LESSON 4

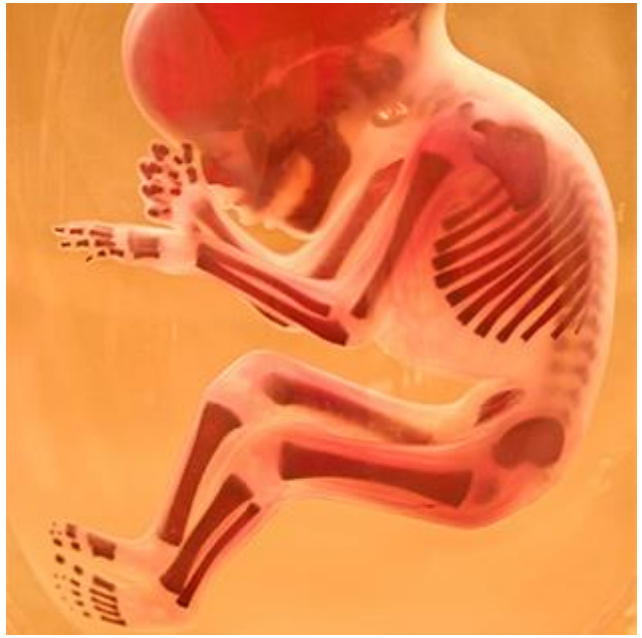
- **Bone Formation & Growth**
- **Cell Types**
- **True or False?**

TRUE!

1. Bones stop growing in length during puberty. Bone density and strength will change over the course of life, however.
2. By the end of the teen years, about 90% of adult bone mass is in place.

Formation of the Human Skeleton

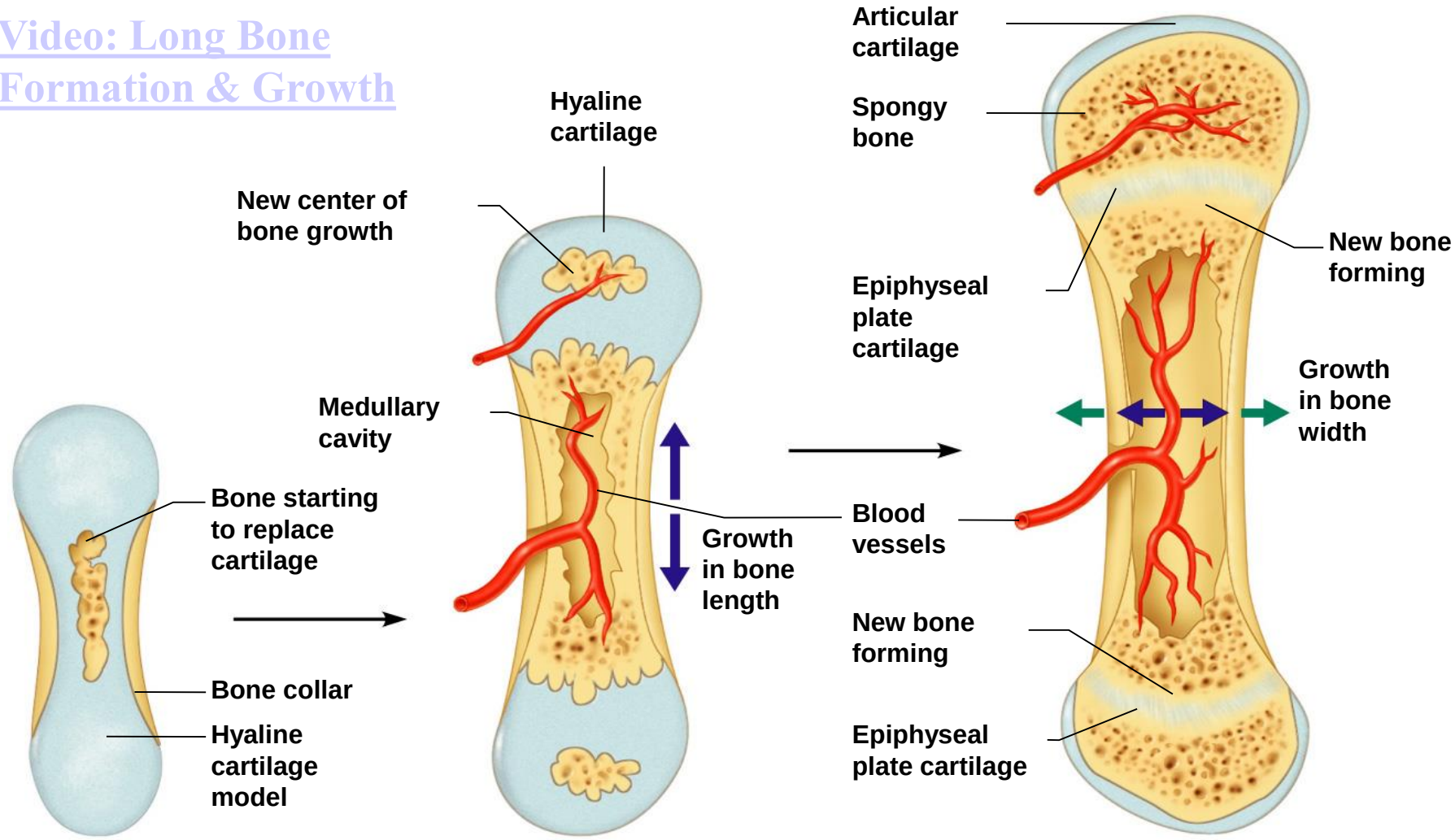
- In embryos, the skeleton is primarily hyaline cartilage
- During development, much of this cartilage is replaced by bone
- Cartilage remains in isolated areas
  - Bridge of the nose
  - Parts of ribs
  - Joints



Long Bone Formation and Growth

Figure 5.4a

Video: Long Bone Formation & Growth



Bone Growth (Ossification)

Video: Bone Remodeling

- Epiphyseal plates allow for **lengthwise** growth of **long** bones during childhood
  - New cartilage is continuously formed
  - Older cartilage becomes **ossified**
    - Cartilage is broken down
    - Enclosed cartilage is digested away, opening up a medullary cavity
    - Bone replaces cartilage through the action of **osteoblasts**

Bone Growth (Ossification)

- Bones are remodeled and lengthened until growth stops
  - Bones are remodeled in response to two factors
    - Levels of blood calcium
    - Pull of gravity and muscles on the skeleton
  - Bones grow in width (called appositional growth)

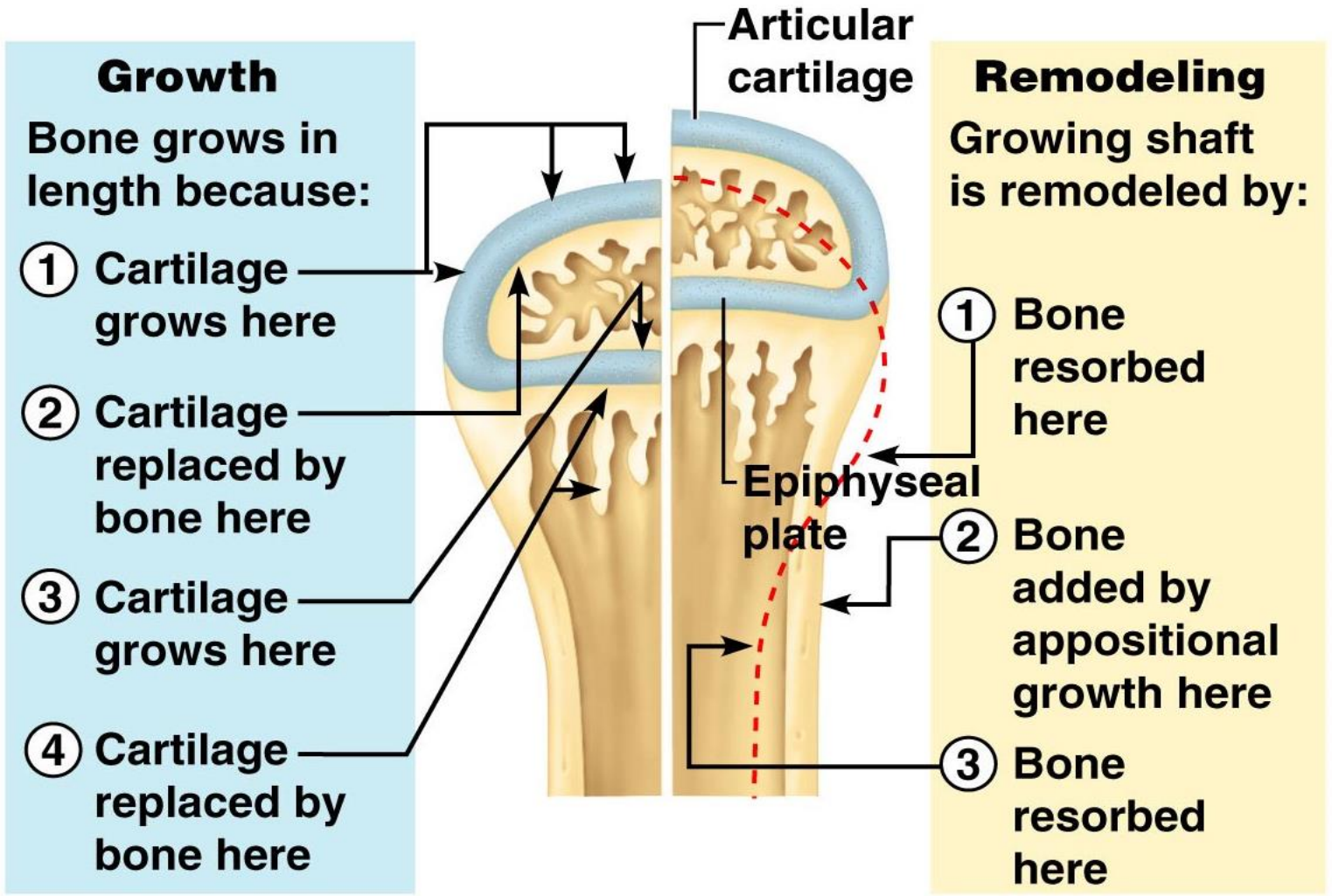
Types of Bone Cells

Video: Osteoblasts & Osteoclasts

- Osteocytes: mature bone cells
- Osteoblasts: bone-forming cells
- Osteoclasts: bone-destroying cells
  - Break down bone matrix for remodeling and release of calcium in response to parathyroid hormone
- Bone remodeling is performed by both osteoblasts and osteoclasts

Long Bone Formation and Growth

Figure 5.4b



(b)