Is C-telopeptide of type I collagen a biomarker of fetal growth?

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Introduction

- Nutritional factors absorbed from amniotic fluid (AF) may play a critical role in fetal bone mineralization.
- Ctx is the Carboxyterminal cross-linking telopeptide of bone collagen.
- During bone resorption, Ctx is liberated and is used as a biochemical marker of bone metabolism.
- Our hypothesis is that AF Ctx is a biomarker of fetal growth.

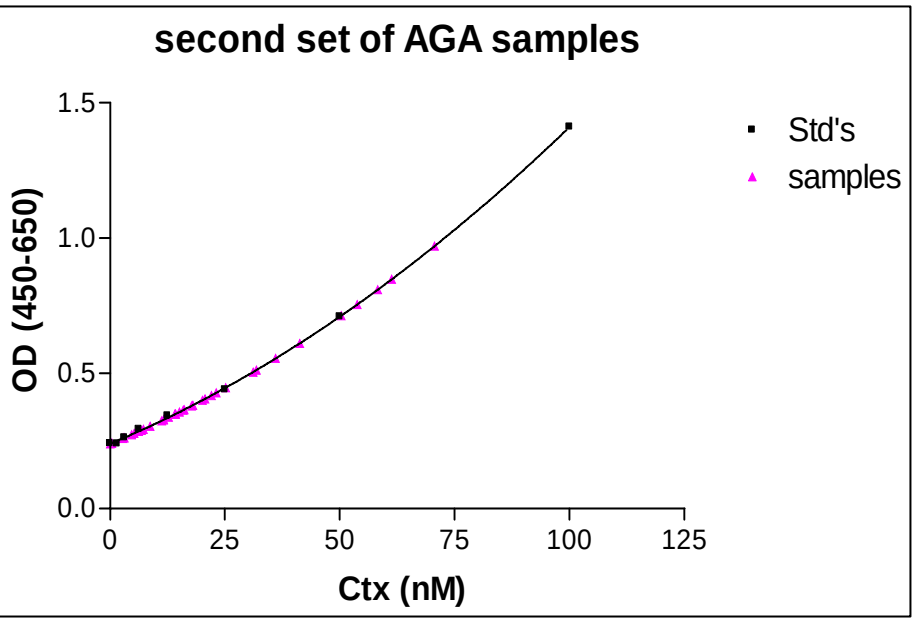
Objectives

- To determine if the serum Ctx ELISA can be applied to detect AF Ctx.
- To determine the concentrations of Ctx in 2nd trimester AF.
- To test whether Ctx concentrations are associated with infant birth weight.

Methods

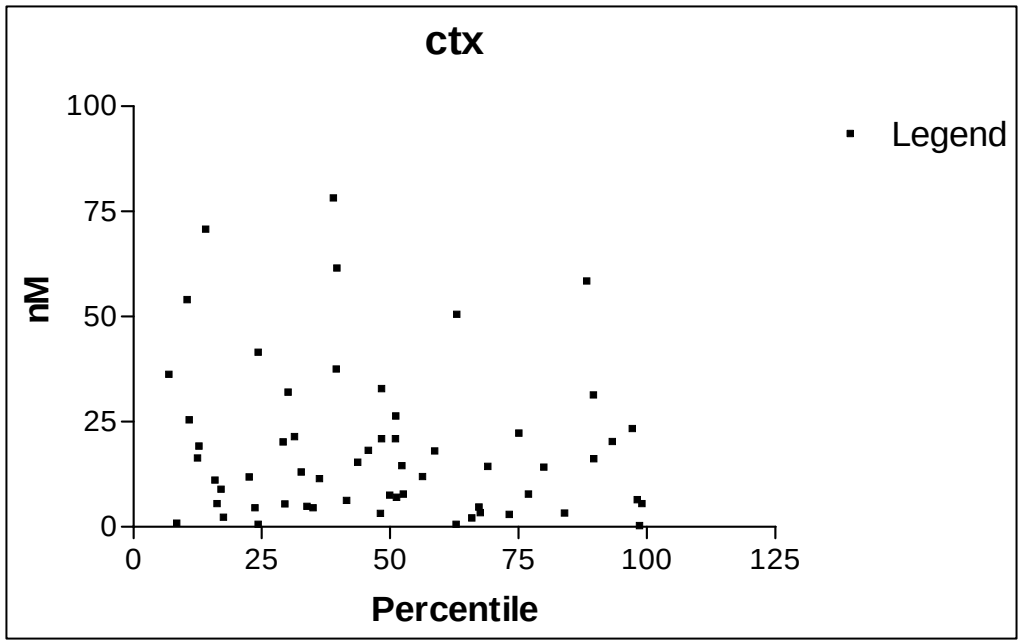
- 60 samples (weeks of gestation 13-20) were tested using an ELISA to quantify Ctx.
- The assay is based on the reaction between two highly specific antibodies against an amino acid sequence .
- This assay is originally intended for diagnostic use as an indication of human bone resorption.
- The assays for serum and tissue culture were both tested. The culture assay showed more sensitivity.

Assay Results



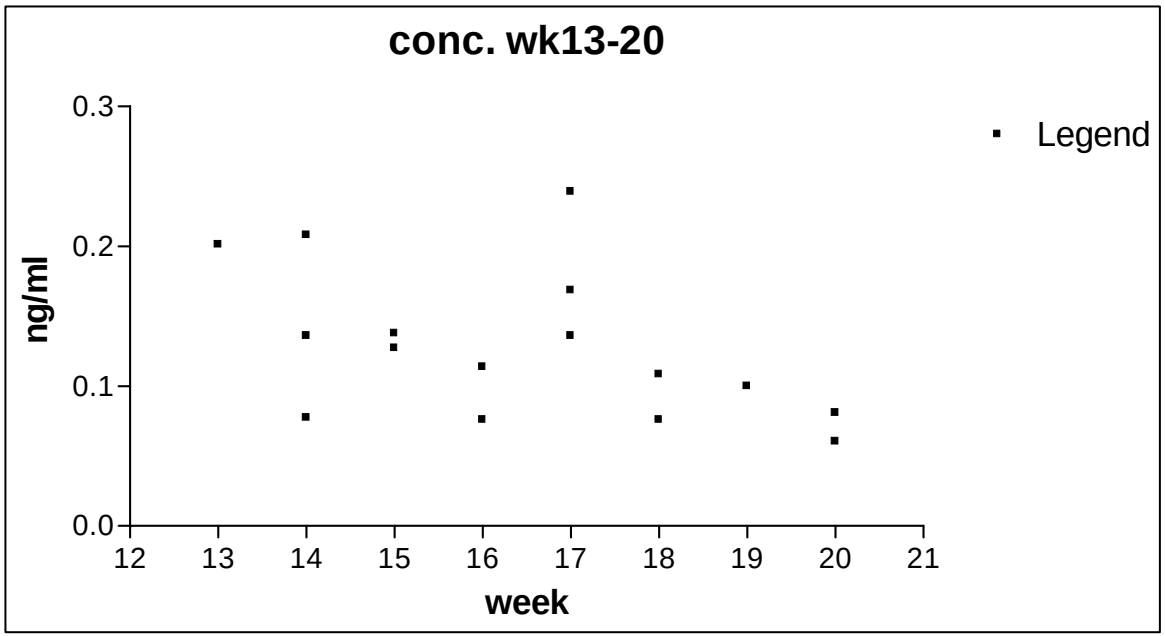
- 2nd order polynomial curve.
- Concentrations in AF are low.
- Range : 0.011nM to 77. 99 nM Ctx in 60 AF samples
- Controls were treated as unknowns

Association of Ctx & birthweight.



- N=60 2nd trimester Human AF samples
- Need a larger number of samples

Association of Ctx concentrations with increasing Gestational age.



- Preliminary results suggest Ctx has an inverse relationship with gestational age.

Conclusions

- These preliminary observations suggest that Ctx decreases as gestation progresses.
- The Ctx culture ELISA kit is an appropriate method for measurements in human AF.
- The variability ensures that Ctx can be used as a biomarker in AF.

Future Work

- We will measure more samples using the selected method.
- With a larger sample size, we will associate Ctx with measurements of fetal ultrasonography including femur length and infant birth weight.

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