A 17-year-old white boy presented to physician at Horizon hospital with a history of insidious, often transitory pain in the left knee, which had persisted over the last 6 months. He reported that he had been kicked on the knee during a high school soccer match, and he thought that the joint had never recovered from that insult. Over the last several weeks, the pain had become more persistent and intractable, and he thought that there was some swelling just below the knee.

On physical examination, the physician could palpate a hard, bony expansion in the proximal tibia. The mobility of the knee joint was normal. Radiographs revealed a large clear area in the tibia, which focally destroyed the cortex. A biopsy of the bone lesion and a chest radiograph were ordered.

The core biopsy specimen revealed varied histopathology. In some sections of the mass, malignant cells surrounded by osteoid predominated, whereas in other sections, malignant cells embedded in cartilaginous matrix predominated. In other sections, large numbers of giant cells were seen. This varied histologic profile presented a diagnostic dilemma to the junior pathology resident. He scheduled a consultation with the attending orthopedic pathologist to help formulate a final diagnosis.

Questions:
1- What is the likely diagnosis by the consultant?
2- What is the significance of trauma in this case?
3- Is this tumor a primary or secondary osteosarcoma?
4- Enlist some methods for diagnosis?
5- Which organ is the preferential site for metastases in patients with osteosarcoma?