Bone Growth Regulation & Blood Calcium

To complete this worksheet, select:

Module: Support and Movement
Activity: Animations
Title: Bone Growth Regulation & Blood Calcium

Complete the following worksheet and add it to your notes.

Interactions: Support & Movement CD/Contents/Skeletal System/Animations/Regulation of Bone Growth & Blood Calcium

1. Why must bone continuously be broken down? ____________________________
   ______________________________________________________________________

2. Describe the two needs that regulate bone remodeling.
   a. blood calcium levels - ________________________________________________
      ______________________________________________________________________
   b. physical stresses - __________________________________________________
      ______________________________________________________________________

3. What is calcium needed for? ____________________________________________
   ______________________________________________________________________
   ______________________________________________________________________
   ______________________________________________________________________

4. Define the normal levels of blood calcium. ________________________________
   ______________________________________________________________________

5. Define hypercalcemia and hypocalcemia. Describe symptoms of each.
   ______________________________________________________________________
   ______________________________________________________________________
   ______________________________________________________________________
   ______________________________________________________________________
   ______________________________________________________________________
6. What causes blood calcium levels to naturally decline?

7. Describe the effect of parathyroid hormone (PTH) on osteoclasts, bone resorption, and ultimately on blood calcium levels.

8. Describe the effect of PTH in the kidneys and ultimately how this affects blood calcium levels.

9. When blood calcium levels are high, the thyroid gland secretes the hormone Calcitonin (CT). Describe the effect of CT on osteoblasts and ultimately on bone matrix structure.

10. Describe the bone growth regulatory role of these vitamins.
   a. Vitamins C, K, and B12 - 
   b. Vitamin A - 
   c. Vitamin D - 
11. Describe the bone growth regulatory role of these hormones.
   a. Insulin-like Growth Factors (IGFs) -
   b. Human Growth Hormone (GH) -
   c. Estrogen, Testosterone, Thyroid Hormones, and Insulin -

12. Describe the regulatory role of these hormones, and what gland secretes each.
   a. Human Growth Hormone (GH) -
   b. Insulin-like Growth Factors (IGFs) -
   c. Somatostatin (GHIH) -
      i. How does GH affect blood glucose levels?
   d. This is a good example of a negative feedback loop that maintains homeostasis. Explain.

13. Describe the affect of sex hormones, initiated during puberty, on osteoblasts and the epiphyseal plate.