

MSS Pathology 2022

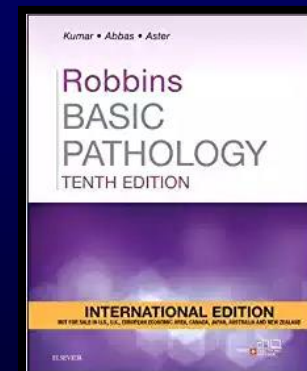
Lecture 1

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College of Medicine*

MY DUTIES

- **10 recorded lectures (1st 5 for midterm)**
- **2 meetings (Microsoft teams) for inquiries (1 before midterm and 1 before final)...u must attend**
- **Simplify**



YOUR DUTIES

- Understand the concepts
- Help U all Understand...understand...
understand X 10...only then memorize
- Answer questions (exception) & inquiries
- Respect the whole process...I paid my
dues...it is your future
- No inquiries about the nature
of the exam...I don't answer questions of
the exam...don't even try

PLEASE DON'T ASK THESE QUESTIONS AT ALL

- **How many questions on my material?**
- **What should we concentrate on?**
- **Are the slides enough?**
- **Should we memorize this or that?**
- **Is this or that required?**

[YOU SHOULD NOT ONLY
STUDY FOR THE EXAM]
[YOU ARE NOT STUDYING
FOR ME EITHER]
[YOU ARE LEARNING SO
THAT YOU WILL BE A GOOD
CARING & THOROUGH
PHYSICIAN WHO WILL
APPLY THE STANDARD OF
CARE]

OUTLINE & OBJECTIVES

- **Remember the basic structure & function of bone**
- **Congenital diseases of bone and cartilage**
- **Metabolic disorders of bone**
- **Paget disease of bone**
- **Fractures**
- **Osteonecrosis**
- **Osteomyelitis**
- **Bone tumors and tumor-like conditions**

CONTINUE...OUTLINE AND OBJECTIVES

- **Arthritis:**
 - **Osteoarthritis; RA; Juvenile Idiop A**
 - **Seronegative Spondyloarthropathies**
 - **Infectious arthritis; Lyme arthritis**
 - **Crystal-induced arthritis**
- **Joint tumors & tumorlike conditions**
- **Soft tissue tumors:**
 - **Adipose tissue; fibrous tissue; skeletal muscle**
 - **Smooth muscle; tumors of uncertain origin**

E learning (will be sent to you too)

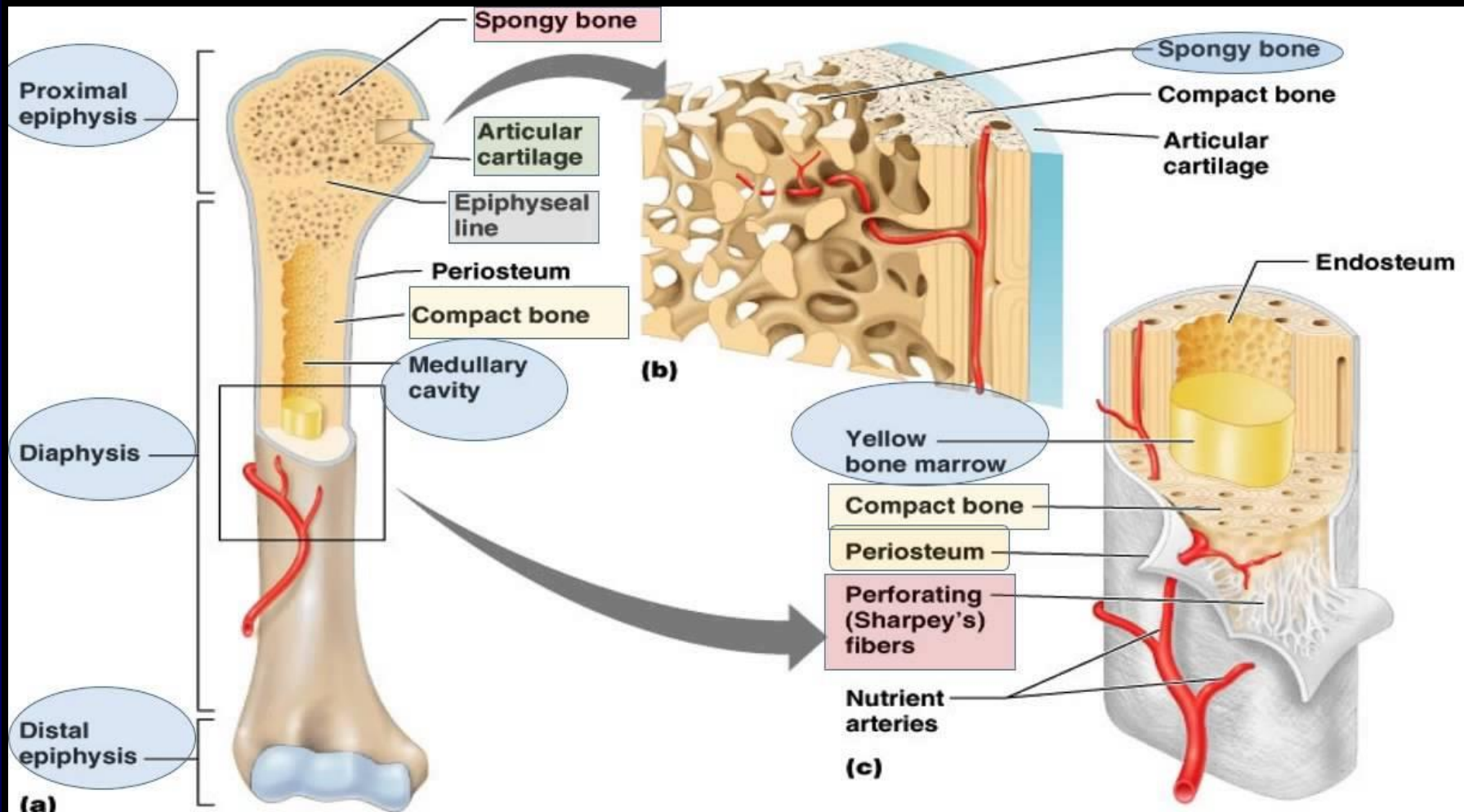
Bone development	https://www.youtube.com/watch?v=xXgZap0AvL0&ab_channel=INTELECOM
Osteoporosis	https://youtu.be/eT_G9NHlyV0 https://youtu.be/VwCkyf0lQwo
Osteoarthritis	https://youtu.be/BBqjlHNOrc https://youtu.be/pnKaBMvVUs0
Rheumatoid arthritis	https://youtu.be/Yc-9dfem3lM https://youtu.be/ld8PhyAHov8
Osteoarthritis vs rheumatoid arthritis	https://youtu.be/6lx_774GuTw
Osteomyelitis	https://youtu.be/mpUq6Ui6yew
Gout	https://youtu.be/bznoU5bke4U
Bone tumors	https://youtu.be/wezFzUX-UWY
Bone and soft tissue tumors	https://youtu.be/gPCzAdD6mlw
Soft tissue tumors	https://youtu.be/qpkPKk3HxUQ
Ossifications	https://youtu.be/Vwethc4jt7U https://youtu.be/vOKLFdP4pjE

BONE FUNCTIONS

- **Mechanical support**
- **Forces transmission**
- **Protection**
- **Mineral homeostasis**
- **Hematopoiesis**

BONE STRUCTURE

- **Matrix (osteoid 35% and minerals 65%):**
 - **Osteoid:** organic type I collagen and glycosaminoglycans & other proteins
 - **Inorganic hydroxyapatite** [$\text{Ca}_{10}(\text{PO}_4)_6(\text{OH})_2$]
 - **Woven vs lamellar bone**
- **Cells:**
 - **Osteoblasts:** forms bone
 - **Osteoclasts:** resorbs bone
 - **Osteocytes:** mature bone cells



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Structure of a Typical Long Bone

WOVEN VS LAMELLAR BONE

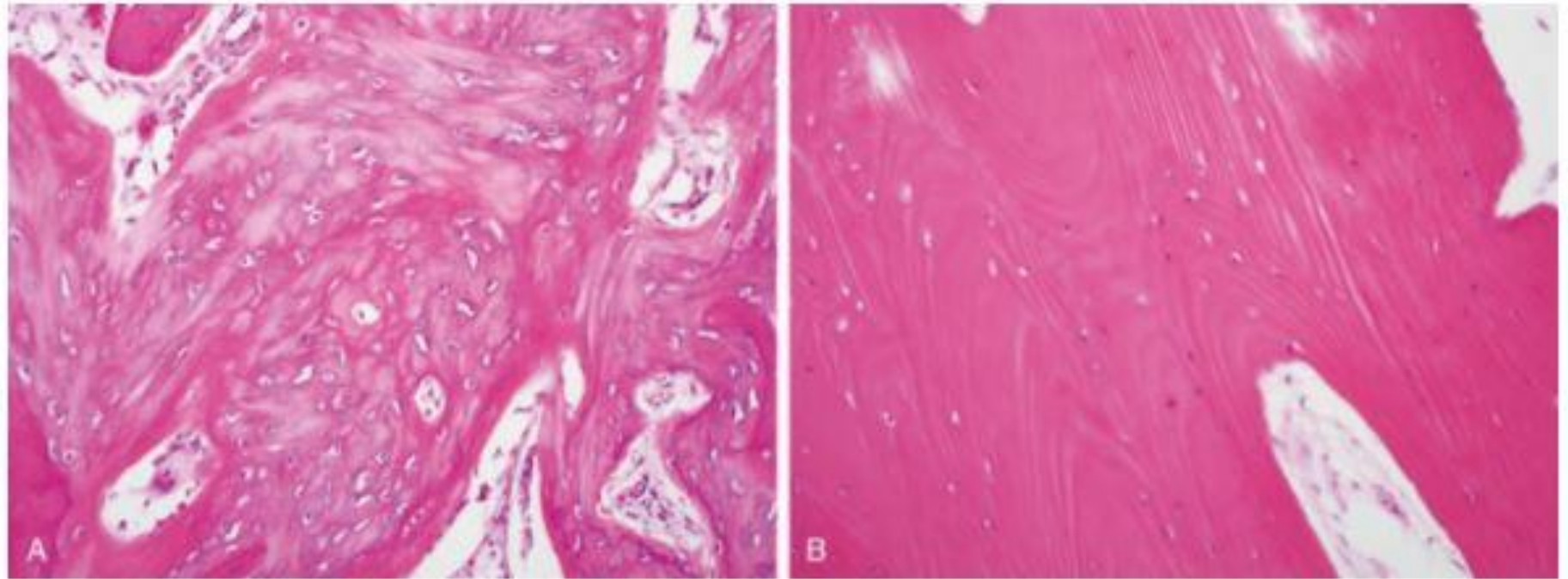

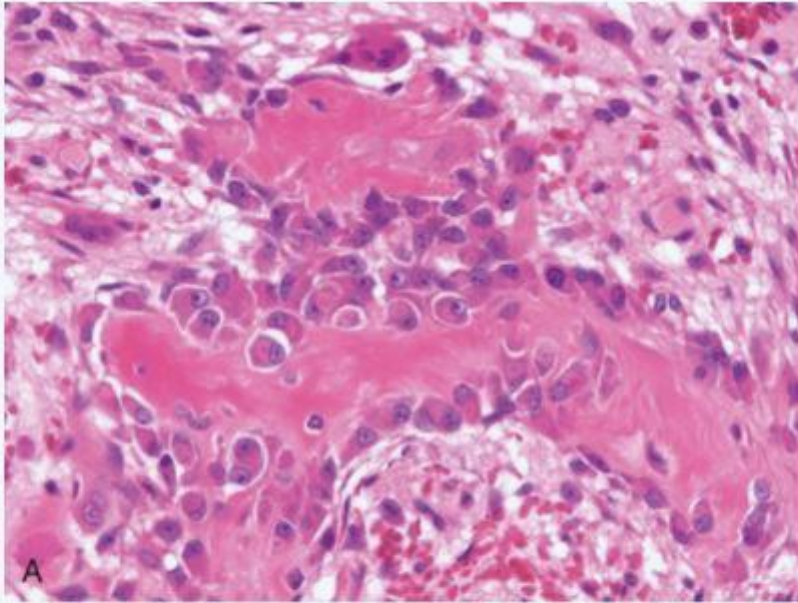
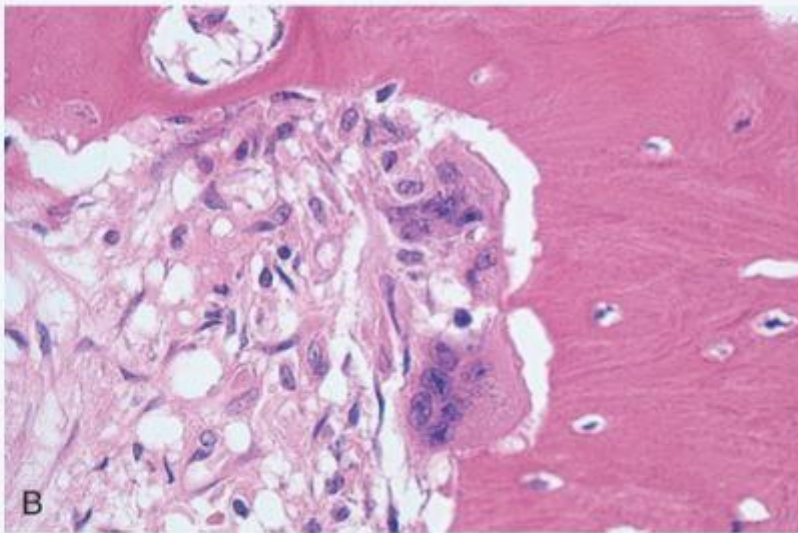


FIG. 21.1  Woven bone (A) is more cellular and disorganized than lamellar bone (B).



OSTEOBLASTS



OSTEOCLASTS

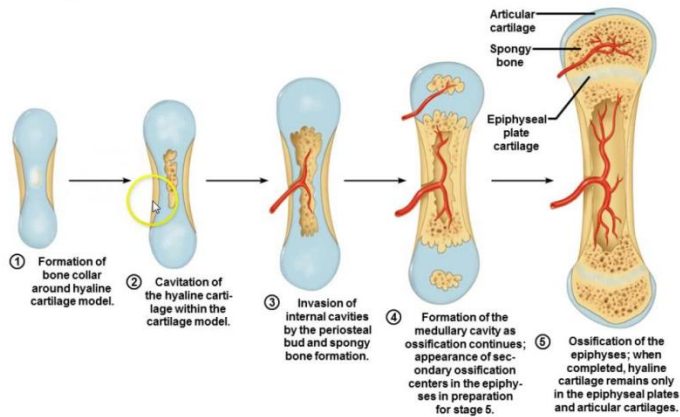
FIG. 21.2 (A) Active osteoblasts synthesizing bone matrix. The surrounding spindle c...

DEVELOPMENT

LONG BONES

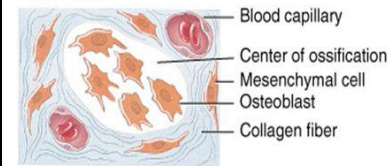
FLAT BONES

Stages of Endochondral Ossification

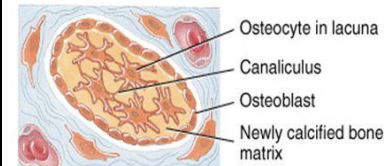


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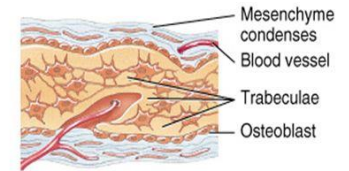
Intramembranous Ossification



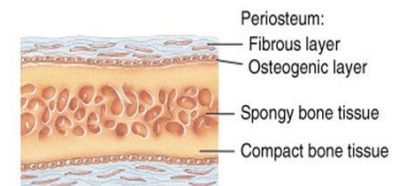
1 Development of center of ossification



2 Osteocytes deposit mineral salts (calcification)

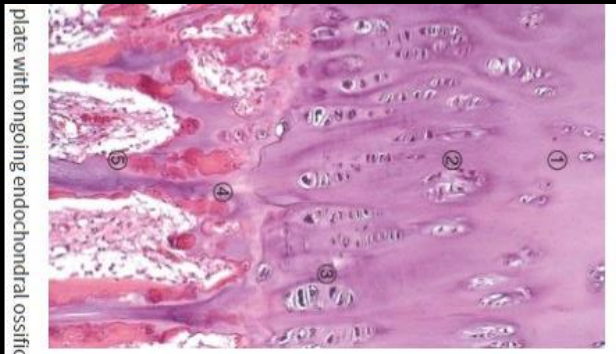


3 Formation of trabeculae



4 Development of periosteum, spongy bone, and compact bone tissue

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HOMEOSTASIS & REMODELING

- Continuous and dynamic complex process even in adult mature skeleton (microscopic level)
- Peak bone mass is reached in early adulthood after completion of skeletal growth
- Resorption > bone formation on 4th decade

+ Osteoclast differentiation

PTH

IL-1

Steroids

- Osteoclast differentiation

BMPs (bone morphogenic proteins)

Sex hormones (estrogen & test.)

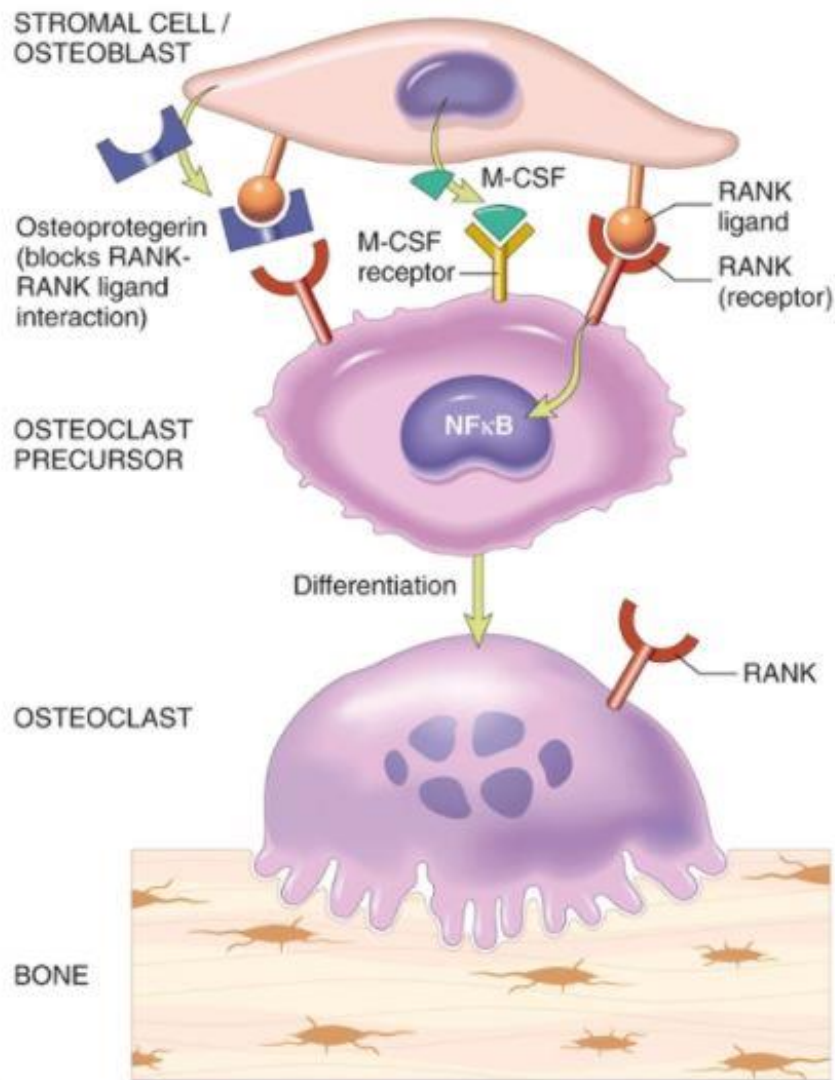


FIG. 21.4 Paracrine molecular mechanisms that regulate osteoclast formation and fun...