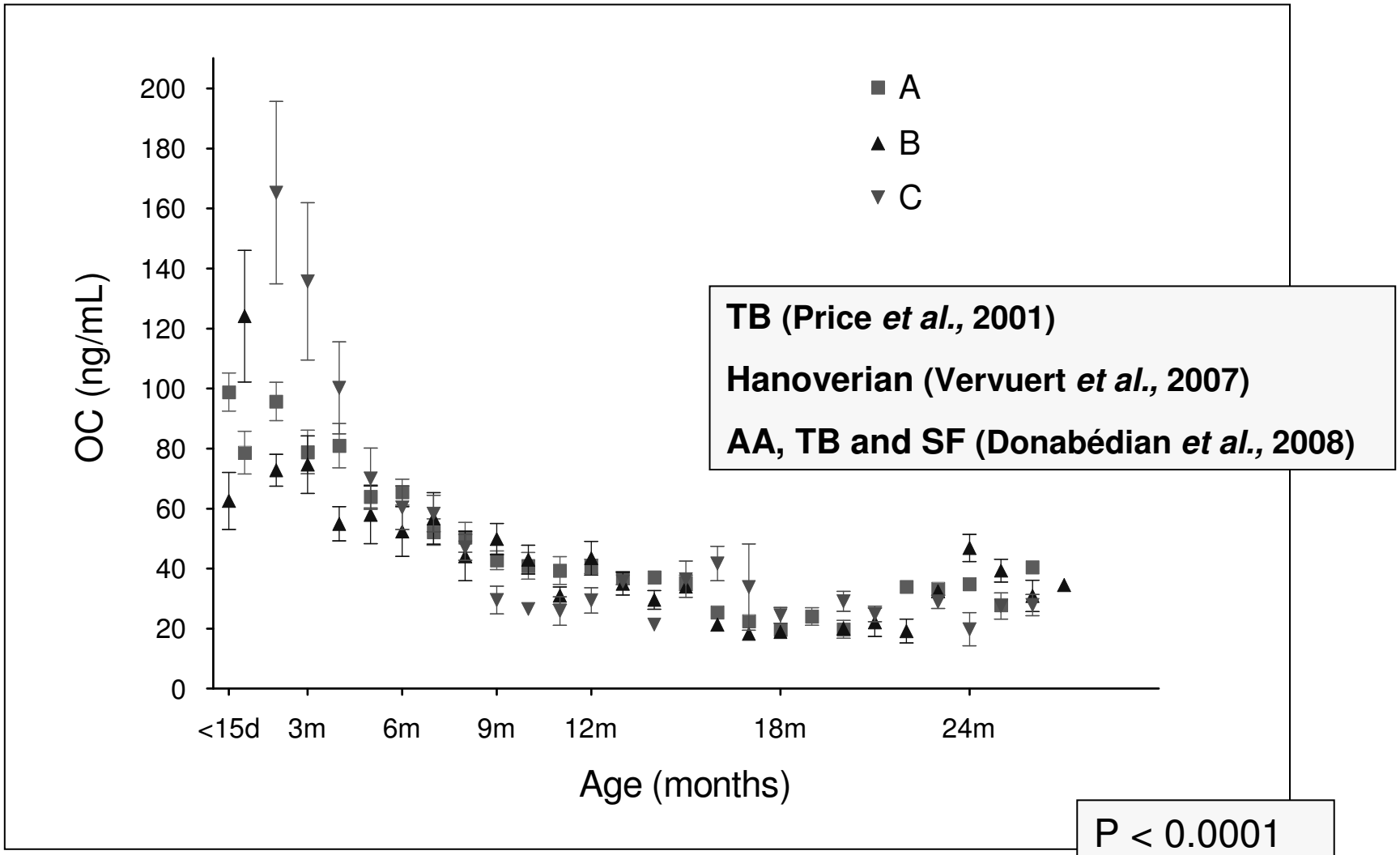
BAP – MicroVue BAP **(Quidel Corporation, USA)**

Statistic analyses

- **Pearson's correlation coefficients were used to examine the variables relationship.**
- **Mixed model:**
  - group, age and interaction group*age - fixed factors;
  - foals - random factor;
  - measurements at different ages in the same foal were treated as repeated measures on animal within group as a subject.

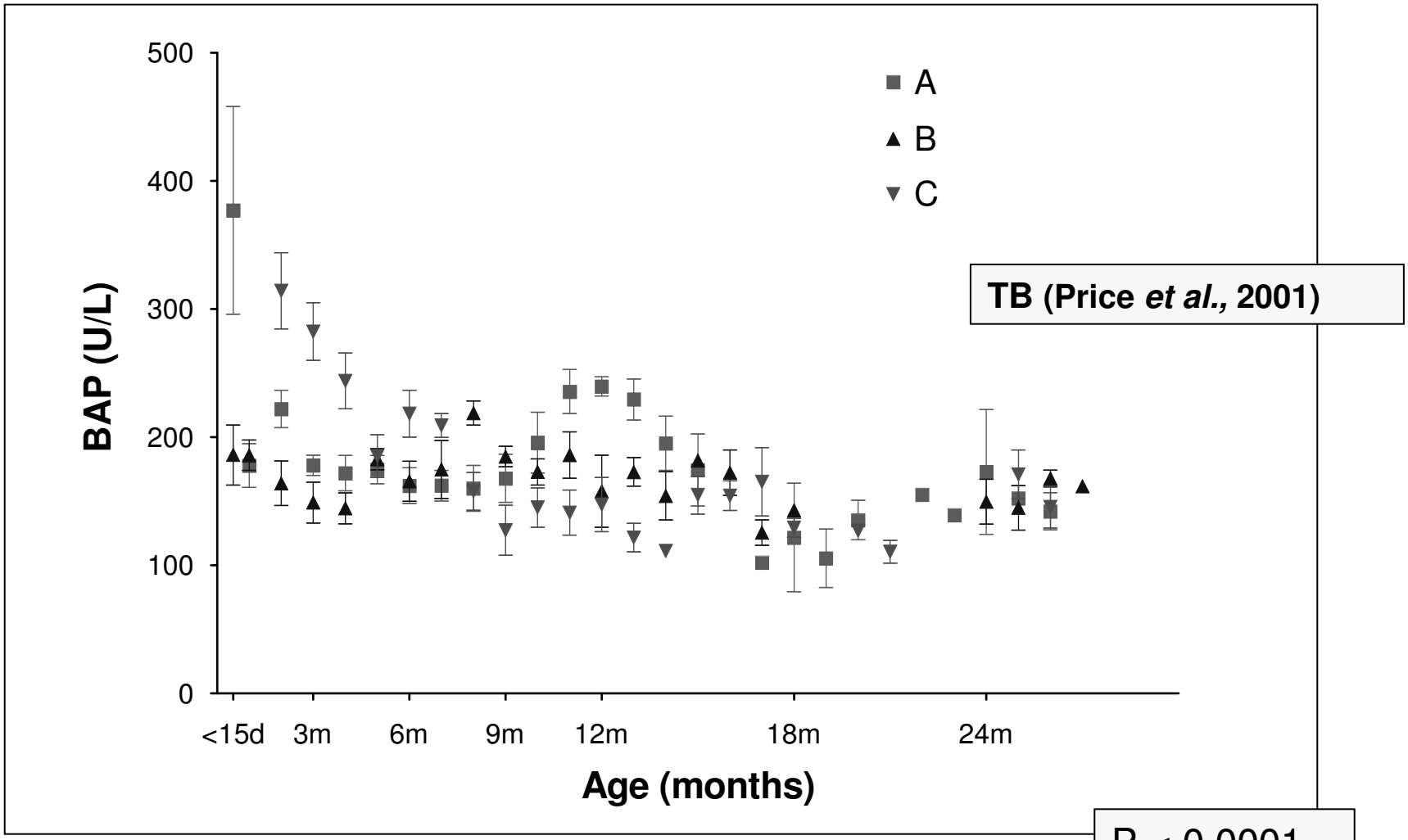
Results

Osteocalcin

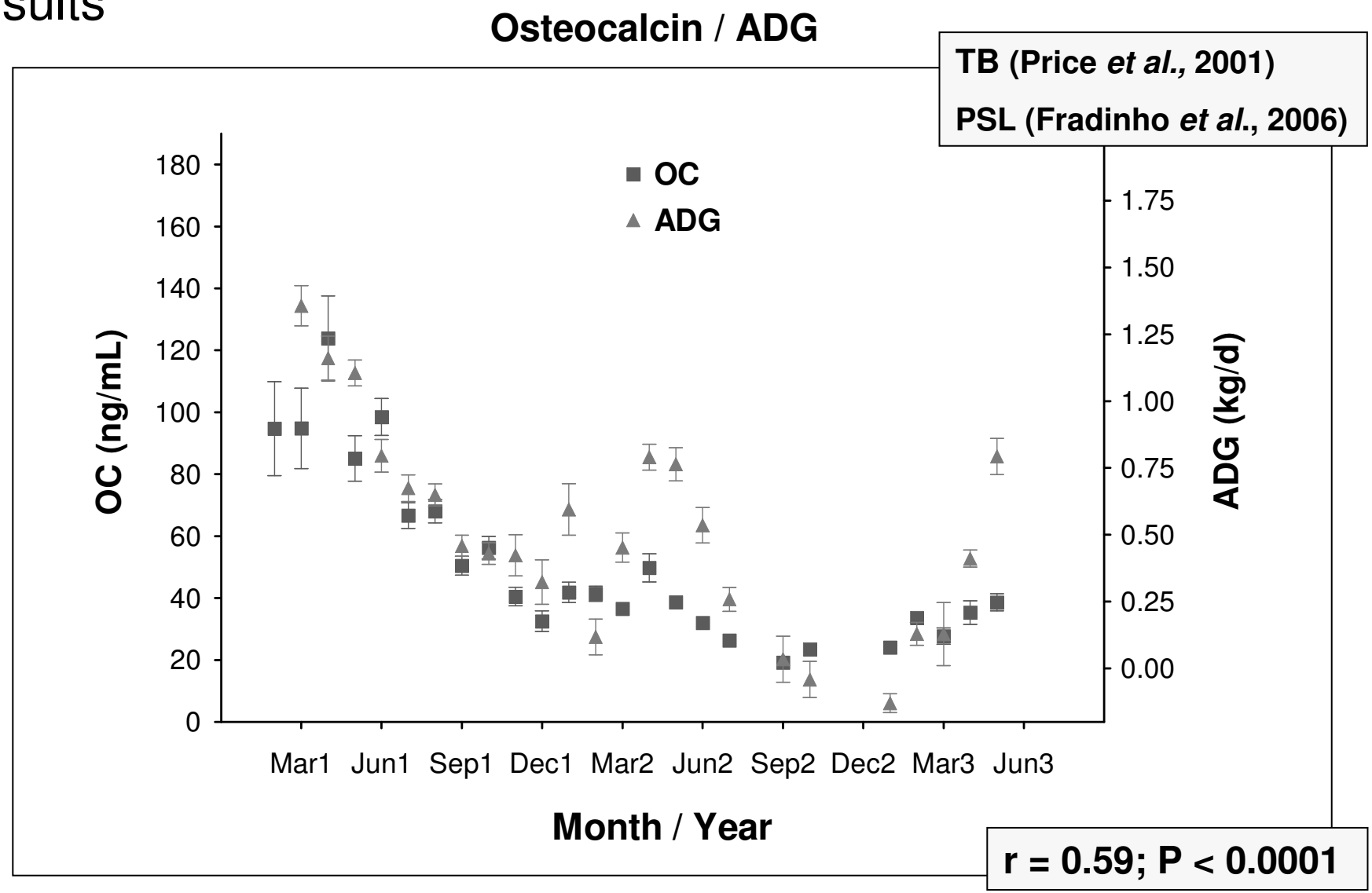


Results

Bone Alkaline Phosphatase

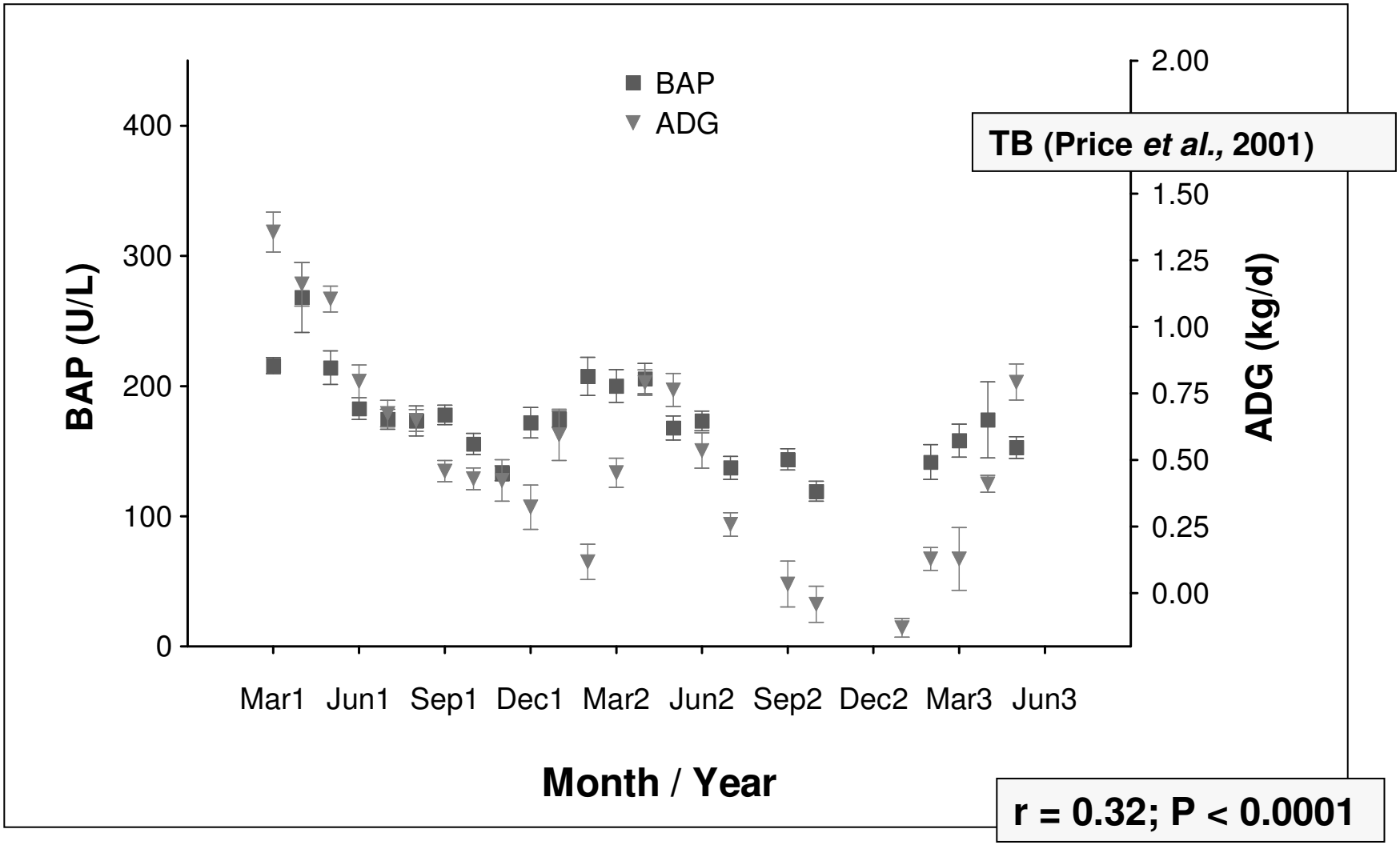


Results


Osteocalcin / ADG
TB (Price *et al.*, 2001)
PSL (Fradinho *et al.*, 2006)
OC
ADG
OC (ng/mL)
ADG (kg/d)
0
20
40
60
80
100
120
140
160
180
0.00
0.25
0.50
0.75
1.00
1.25
1.50
1.75
Mar1
Jun1
Sep1
Dec1
Mar2
Jun2
Sep2
Dec2
Mar3
Jun3
Month / Year
r = 0.59; P < 0.0001

Results

Bone Alkaline Phosphatase / ADG

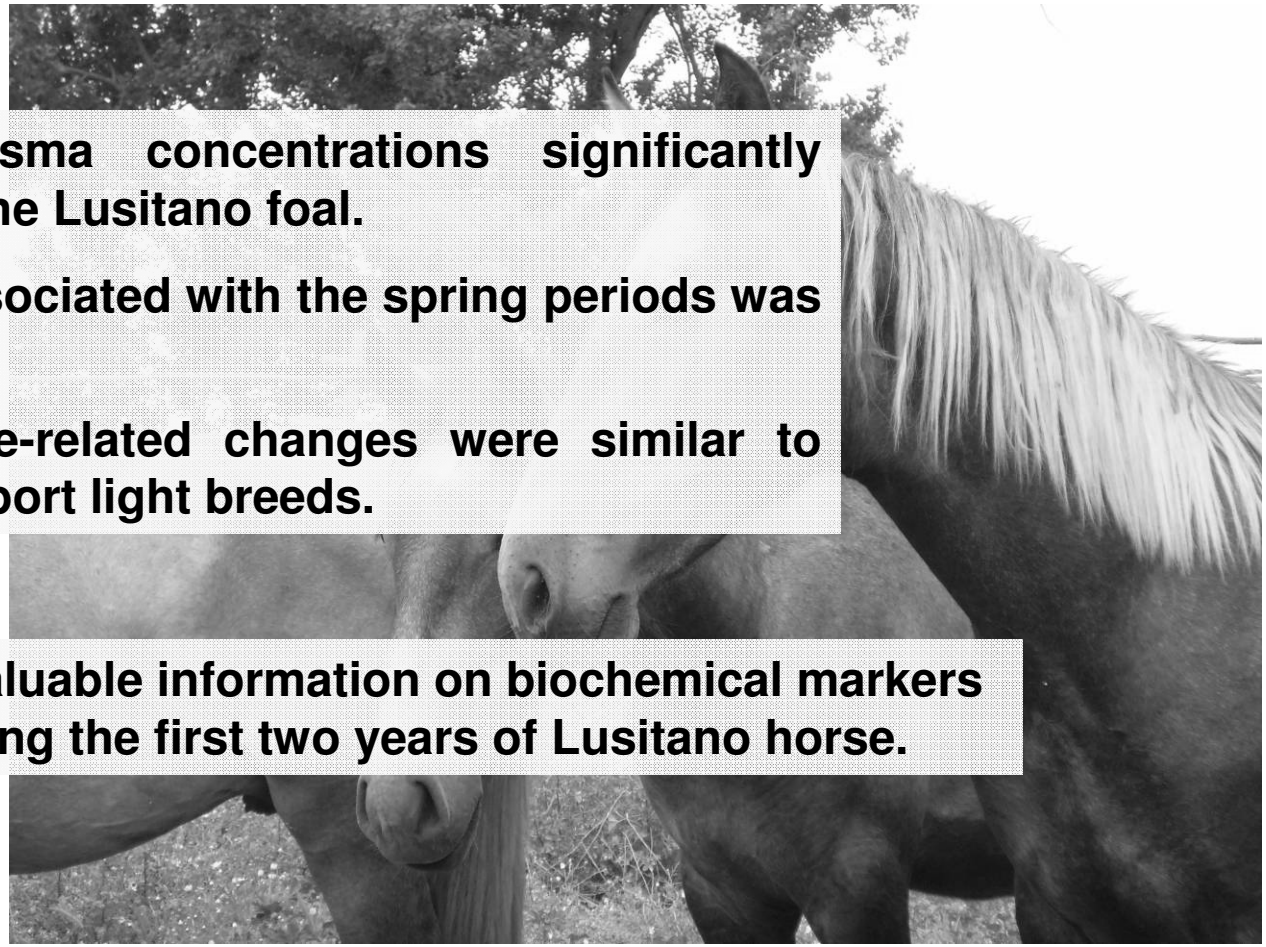


Results

Correlations coeficients between withers height, cannon circunference and bone markers

	OC (ng/mL) r *P* value n	**BAP** (U/L) r *P* value n
Withers Height (cm) r *P* value n	**- 0.63** **< 0.0001** **377**	**- 0.33** **< 0.0001** **354**
Cannon Circumference (cm) r *P* value n	**- 0.59** **< 0.0001** **385**	**- 0.28** **< 0.0001** **359**

Conclusions



- **OC and BAP plasma concentrations significantly decrease with age in the Lusitano foal.**
- **A seasonal effect associated with the spring periods was observed.**
- **The results and age-related changes were similar to others described on sport light breeds.**

This study provides valuable information on biochemical markers of bone formation during the first two years of Lusitano horse.

Ευχαριστώ πολύ

Acknowledgements:

This work was supported by grants:

- POCI 2010, Nº GG/GGP/ME611-0166/05 from FCT, Lisbon, Portugal.
- SFRH/BD/29890/2006 from FCT, Lisbon, Portugal.

União Europeia
Fundo Europeu de Desenvolvimento Regional

Programa Operacional Ciência e Inovação 2010

Governo da República Portuguesa

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