Primary bone tumors
Tumeurs osseuses primitives
Primitieve bottumors

Majority of these tumors occur in childhood and adolescence
- High level of metabolic activity -> profound osteoblastic response
  -> increased uptake of tracer

- Highly vascular: vascularity helps to delineate tumor size

- Local flush also noted in benign lesions: osteoid osteoma, ossifying fibroma (osteofibrous dysplasia)

- No uptake found in simple bone cyst

- Benign tumors: margins are clearly delineated
Benign tumors
- **Non ossifying fibroma**: radiologically confined to the cortex, mild or no increase at bone scan

- **Ossifying fibroma** (osteofibrous dysplasia): intense (though non specific) uptake on bone scan (generally localized in the cortex of the tibia)

- **Enchondroma**: formation of hyaline cartilage within bone (frequent: tubular bone of the hands). Can transform into chondrosarcoma

- **Osteochondroma**: metaphysis of long bones: projection covered with cartilage on external surface of bone, relatively mild uptake no vascular response

- **Chondroblastoma**: epiphysis of long bones, rare (1% of bone tu) mild scintigraphic uptake

- **Giant cells tumor**: frequently found around the knee, prox humerus
  Present with active uptake of tracer surrounding photopenic areas

Scan does not differentiate between be and ma tumor
Osteoid osteoma (frequent: 14% of benign tumors)

Pain occurring at rest, relieved by PG inhibitors (aspirine)
Bone scintigraphy mandatory (especially if radiological difficulties: spine, small bones)
Negative bone scan excludes the diagnosis
RX: lucent nidus surrounded by sclerosis
Bone scan: intense focus of uptake in the nidus (interest of intraoperative probe: precise localization and ensure complete excision)
Malignant tumors

**Osteogenic sarcoma** (osteosarcoma) (metaphyseal region of tubular bones)
Localized pain, swelling, loss of adjacent joint mobility
Increased vascularity
Poor definition of the margins of lesion at bone scan
Metastatic spread (osseous and extraosseous: lungs) not infrequent

**Ewing’s sarcoma** (diaphysis of tubular bones)
Intense accumulation with homogenous distribution, margins poorly delineated
Frequent metastatic spread

**Chondrosarcoma** (primary or secondary tumor arising out of Enchondroma)
Radiopharmaceutical uptake moderate to high, outlines mildly distorted
Coronal slices of pelvis showing an osteoid osteoma of right hip (arrow)
In case of surgery, the lesion can be precisely located by a probe
12 years old girl complaining from right knee pain
A primary tumor of the right tibia was found,
Corresponding to an ossifying fibroma.
Differential diagnosis with Ewing sarcoma was not possible on the basis of bone scan

Ewing’s sarcoma
Ossifying fibroma of the left tibia

Left: standard imaging, right: fusion SPECT/CT
Ewing’s Sarcoma of the right part of the pelvis
Ewing’s sarcoma of second dorsal vertebra (09 2002). Chemo/Radiotherapy
Development of metastases (11 2004) (left femur), note involvement of metaphyses
Eosinophilic granuloma
Note the lytic central area surrounded by important osteoblastic response
No other suspect lesions were found
Same pattern can be observed in histiocytosis X