Monitoring of turkey breeders growth and composition

through rearing to photostimulation as influenced by body weight category at 16 weeks of age

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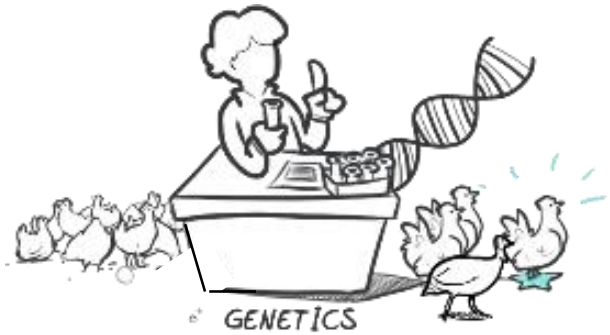
15th EPC – 17th to 21th September 2018, Dubrovnik

Genetic selection

- ✓ Growth performance
- ✓ Reproductive performance

Context

Genetic selection

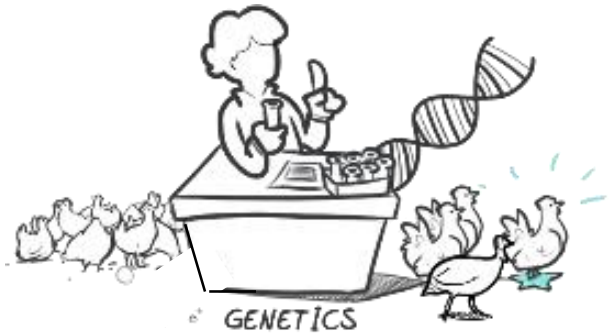


Breeder Flock

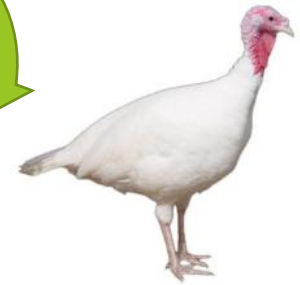
- ✓ Management
- ✓ Average body weight

Context

Genetic selection



Breeder Flock

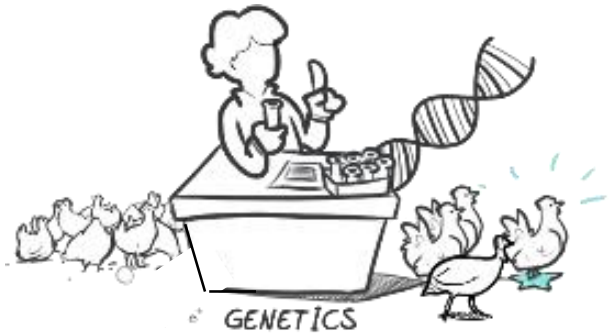


Individual

- ✓Sensitive
- ✓Response

Context

Genetic selection



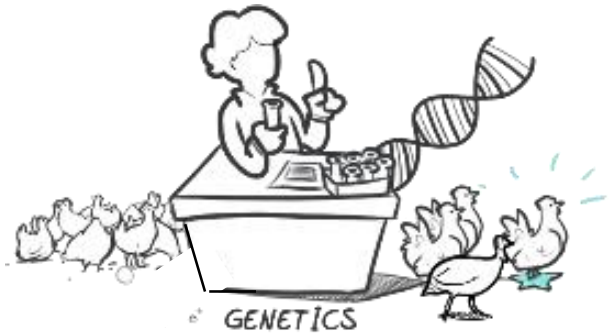
Breeder Flock

Individual

Body composition

Context

Genetic selection



Breeder Flock

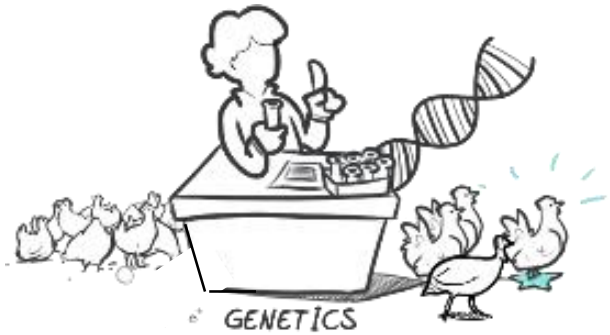
Individual

Body composition

Muscle

Context

Genetic selection



Breeder Flock

Individual

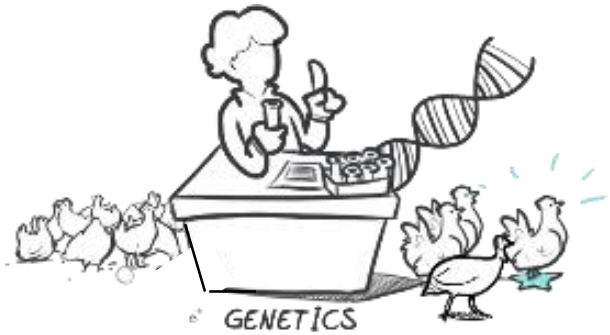
Body composition

Muscle

Bone

Context

Genetic selection



Breeder Flock

Individual

Body composition

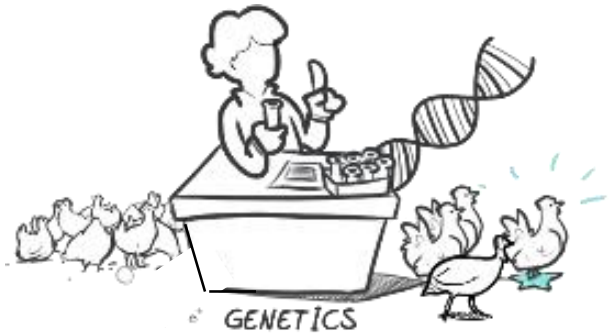
Muscle

Adipose tissue

Bone

Context

Genetic selection

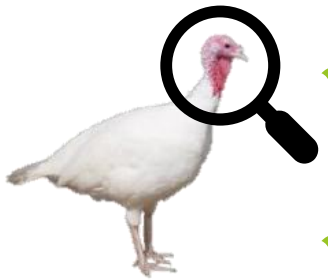


Breeder Flock

Individual

Body composition

How to monitor ?



- ✓ Tissue deposition
- ✓ Non invasive

Objectives

How does body weight category at 16 wk of age influence growth until photostimulation ?

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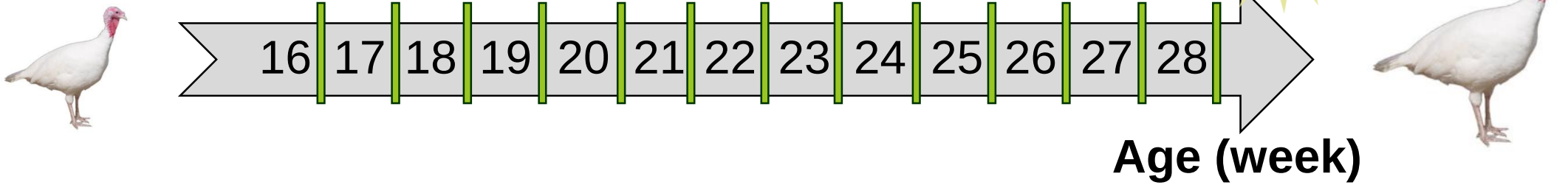
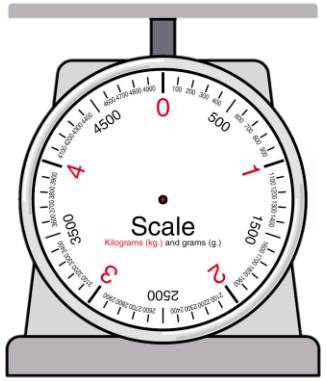
How does body weight category at 16 wk of age influence growth until photostimulation ?

Is CT-Scan an appropriate tool for an accurate phenotyping of turkey breeders ?

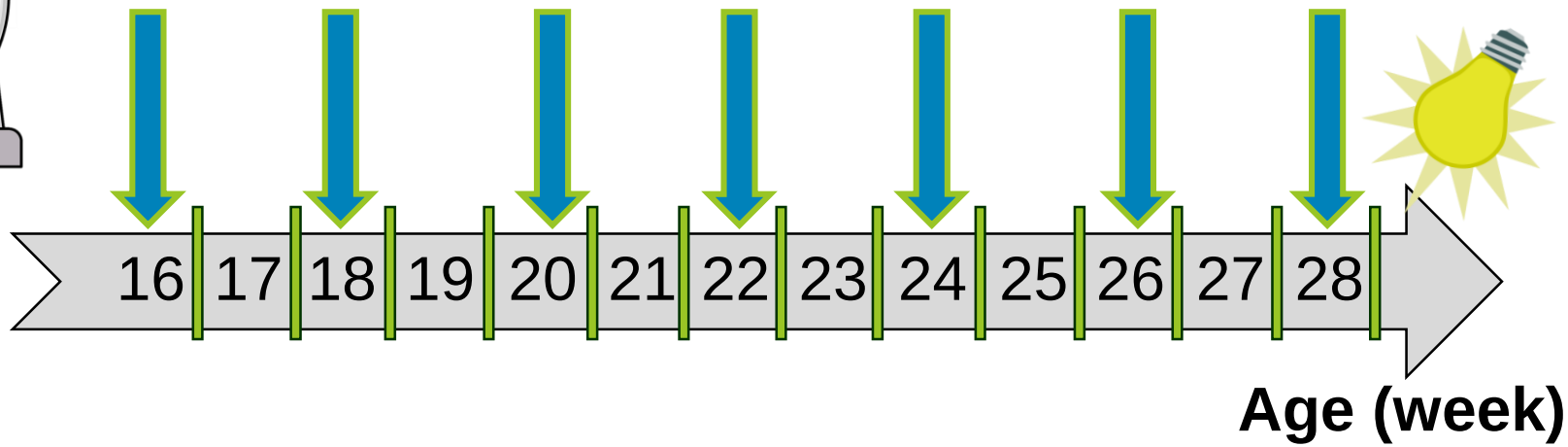
Experimental Design – N = 237



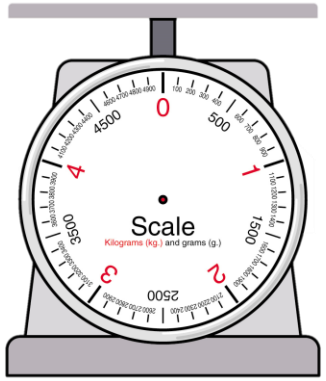
Experimental Design – N = 237



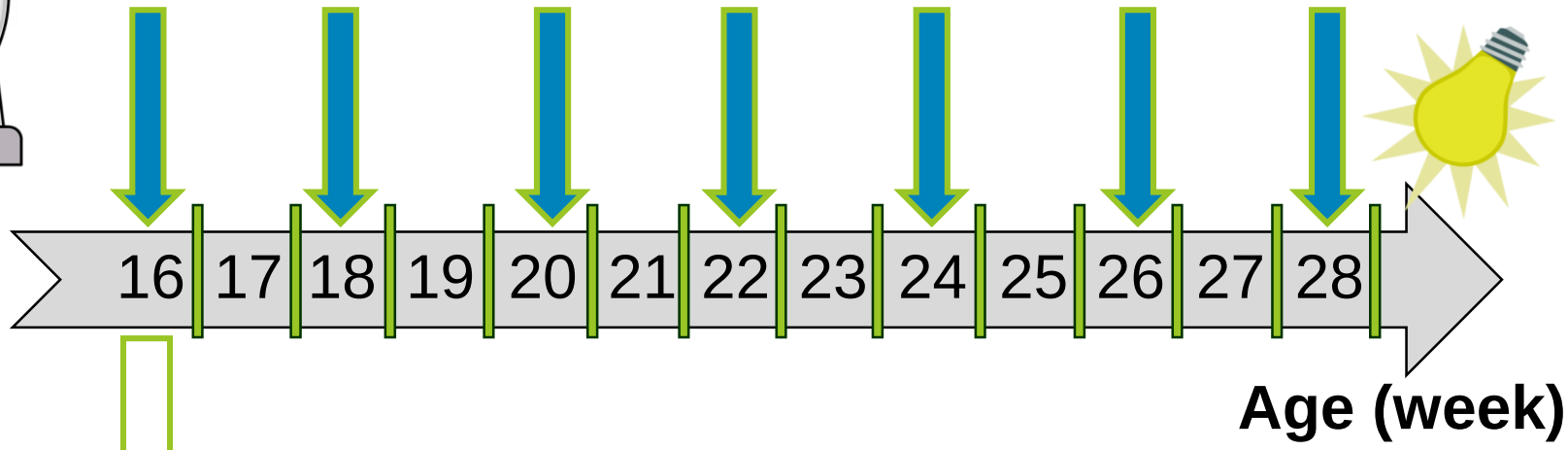
BODY WEIGHT



Experimental Design – N = 237



BODY WEIGHT

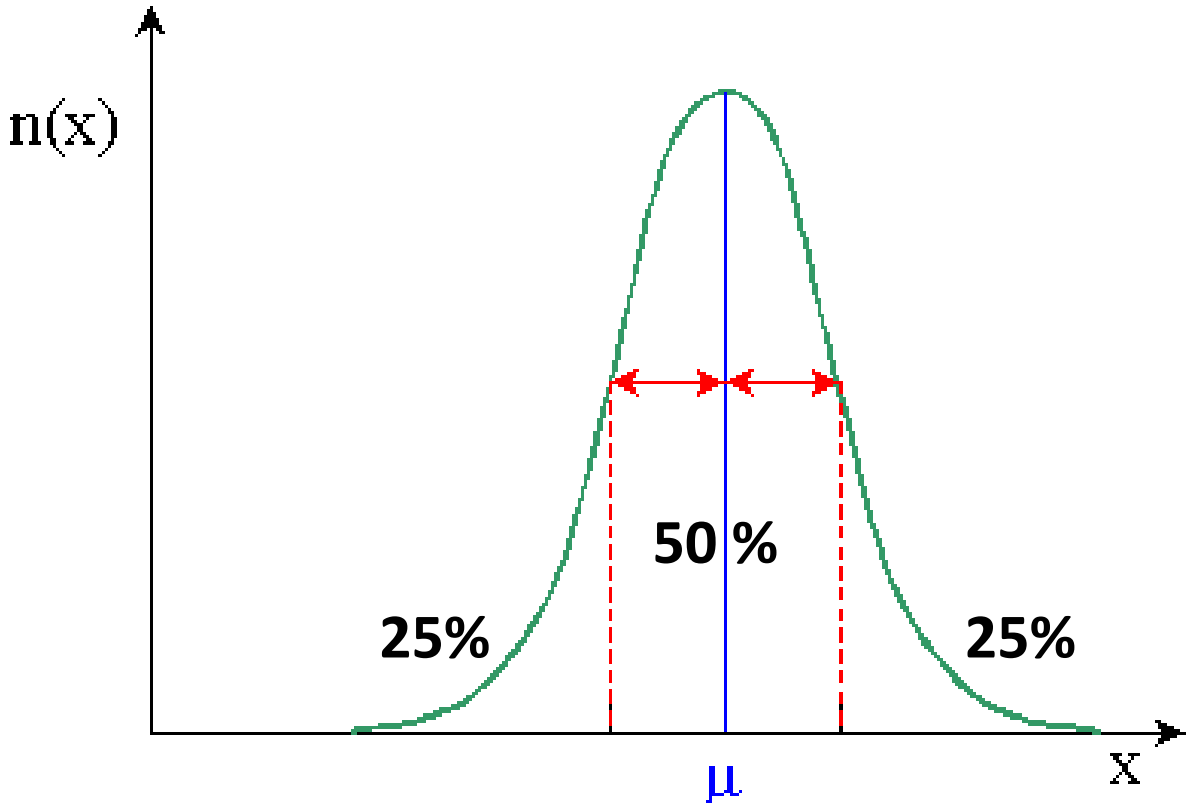


3 groups at 16 weeks

LIGHT **MEDIUM** **HEAVY**

Experimental Design – N = 237

3 groups at 16 weeks

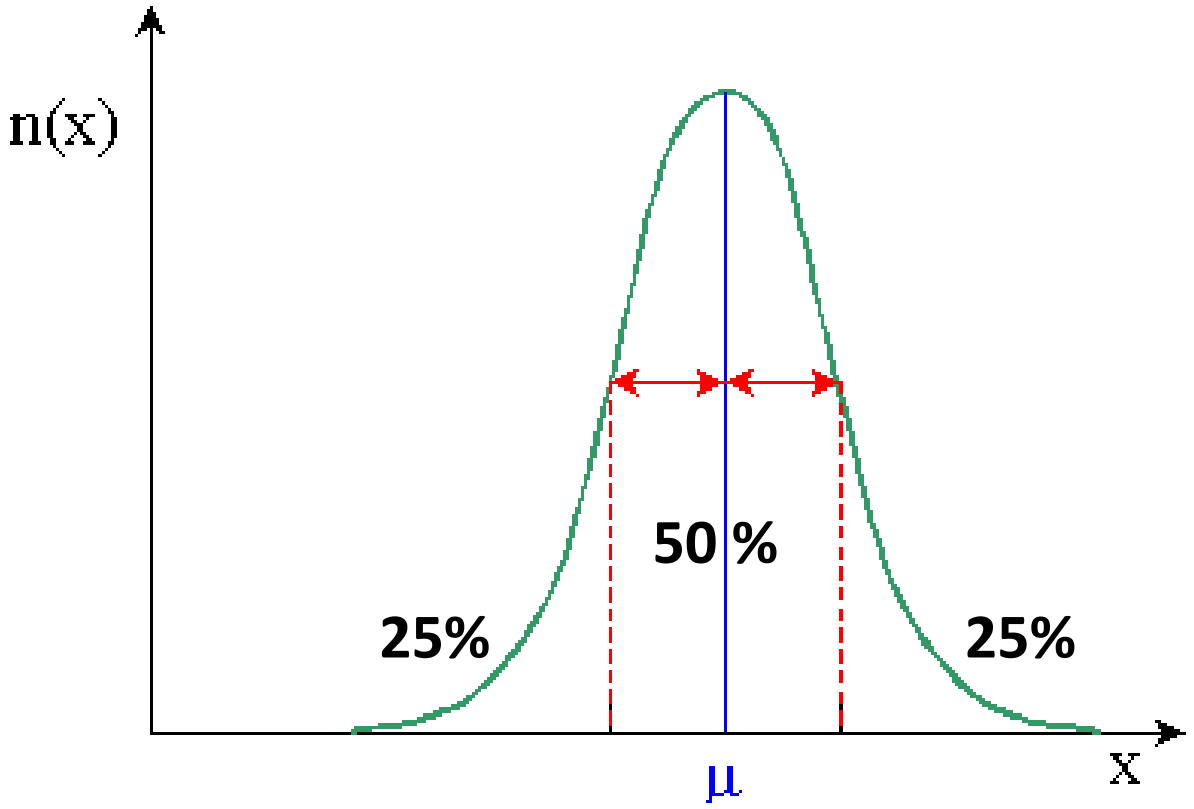


LIGHT	MEDIUM	HEAVY
N = 60	N = 117	N = 60

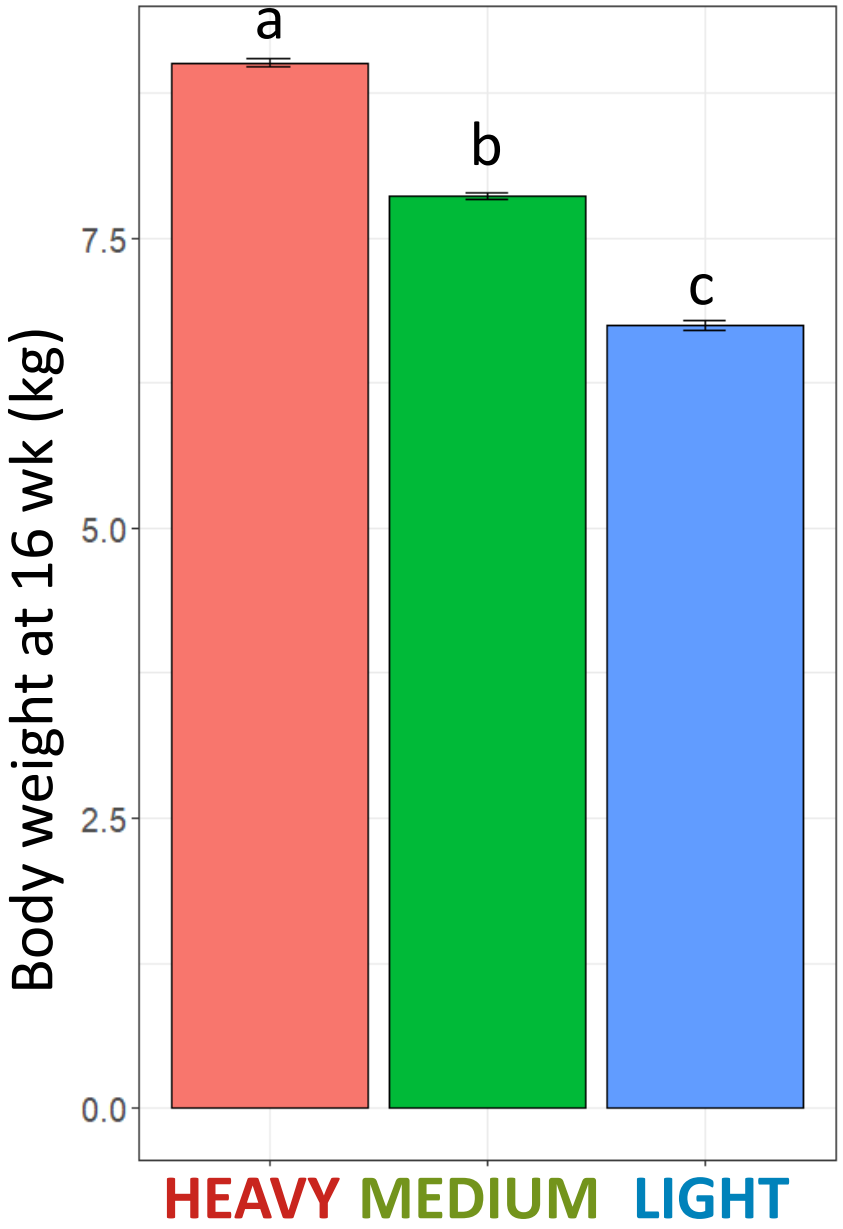
Experimental Design – N = 237

[a-c] Means with different superscripts are significantly different (P < 0.0001)

3 groups at 16 weeks

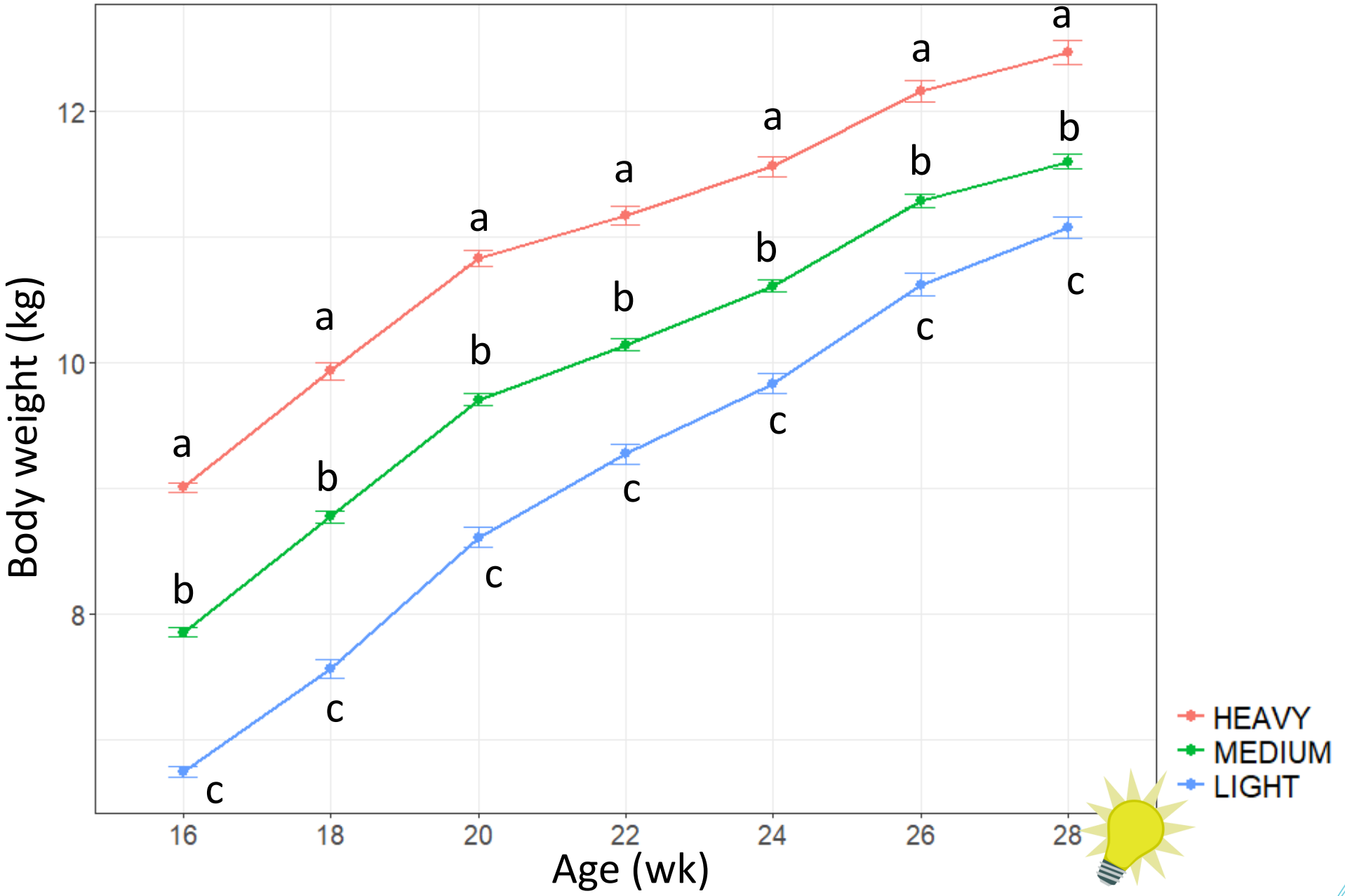


LIGHT N = 60 | **MEDIUM** N = 117 | **HEAVY** N = 60



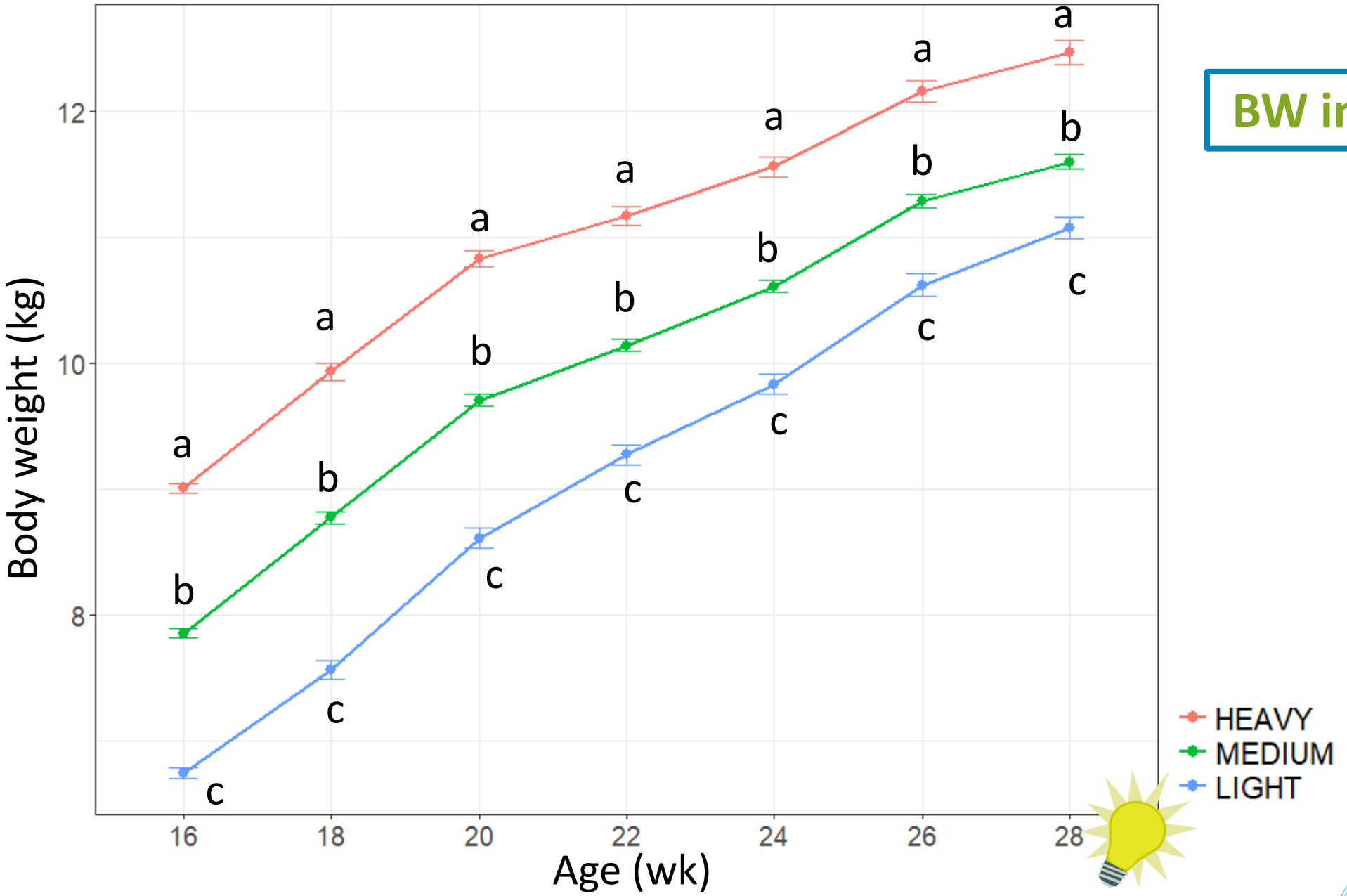
Results – N = 237

[a-c] Means with different superscripts are significantly different (P < 0.0001)



Results – N = 237

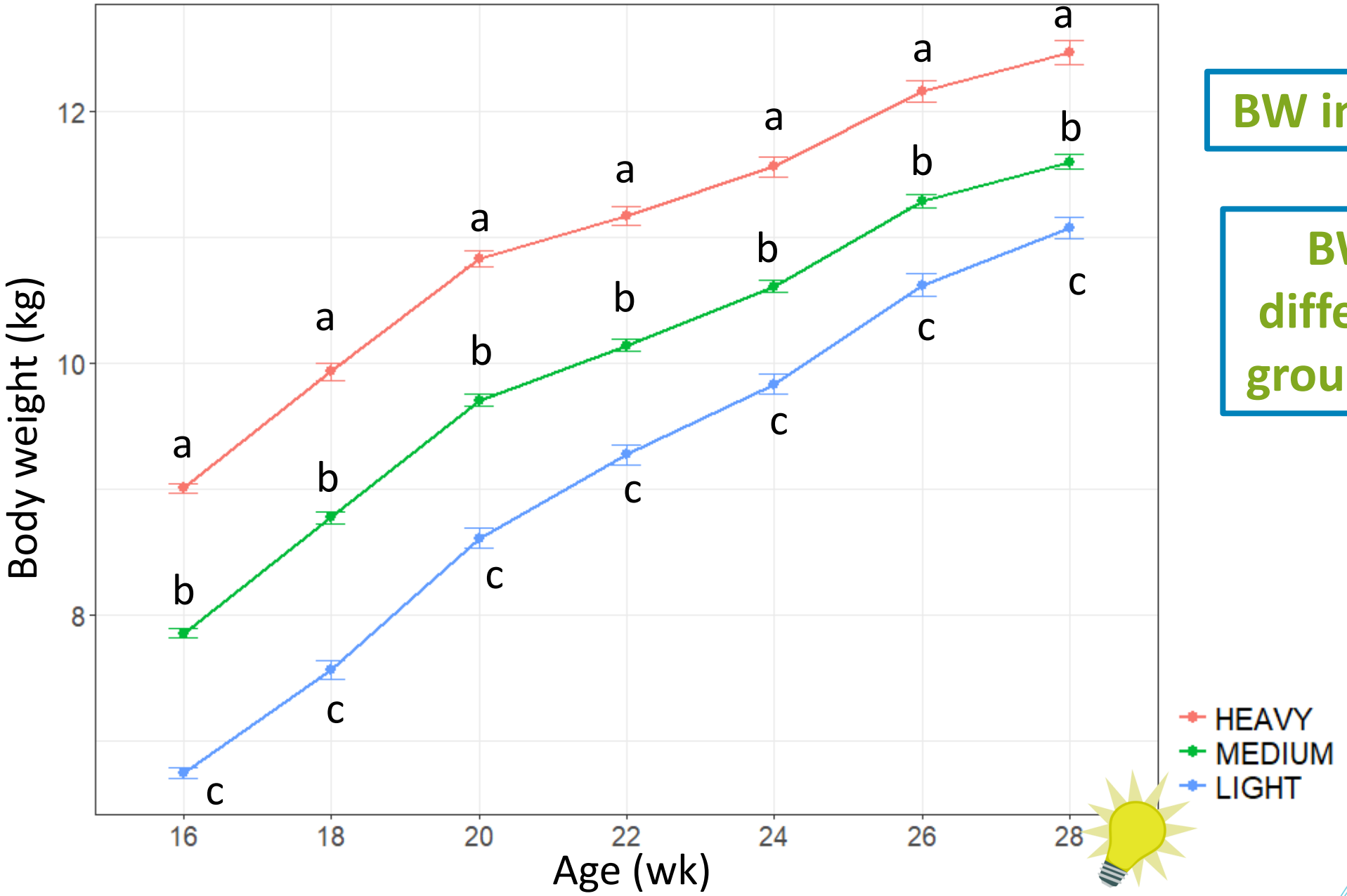
[a-c] Means with different superscripts are significantly different (P < 0.0001)



BW increase until PS

Results – N = 237

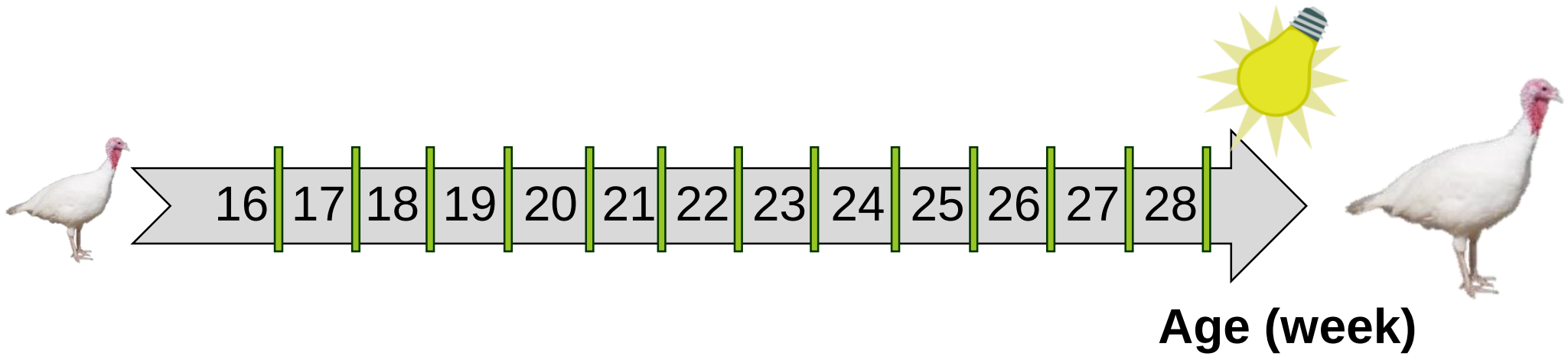
[a-c] Means with different superscripts are significantly different (P < 0.0001)



BW increase until PS

BW remained different between groups (P < 0.0001)

Experimental Design – N = 4



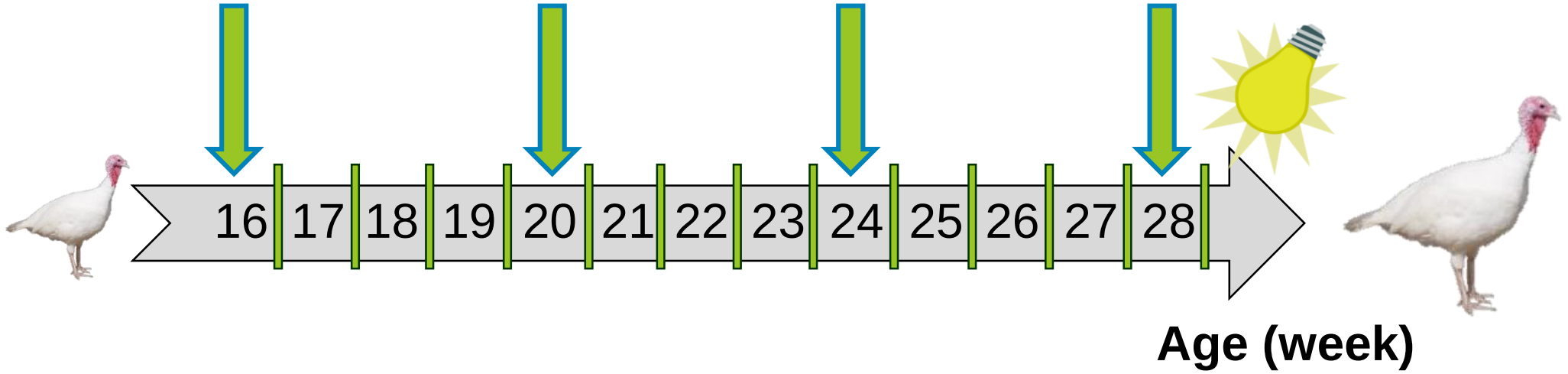
Experimental Design – N = 4

LIGHT N = 1

MEDIUM N = 2

HEAVY N = 1

CT-SCAN



Experimental Design – N = 4

CT-SCAN

Experimental Design – N = 4

CT-SCAN

Body Composition

Experimental Design – N = 4

CT-SCAN

Body Composition

Samples

Plasma

- ✓Triglyceride
- ✓Calcium

Experimental Design – N = 4

CT-SCAN

Body Composition

Samples

Ovary

- ✓Weight

Plasma

- ✓Triglyceride
- ✓Calcium

Experimental Design – N = 4

CT-SCAN

Body Composition

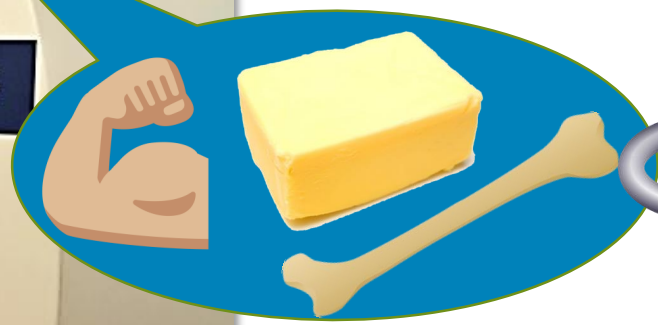
Samples

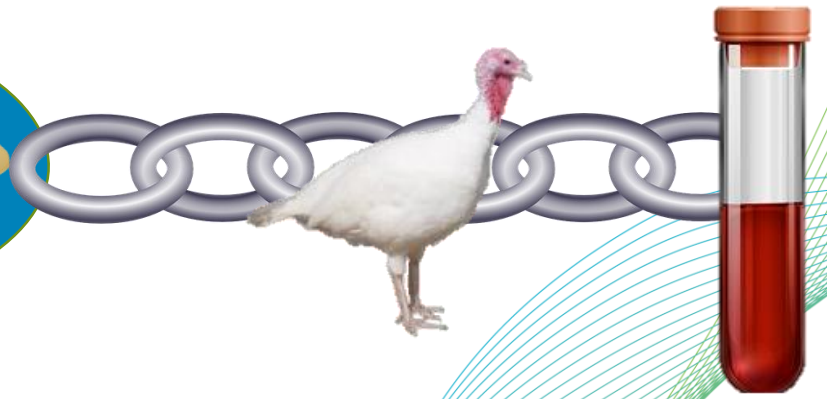
Ovary

- ✓Weight

Plasma

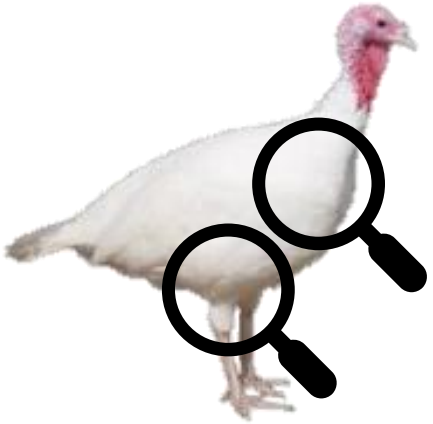
- ✓Triglyceride
- ✓Calcium





Results – N = 4

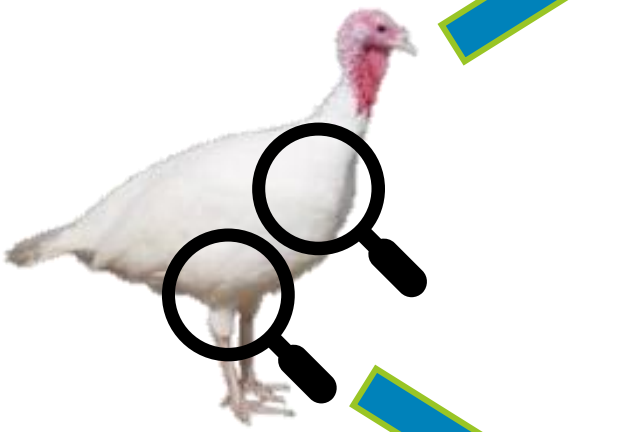
Siemens
CT-Scan Somatom Definition AS

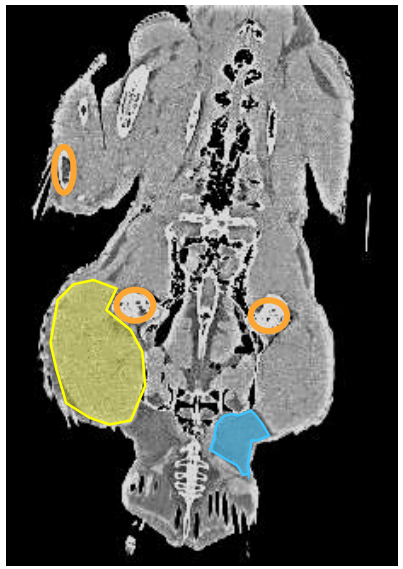


Results – N = 4

Siemens
CT-Scan Somatom Definition AS

Age 28 wk



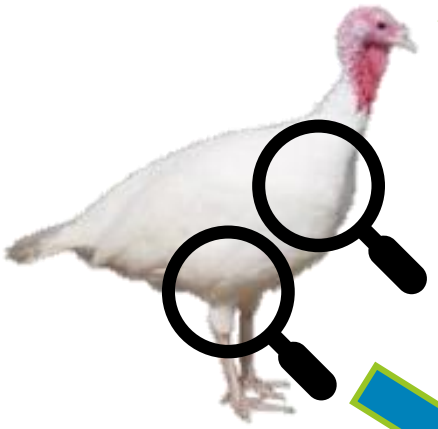


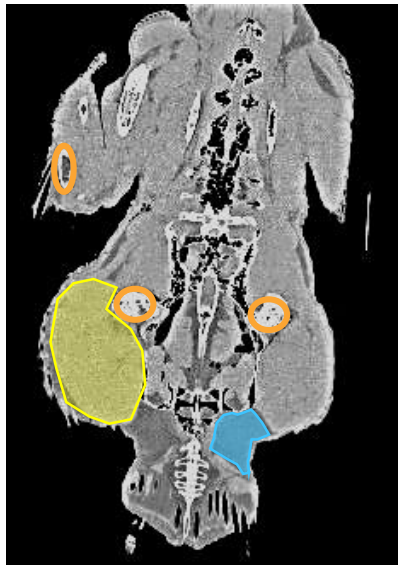
- Muscle
- Bone
- Fat tissue

Results – N = 4

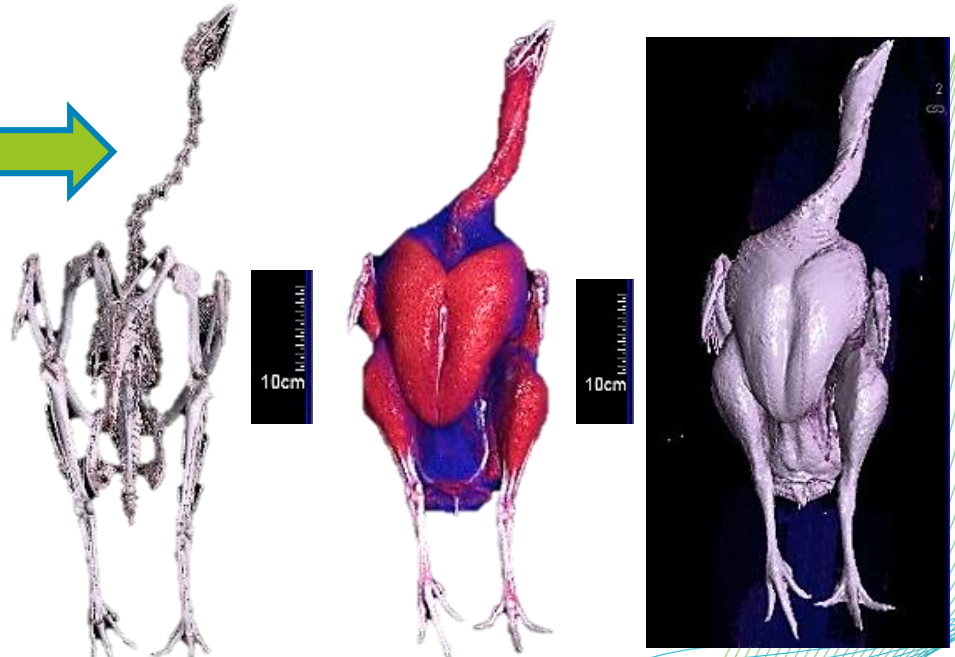
Siemens
CT-Scan Somatom Definition AS

Age 28 wk



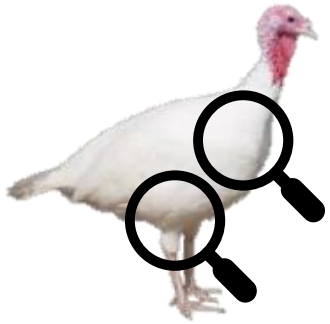


Age 24 wk

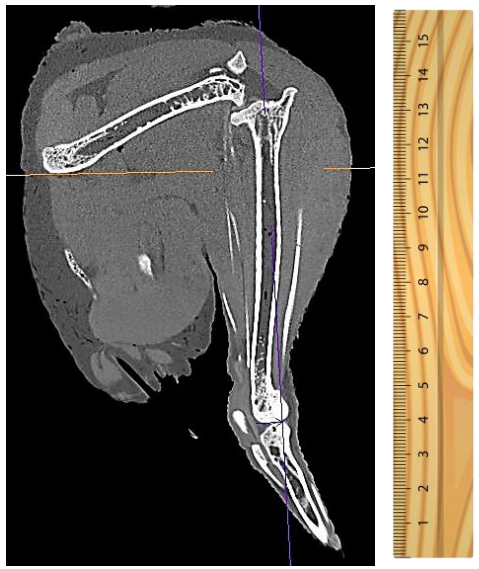


Muscle
Bone
Fat tissue

Results – N = 4

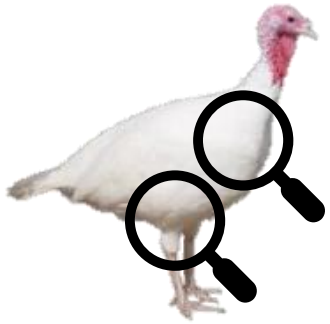


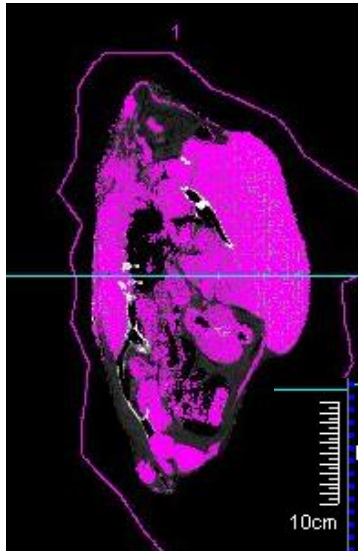
Length

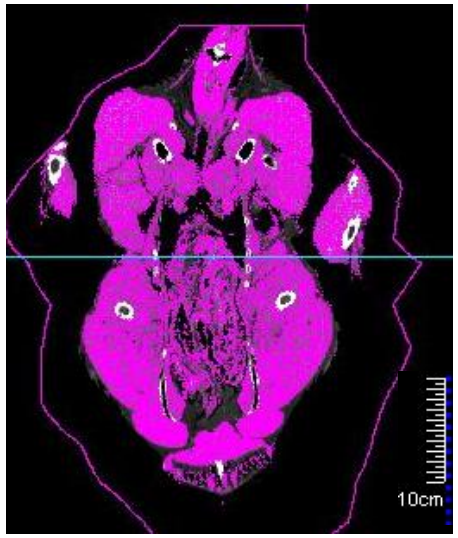


Results – N = 4

Whole body Tissue volume







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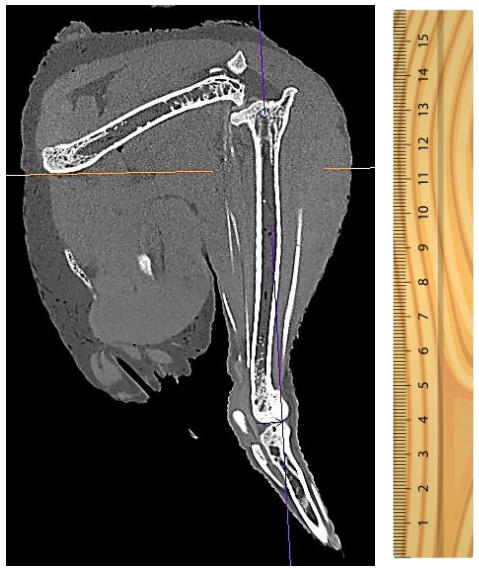
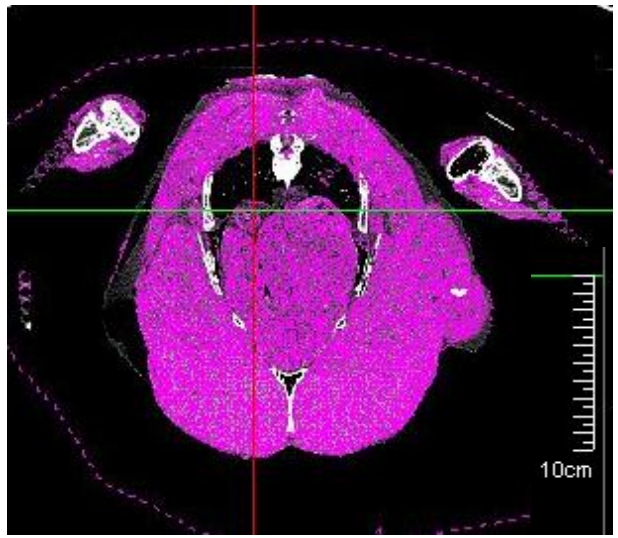
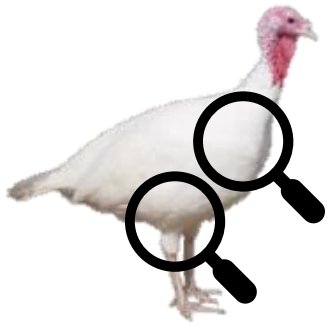
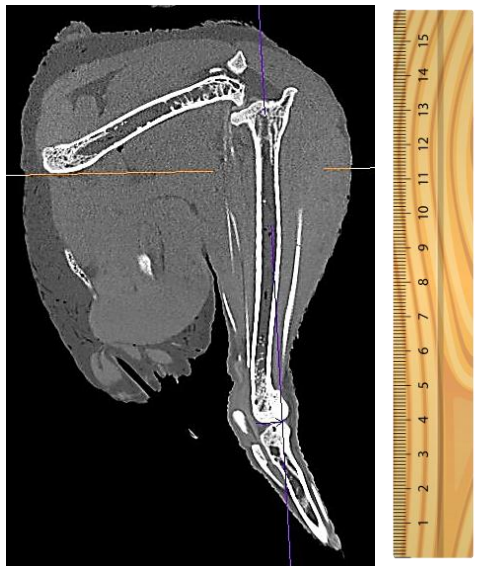




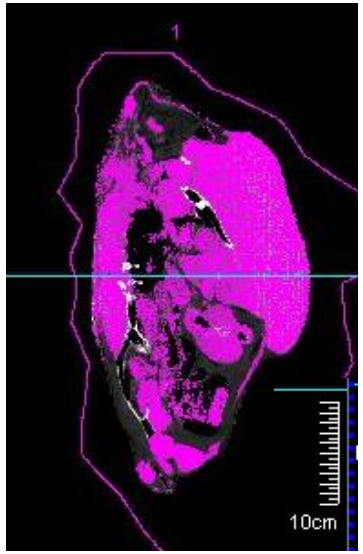
Results – N = 4

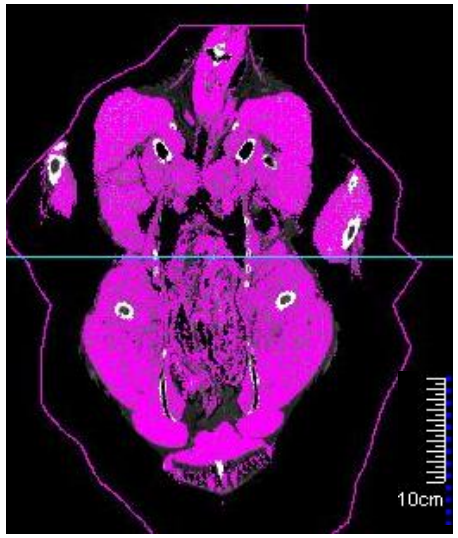


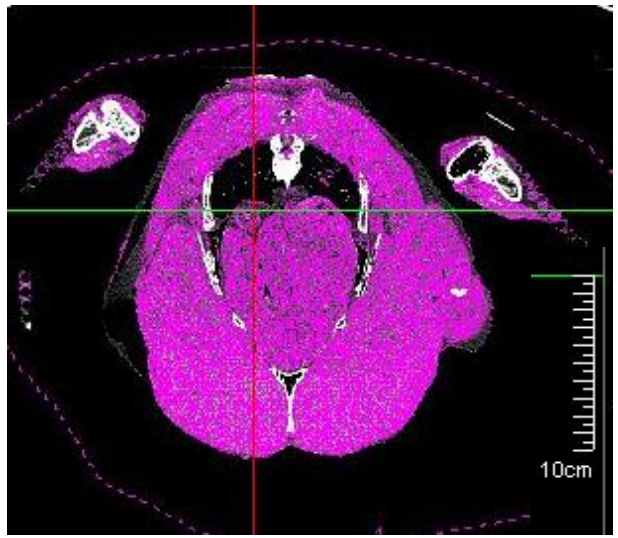
Length



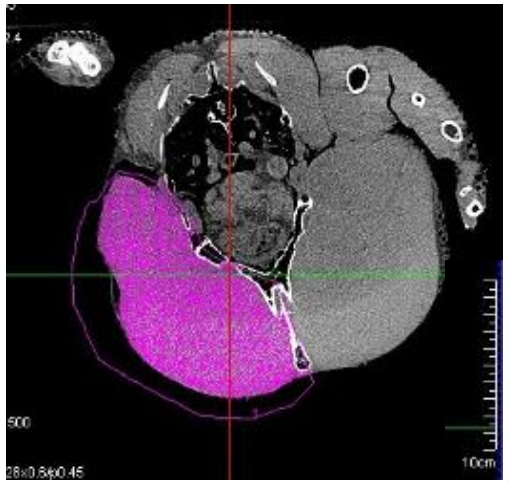
Whole body Tissue volume

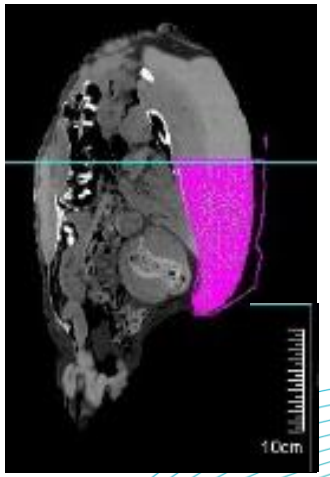


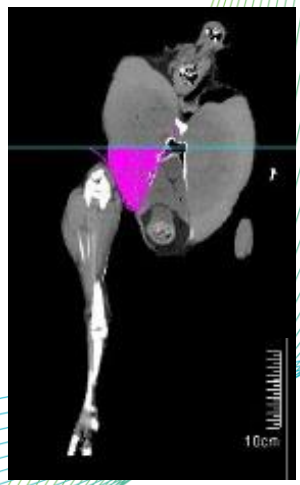




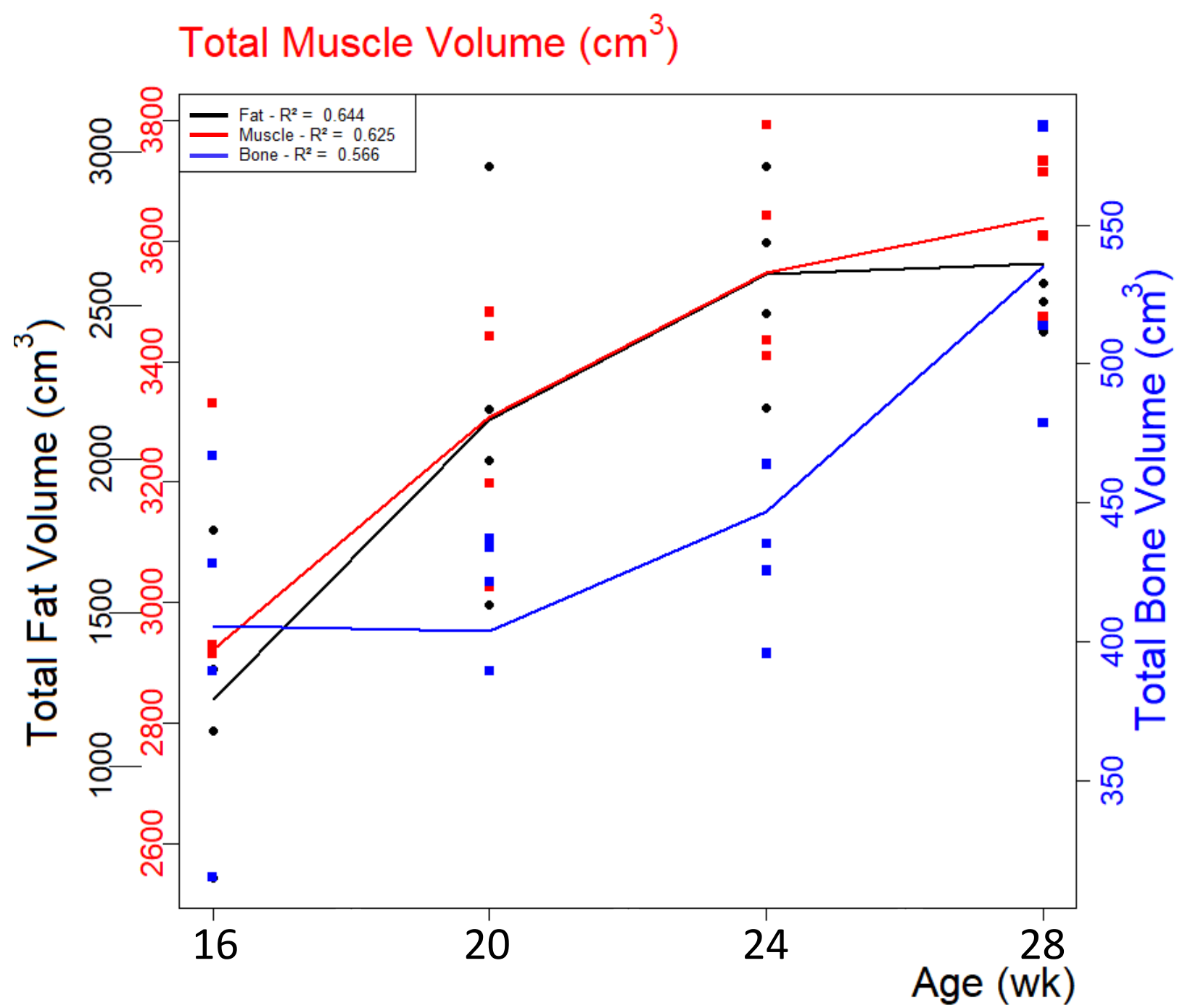
Region of interest



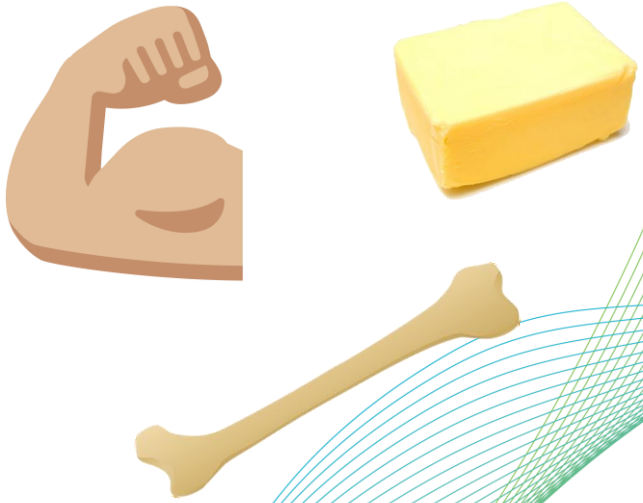




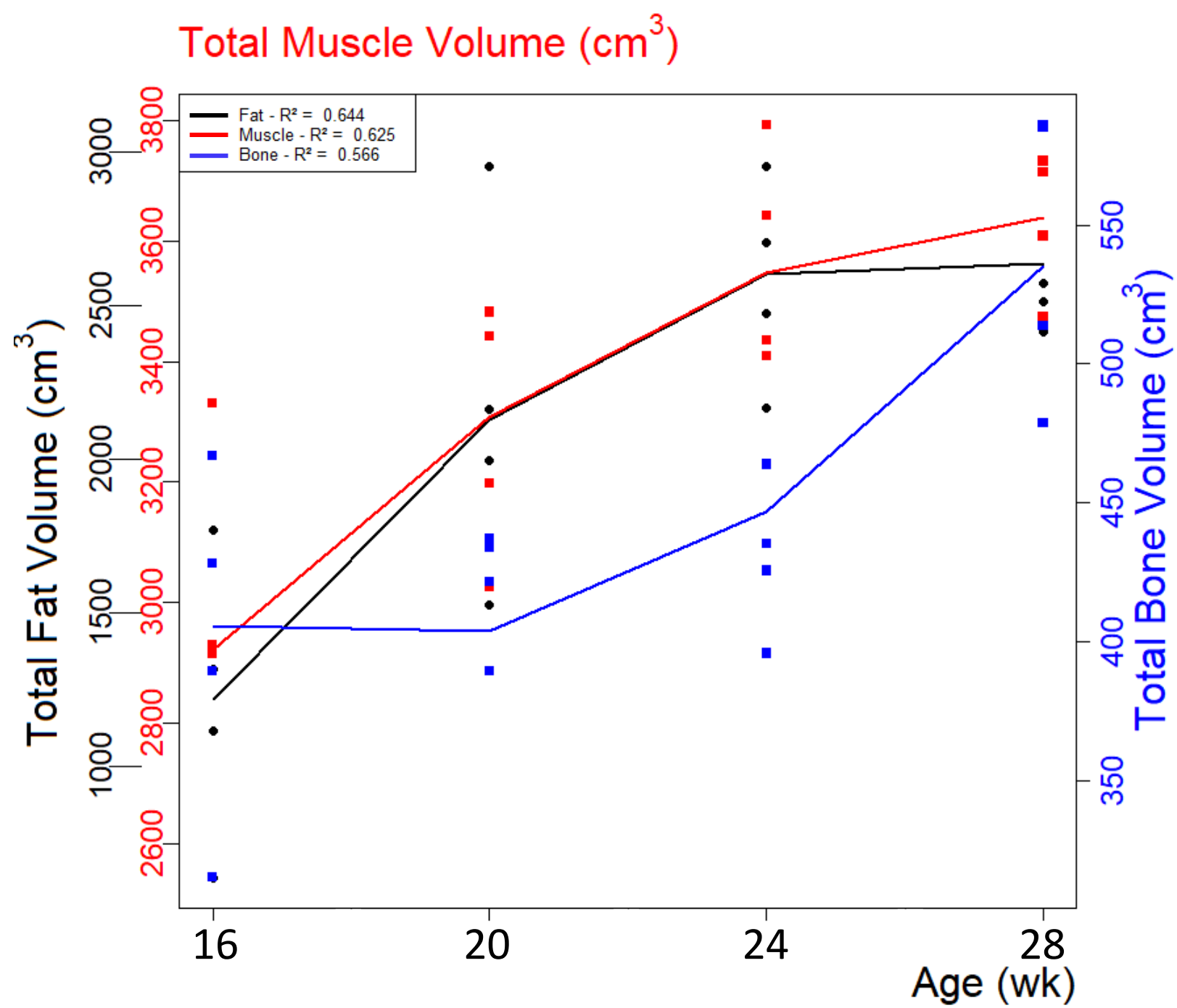
Results – N = 4



Quadratic regression analysis of CT volumes with age

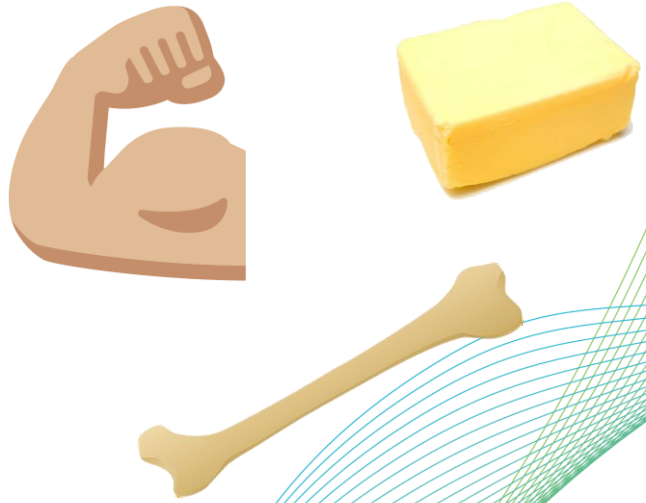


Results – N = 4

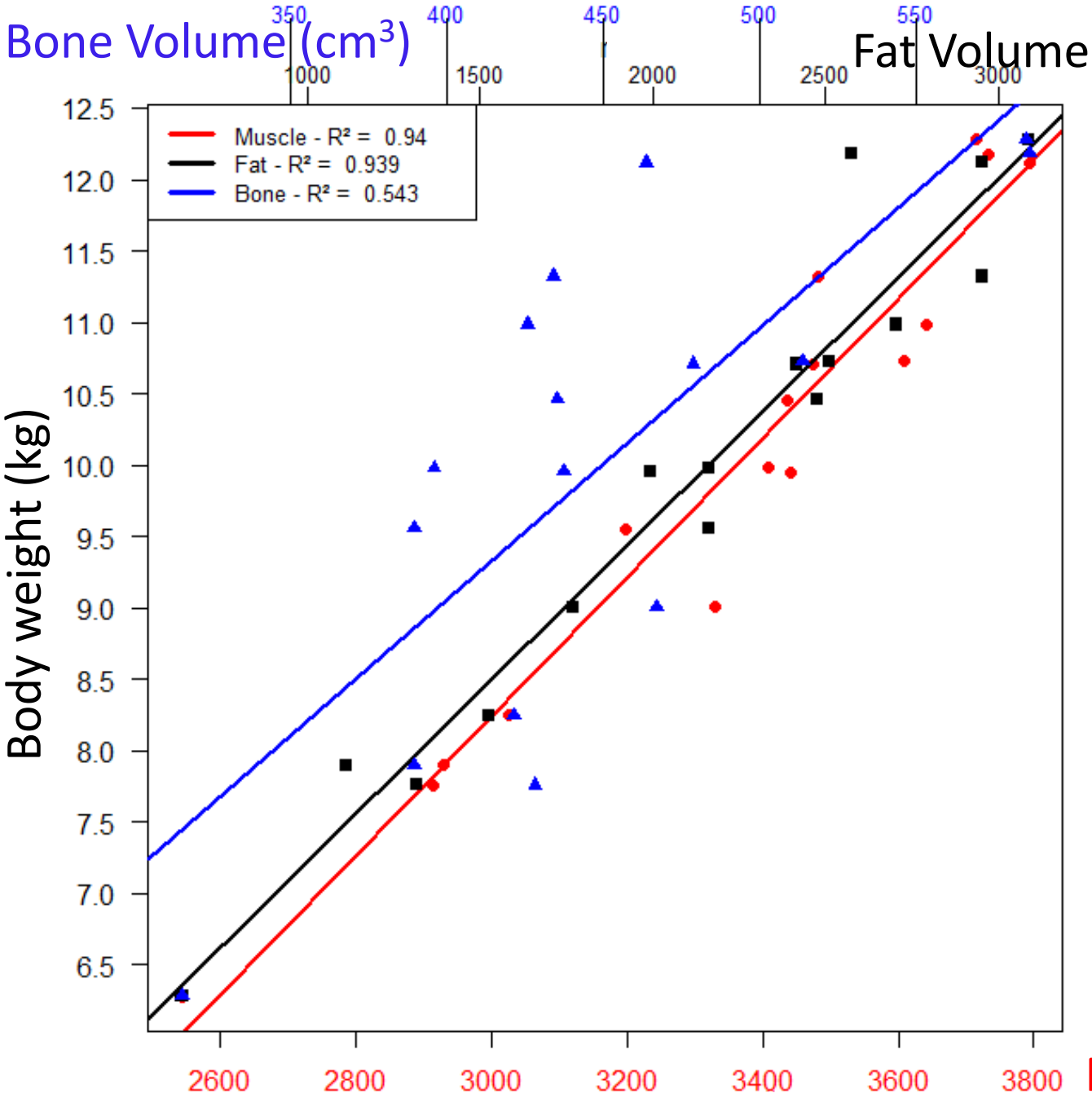


Quadratic regression analysis of CT volumes with age

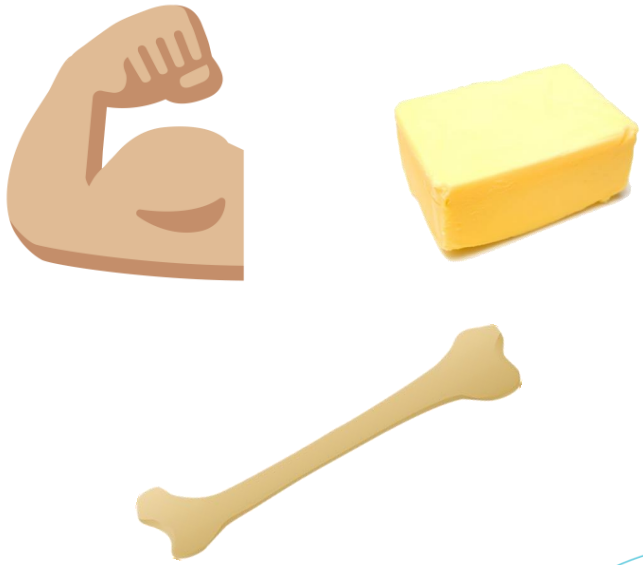
- ✓ Increase for muscle
- ✓ Increase for bone
- ✓ Increase and plateau for fat



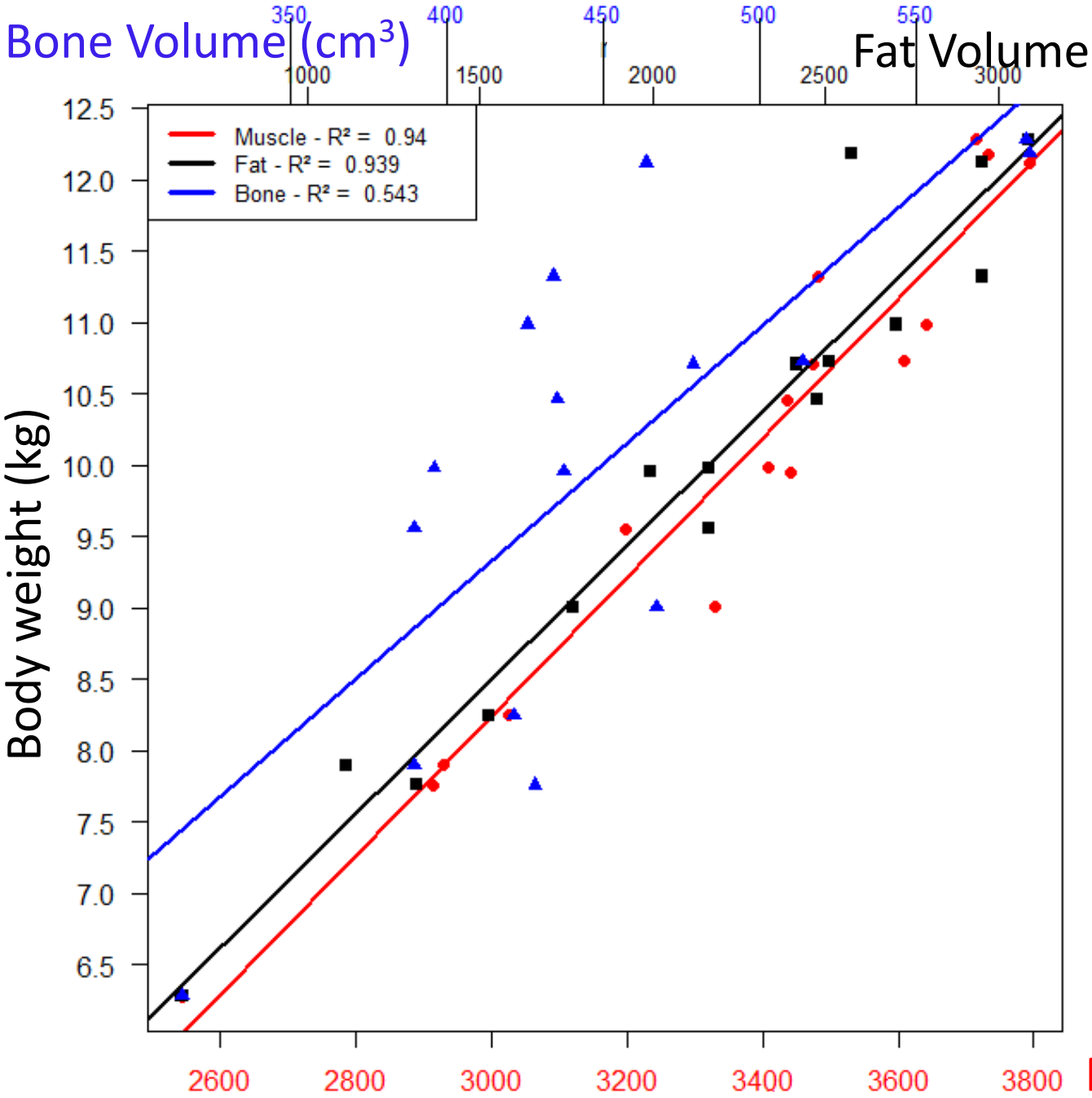
Results – N = 4



Linear regression analysis between BW and CT volumes

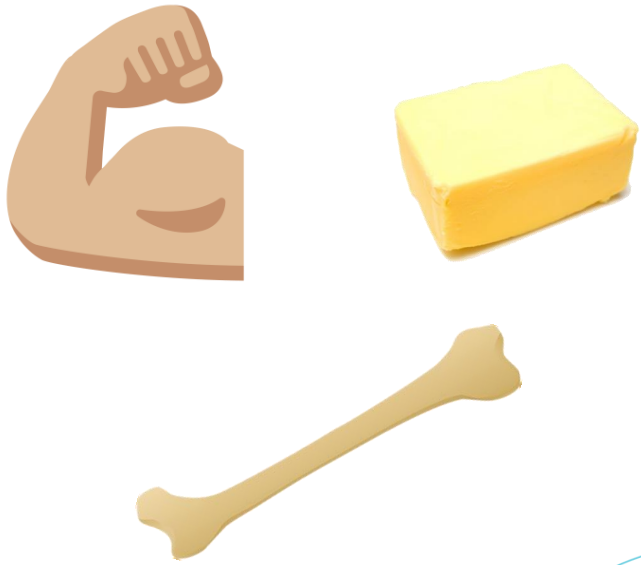


Results – N = 4

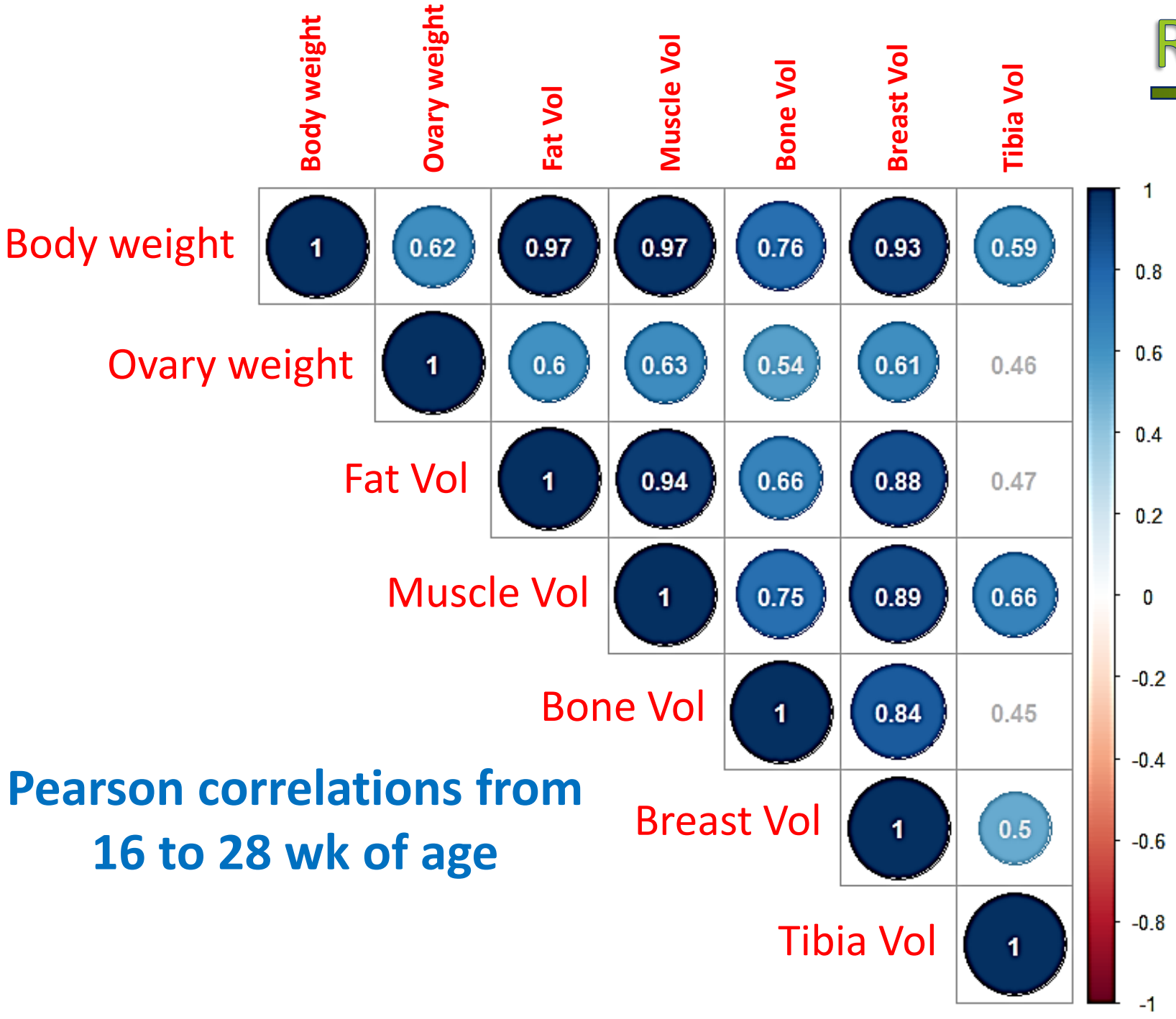


Linear regression analysis between BW and CT volumes

- ✓ Muscles ($R^2 = 0.940$)
- ✓ Fat ($R^2 = 0.939$)

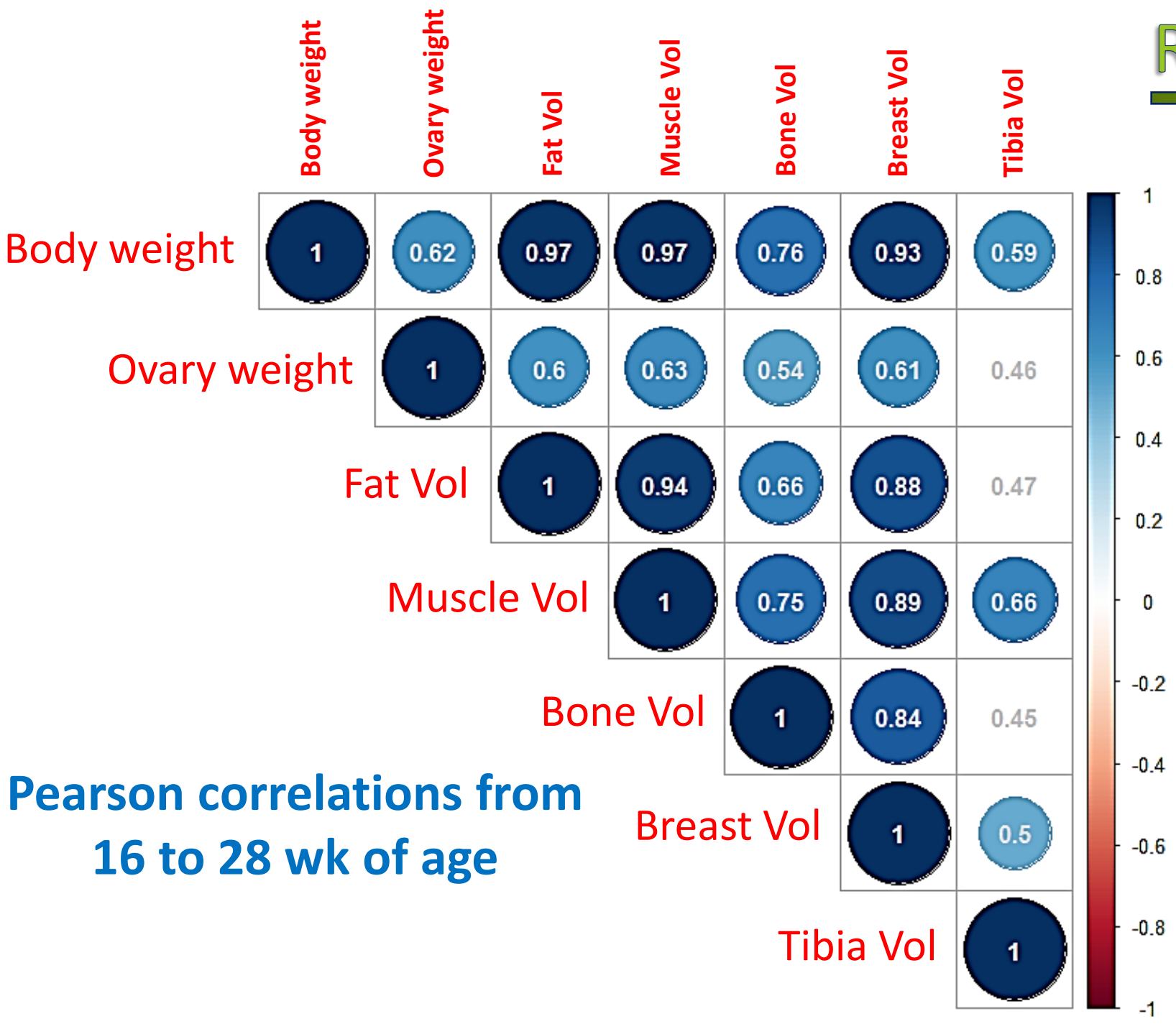


Results – N = 4



Pearson correlations from 16 to 28 wk of age

Results – N = 4

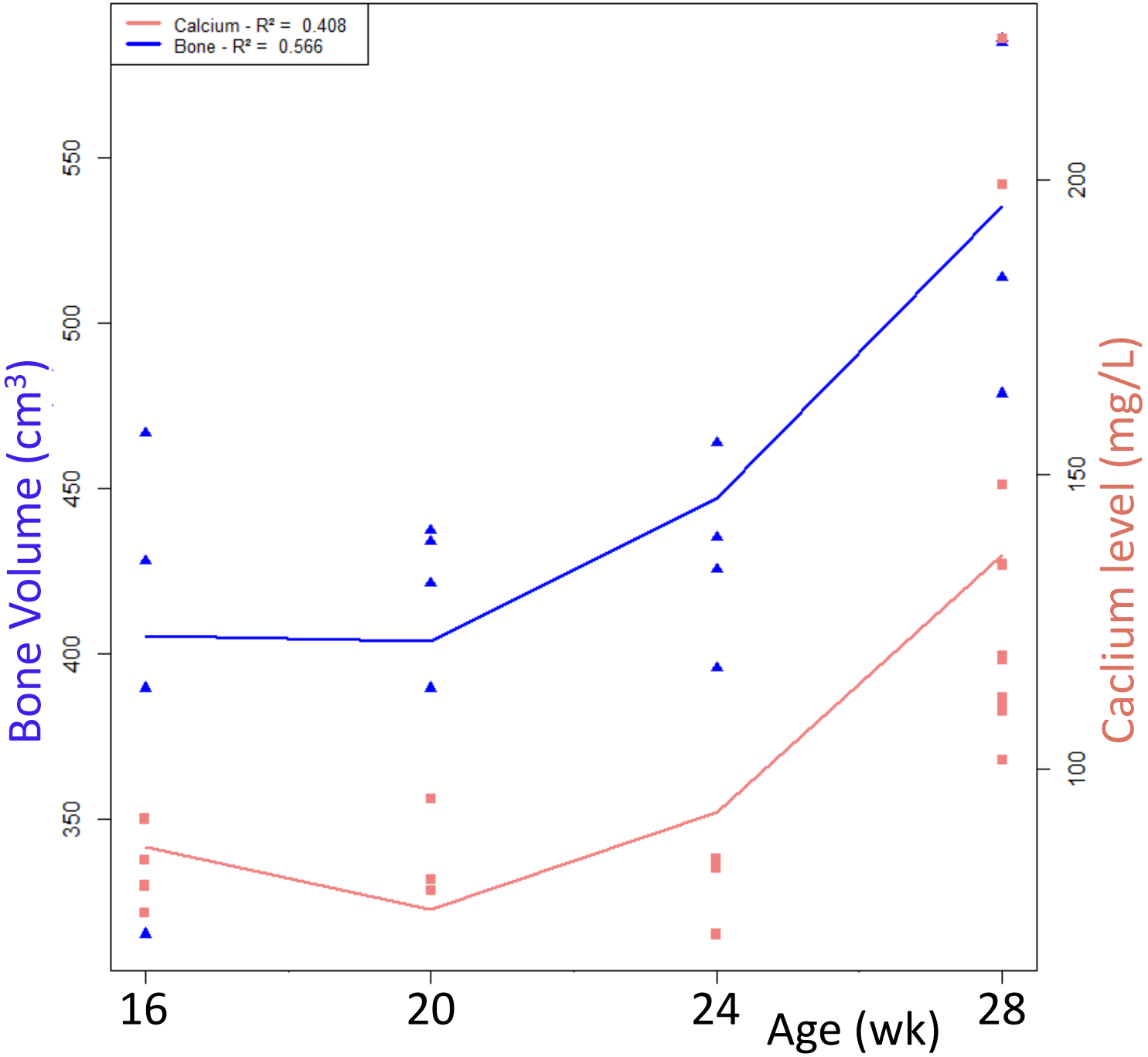


Pearson correlations from 16 to 28 wk of age

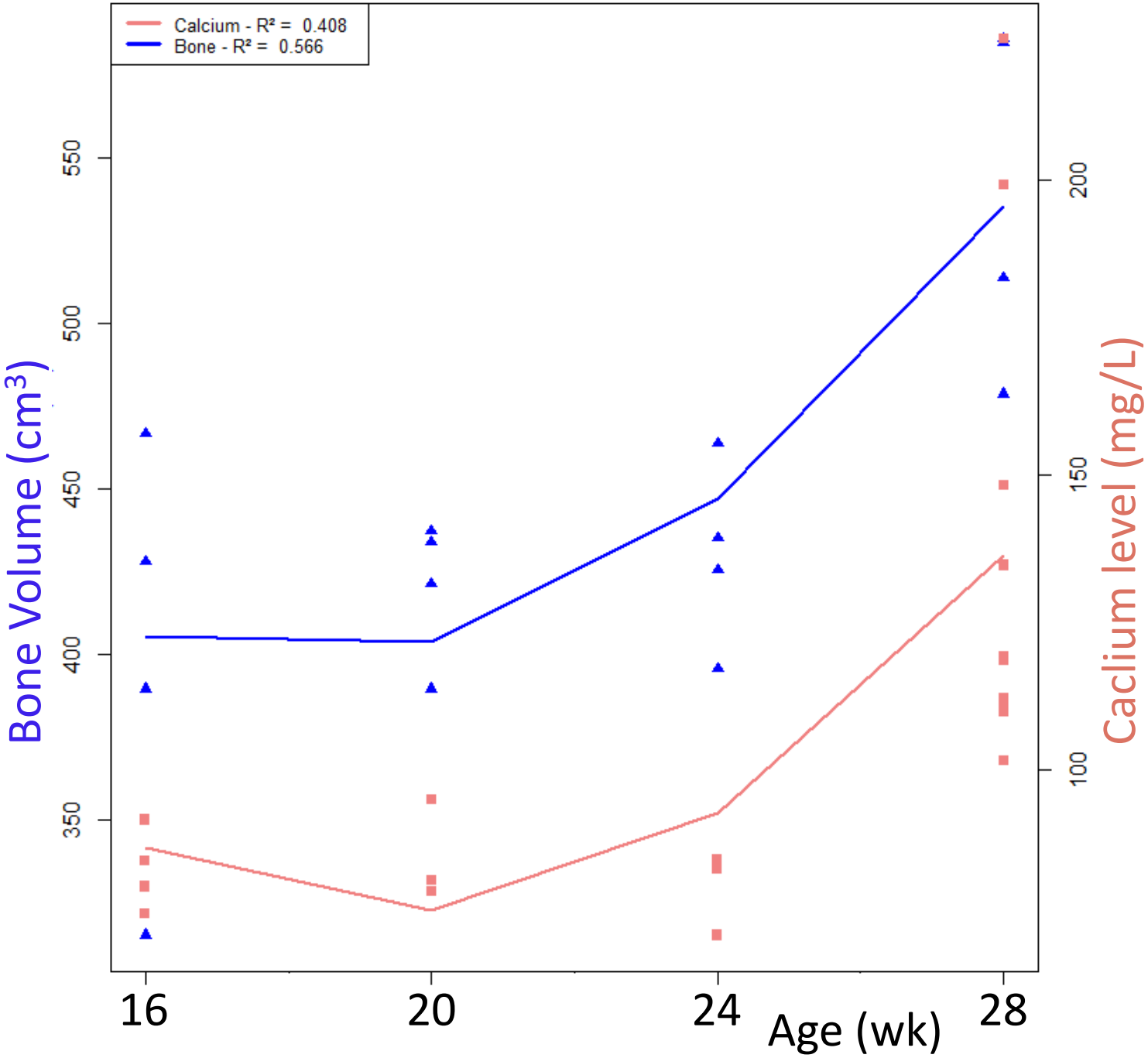
Strongly correlated with BW

- ✓ Muscles (r = 0.97)
- ✓ Fat (r = 0.97)
- ✓ Bone (r = 0.76)
- ✓ Ovary weight (r = 0.62)

Results – N = 4


Calcium - R² = 0.408
Bone - R² = 0.566
Bone Volume (cm³)
Caclium level (mg/L)
Age (wk)
16
20
24
28
350
400
450
500
550
100
150
200

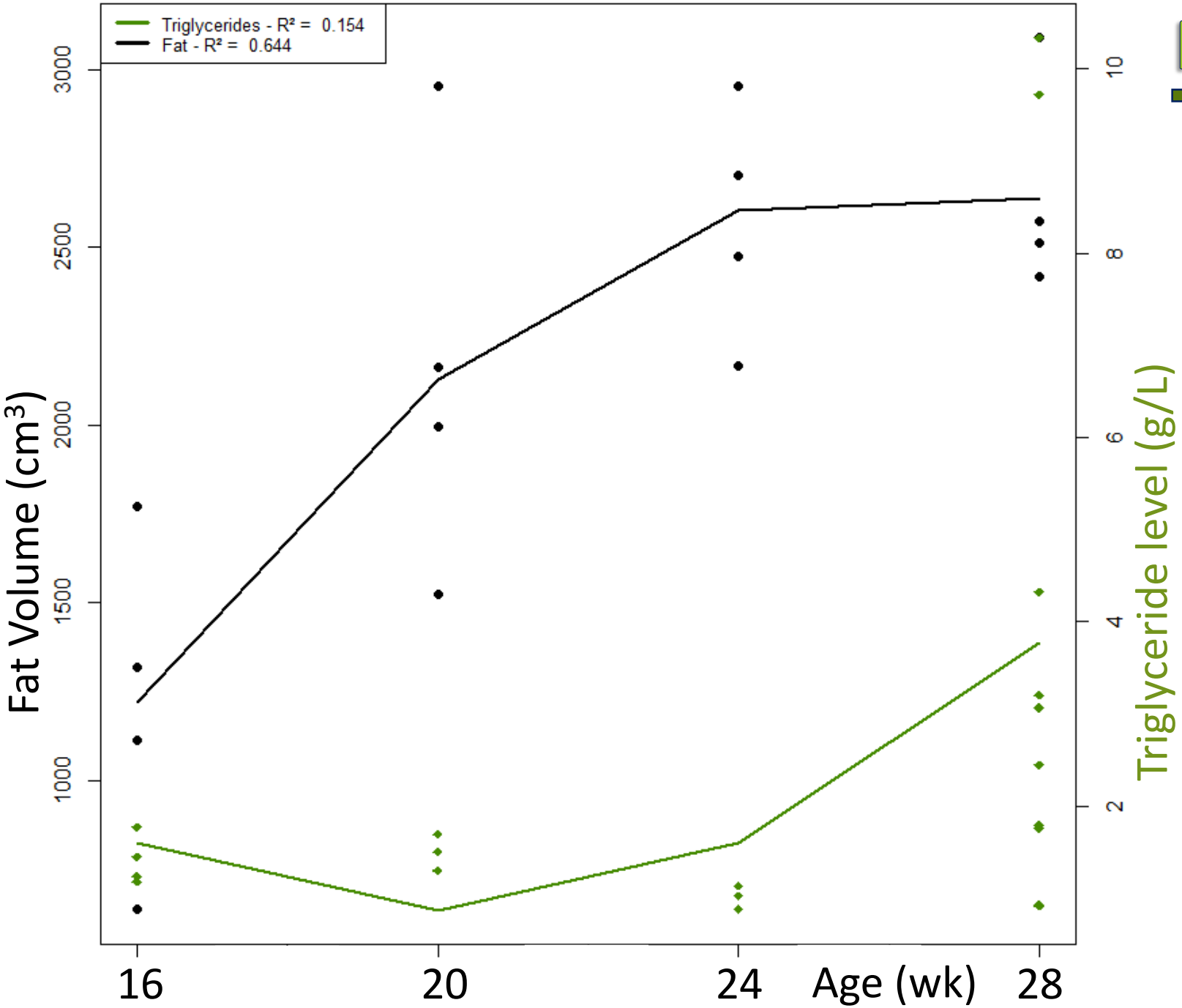
Results – N = 4



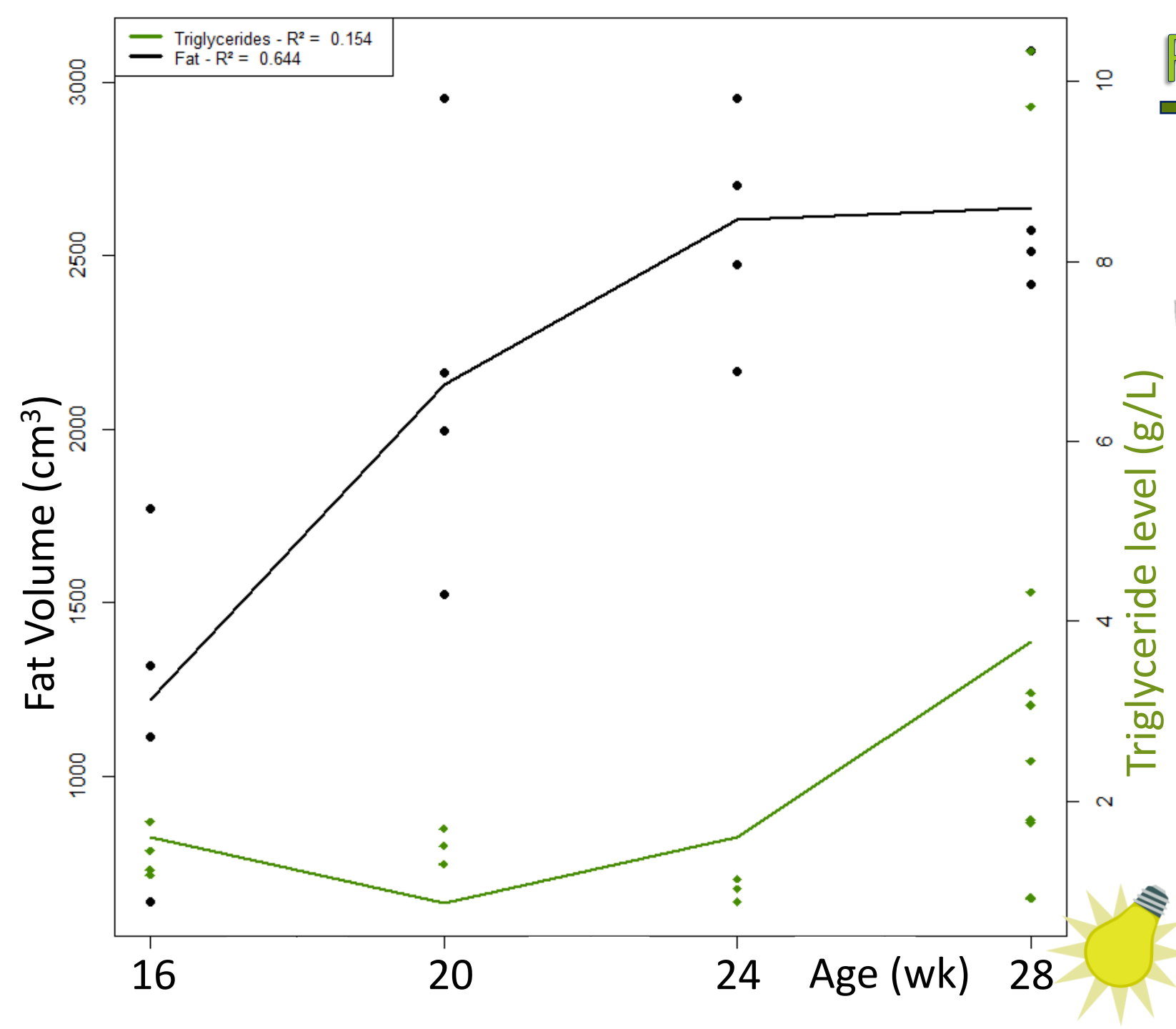
Calcium levels

✓ **Increase with age**

Results – N = 4


Triglycerides - R² = 0.154
Fat - R² = 0.644
Fat Volume (cm³)
Triglyceride level (g/L)
Age (wk)
16
20
24
28
1000
1500
2000
2500
3000
2
4
6
8
10

Results – N = 4



Triglyceride levels

✓ **Increase at PS**

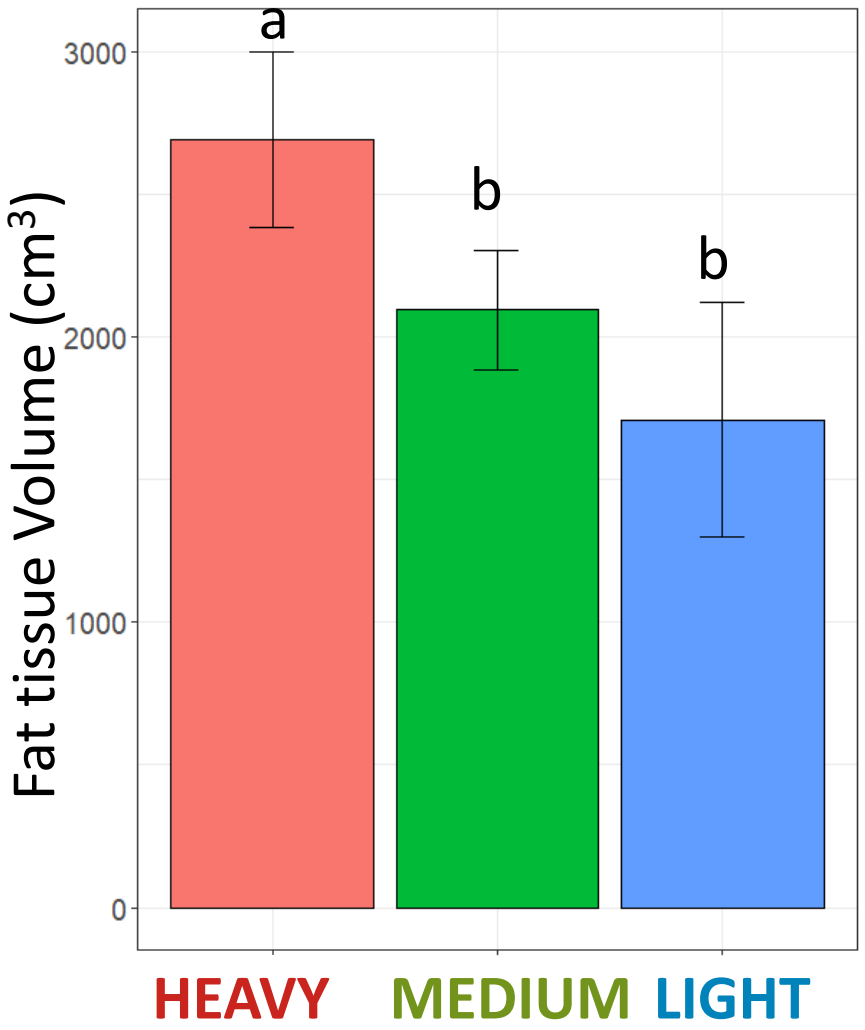
Results – N = 4

LIGHT **MEDIUM** **HEAVY**

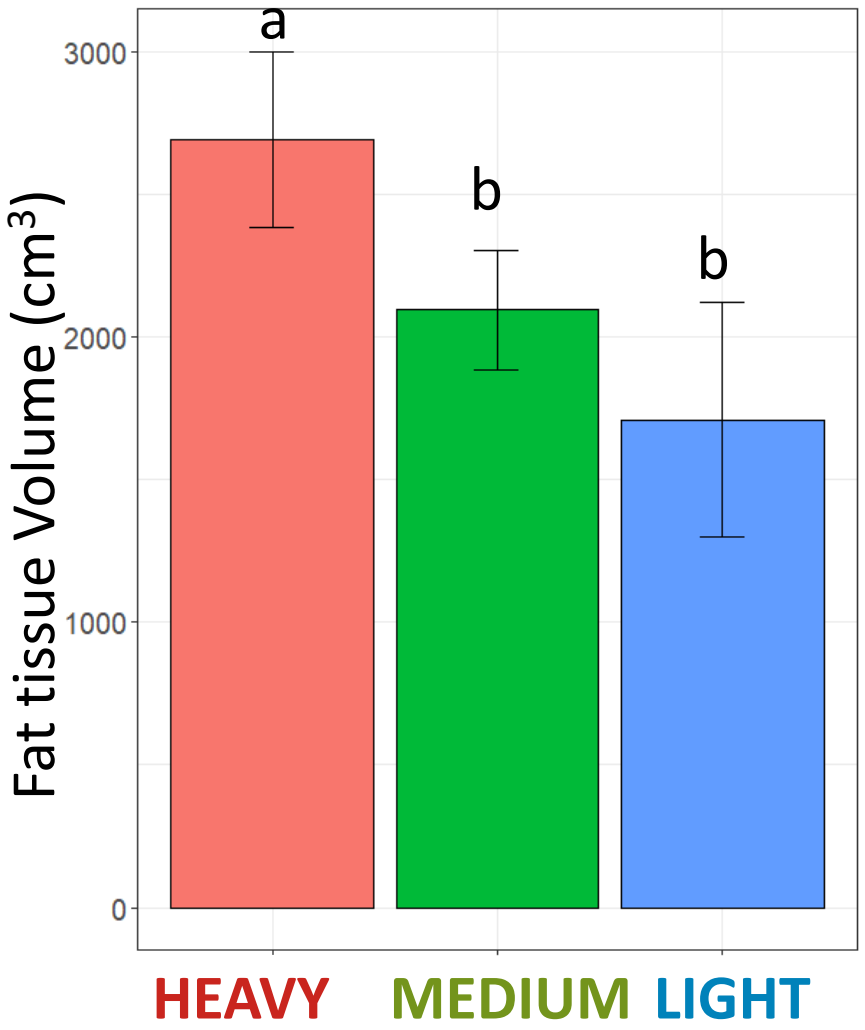
No difference between groups

- ✓ **Muscle volume**
- ✓ **Bone volume**

Results – N = 4


a
b
b
3000
2000
1000
0
Fat tissue Volume (cm³)
HEAVY
MEDIUM
LIGHT

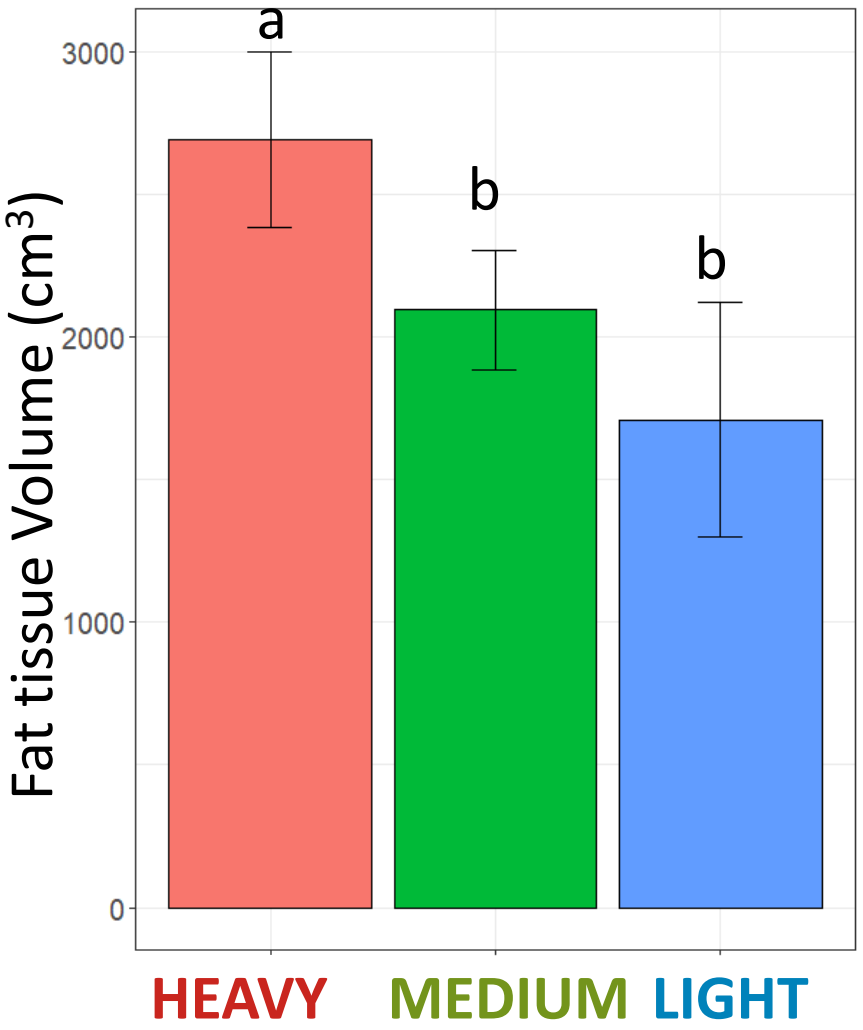
Results – N = 4

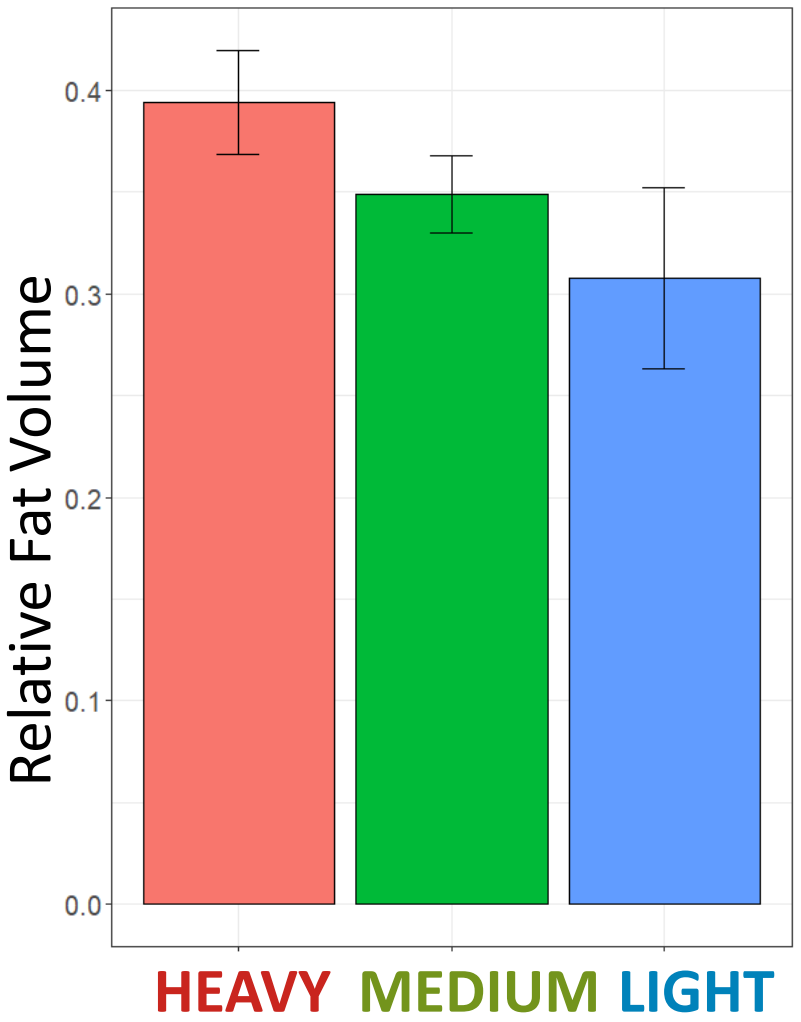


Group HEAVY

✓ **More fat volume**

Results – N = 4





Group HEAVY
✓ **More fat volume**

Relative fat volume
✓ **No difference**

Growth rate

- ✓ Influenced by BW at 16 wk
- ✓ Volumes and BW follow a linear relationship during rearing

Conclusion

Growth rate

- ✓ Influenced by BW at 16 wk
- ✓ Volumes and BW follow a linear relationship during rearing

CT - Scan

- ✓ Non – invasive body composition estimation
- ✓ Adapt feeding strategies
- ✓ Valuable tool for genetic selection

Conclusion

Growth rate

- ✓ Influenced by BW at 16 wk
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CT - Scan

- ✓ Non – invasive body composition estimation
- ✓ Adapt feeding strategies
- ✓ Valuable tool for genetic selection

Perspective:

Body composition and growth rate

- ✓ Through sexual maturity
- ✓ During laying

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HENDRIX GENETICS

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Thank you for your attention !

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