## Osteosarcoma

- most common primary malignant tumor of bone
- Malignant tumor that produces osteoid matrix or mineralized bone.
- Genes: RB / TP53: with Li-Fraumeni syndrome / CDKN2A / CDK4 / MDM2
- 75% of osteosarcomas occur in persons younger than 20 years of age.
- secondary osteosarcomas smaller second peak occurs in older adults suffer from conditions known to predispose to osteosarcoma such as : Paget disease, bone infarcts, and previous radiation.
- Metaphyseal regions of the distal femur and proximal tibia around the knee
- Men are more commonly affected than women
- XRAY: Codman triangle (triangular shadow between the cortex and raised ends of periosteum)

## Pathogenesis

**RB**

- regulator of the cell cycle

**TP53**

- guardian of genomic integrity by promoting DNA repair and apoptosis of irreversibly damaged cells.
- Mutation in TP53 causes Li-Fraumeni syndrome

**CDKN2A:** This gene encodes two tumor suppressors

- p16 (a negative regulator of cyclin-dependent kinases)
- p14 (which augments p53 function).

**MDM2** and **CDK4**

- cell cycle regulators that inhibit p53 and RB function, respectively
- overexpressed in many low-grade osteosarcomas