Effects of Size at Birth, Childhood Growth Patterns and Growth Hormone Treatment on Telomere Length

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Conclusion

Birth size and growth patterns during infancy and childhood are **not** associated with telomere length in young adulthood

Growth hormone treatment does **not** have adverse effects on telomere length

Background

Small size at birth and rapid growth in early life are associated with increased risk for cardiovascular disease (CVD) in later life.[1]

Short children born small for gestational age (SGA) are treated with growth hormone (GH), inducing catch-up in length.[2]

Leukocyte telomere length (LTL) is a marker of biological age and shorter LTL is associated with increased CVD-risk.[3]

Picture 1. Child born small for gestational age (left)

Picture 2. Telomeres are the end of each chromosome

TELOMERE

CHROMOSOME OF ADULT CELL

TELOMERE SHORTENS AFTER MULTIPLE REPLICATIONS
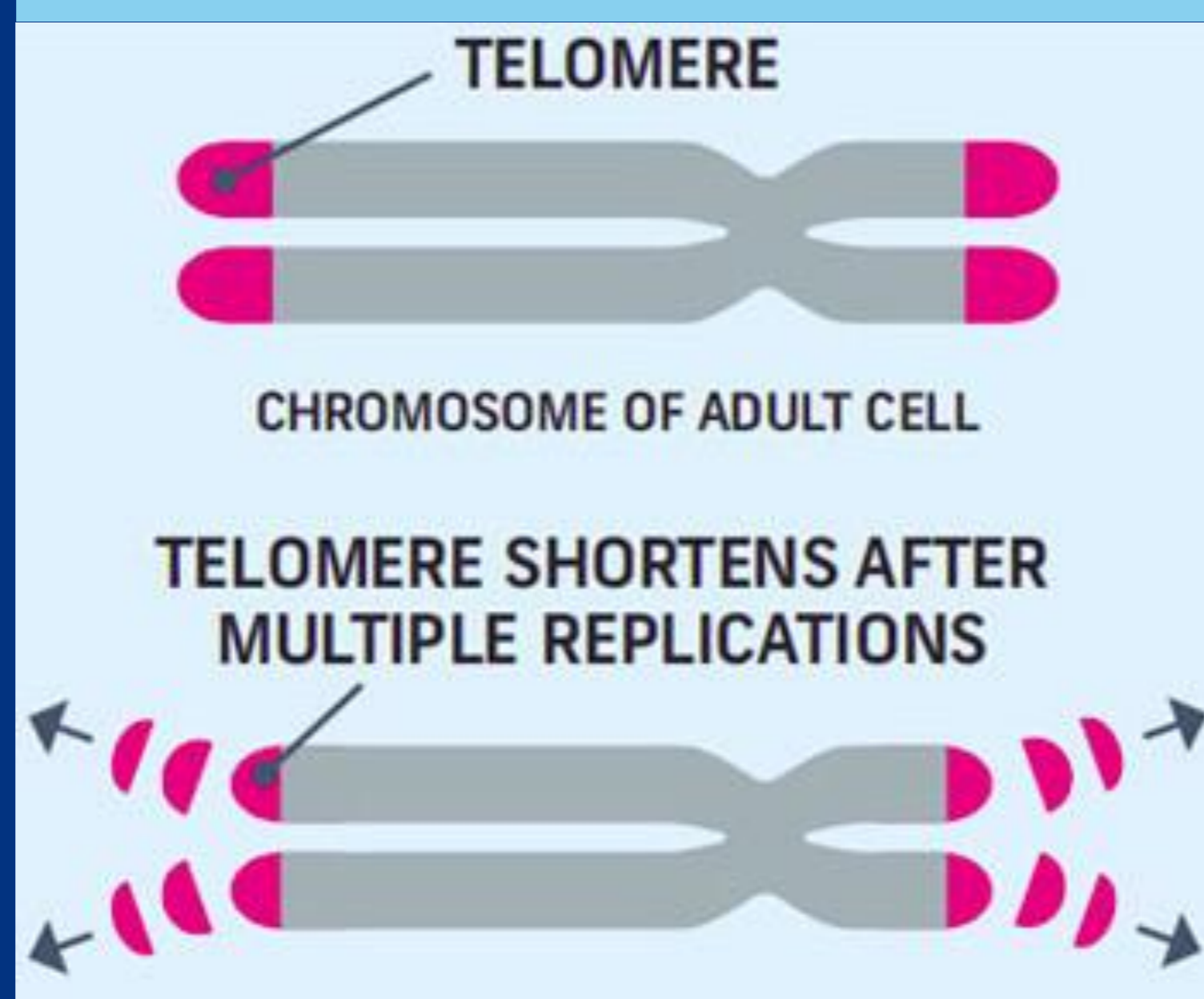
Objectives

To investigate whether LTL is influenced by birth size, growth during infancy and childhood, and long-term GH-treatment.

Methods

LTL was analyzed in 545 young adults (17-24 yrs) with differences in birth size and childhood growth patterns.

Previously GH-treated young adults born SGA (SGA-GH, n=75) were compared to untreated short SGA (SGA-S, n=48), SGA with spontaneous catch-up to a normal body size (SGA-CU, n=89), and appropriate for gestational age with a normal body size (AGA-NS, n=135).

LTL was measured using a quantitative PCR assay and expressed as T/S ratio.

Results

Size at birth, weight gain during infancy and childhood and adult body size did not influence LTL (Figure 1).

Female gender and gestational age were positively associated with LTL (ß=0.25, p=0.02 and ß=0.02, p=0.02 resp.), and smoking negatively (ß=-0.12, p=0.03).

After adjustments for gender, age and gestational age, the SGA-GH subgroup had similar LTL as SGA-S (p=0.11), SGA-CU (p=0.80), and AGA-NS (p=0.30) (Figure 2).

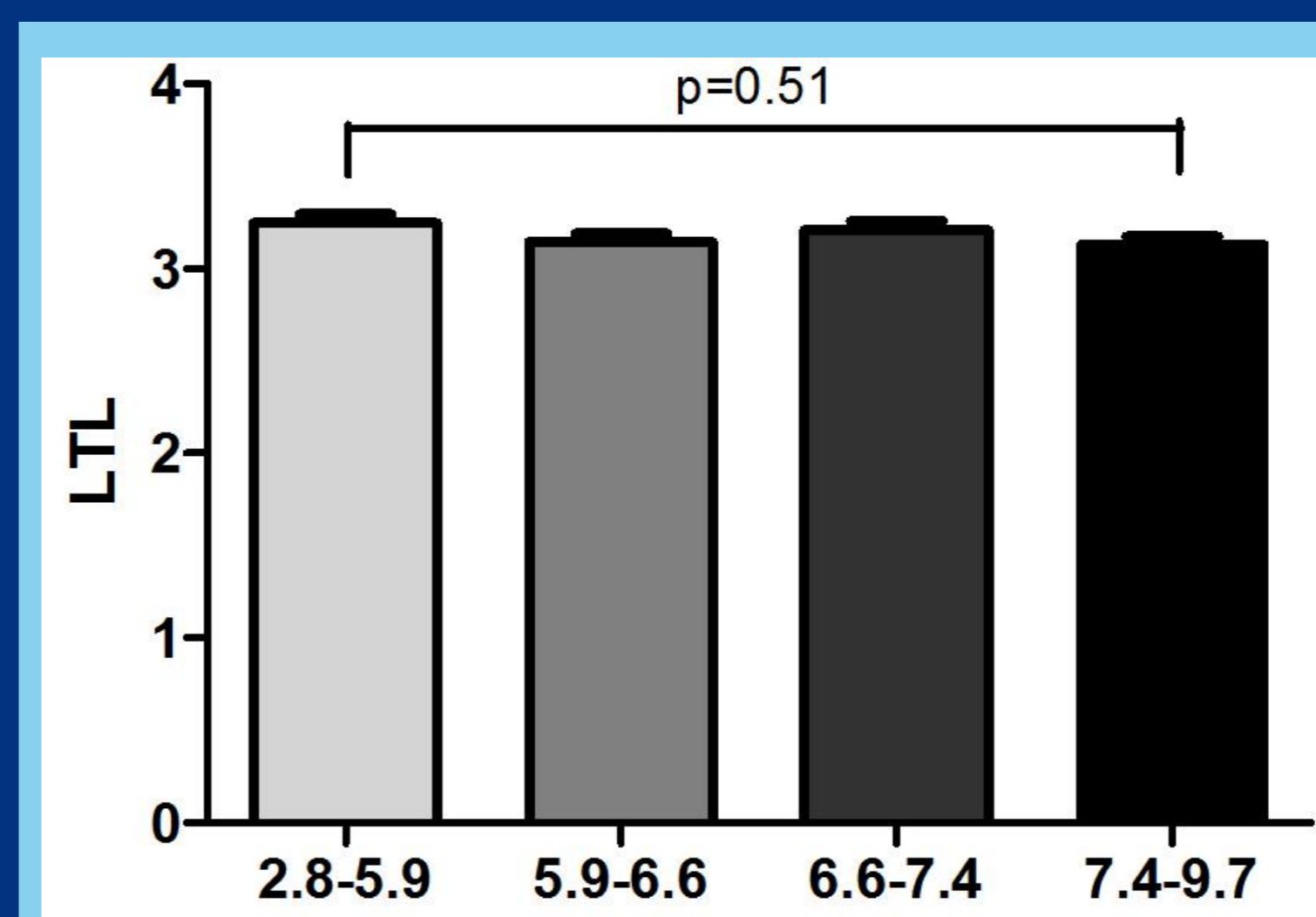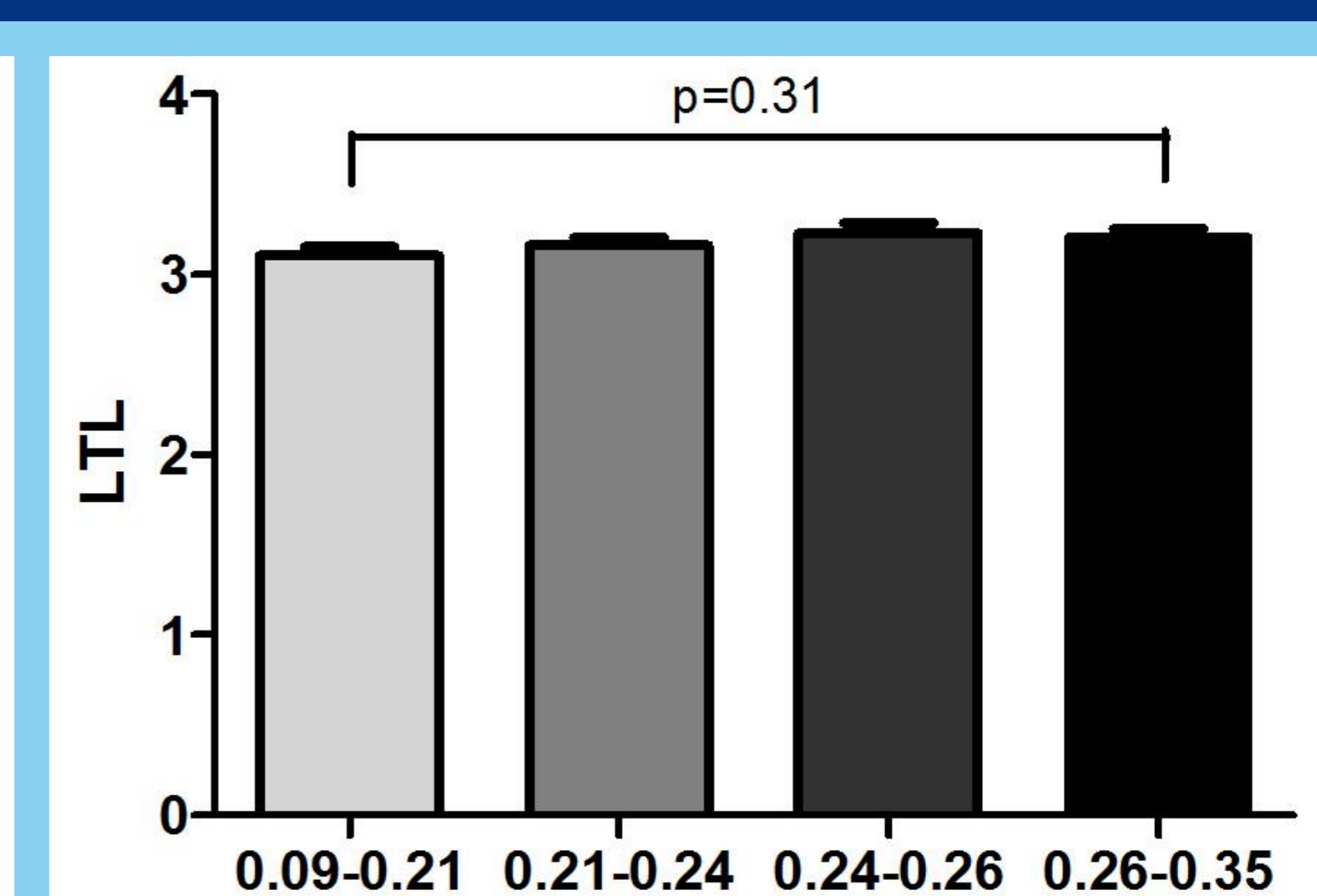**Figure 1A.** LTL in the quartiles of weight gain (kg) from birth to 12 months

Figure 1B. LTL in the quartiles of Δweight (kg)/Δlength (cm) from birth to 12 months
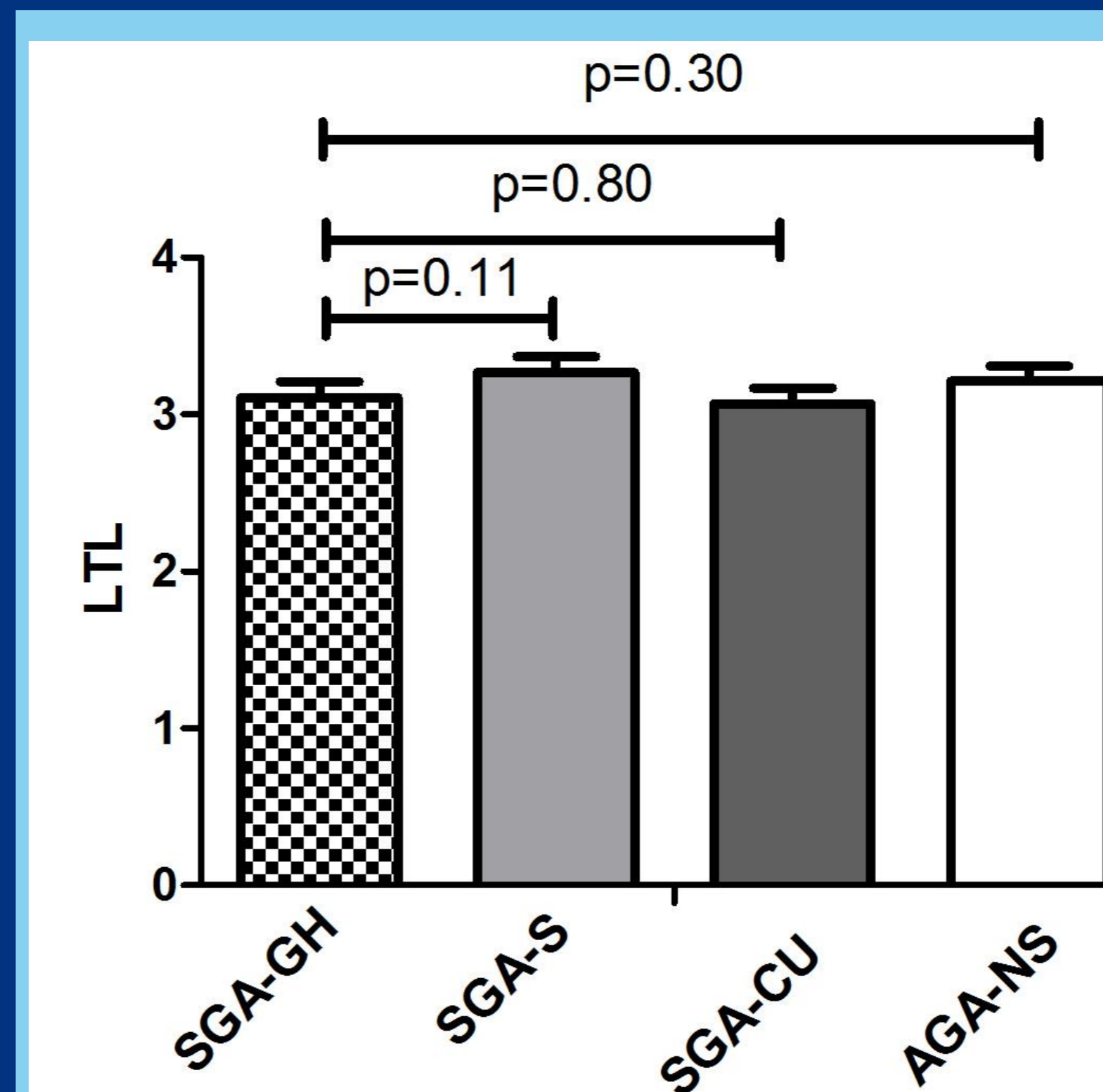

Figure 2. LTL in the subgroups based on size at birth and adult body size

SGA-GH =   Born SGA, GH-treated
SGA-S =   Born SGA, short stature
SGA-CU =   Born SGA, normal stature
AGA-NS =   Born AGA, normal stature

Adjusted for gender, age and gestational age

Values are given as estimated means ±SEM

References

[1]Leunissen et al. Jama 2009   [3]Samani et al. Lancet 2001
[2]van Pareren et al. JCEM 2003

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No conflict of interest