

BONE METASTASES FACT SHEET

About Bone Metastases

Prevalence and Impact

- More than 10 million people worldwide have bone metastases.
- Approximately 452,000 people in the United States suffer from cancer with metastases to the bone.
- Approximately 50-80 percent of all those diagnosed with carcinoma are predicted to have metastases to bone at the time of their death.
- Certain cancers, like breast, prostate, thyroid, and lung are more likely to spread to the bone than others.

Tumor Type	Worldwide Incidence of Bone Metastases
Myeloma	95-100 percent
Breast	65-75 percent
Prostate	65-75 percent
Thyroid	60 percent
Lung	30-40 percent
Renal	20-25 percent

Source: Coleman RE. Skeletal Complications of Malignancy. *Cancer* 1997;80(suppl 8):1588-94.

For information about relevant clinical trials, go to www.rising-psa.com or call 1-800-536-8604

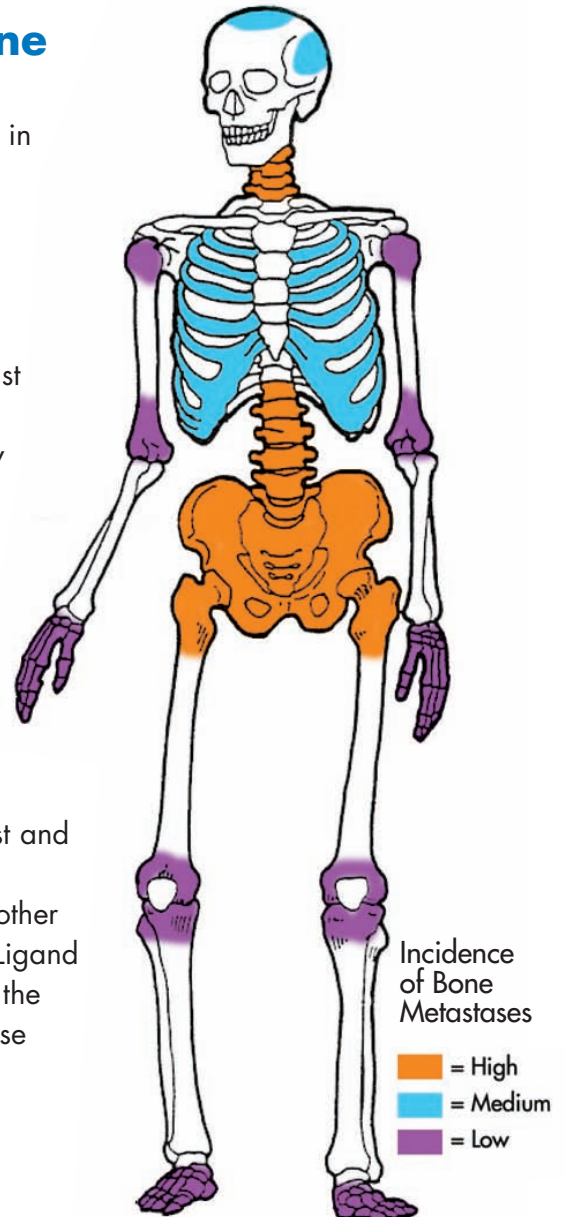
About Bone Metastases

Bone metastases are cancer cells that separate from tumors, enter the bloodstream or the lymph system, and migrate to bone tissue where they settle and grow. The tumor cells and bone cells interact, which may lead to the disruption of normal bone metabolism and cause an increase in osteoclast (cells responsible for bone resorption) activity. This interaction may stimulate tumor growth and bone destruction.

Vicious Cycle of Bone Metastases

Once tumor cells have settled in bone, they secrete growth factors that stimulate RANK Ligand production, promoting increased bone resorption. RANK Ligand acts as an essential mediator of osteoclast formation, function, and survival. This stimulation may lead to the release of other factors that further promote tumor growth, creating a vicious cycle of bone destruction and cancer cell proliferation. Inhibiting RANK Ligand may interrupt this vicious cycle.

Certain cancers such as breast and prostate are more likely to metastasize to the bone than other tumors. The action of RANK Ligand is believed to be important in the tissue-specific migration of these cancer cells to bone.



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Diagnosis

Bone metastases may be diagnosed by lab tests, x-rays, or bone scans. However, bone metastases often go undiagnosed until serious complications arise.

Complications

Bone metastases are one of the most frequent causes of pain in people with cancer and may lead to skeletal-related events (SREs), such as fractures; the need for bone surgery and radiation; and may lead to high levels of calcium in blood (known as hypercalcemia which may lead to nausea and loss of appetite). Symptoms of bone metastases include:

- **Bone pain:** Bone pain results from the pressure on the bone caused by tumor growth. It often begins as intermittent and then becomes chronic.
- **Broken bones:** The bones most likely to break are the long bones of the arms and legs and the bones of the spine.
- **Pressure on the spinal cord:** Pressure can be painful and damage the spinal cord so that the legs become numb or even paralyzed.
- **Hypercalcemia:** High levels of calcium are caused by release of calcium from broken bones. This can cause loss of appetite, nausea, thirst and tiredness, and can even lead to a coma if left untreated.

Current Treatments

Treatment for bone metastases depends on where the cancer began, which bones it has spread to, and whether any bones are weak or broken. It often depends on the type, size, location, and stage of the cancer as well as the person's age and general health. Surgery may often be the primary treatment. Other options include:

- **Bisphosphonates:** Bisphosphonates help reduce bone pain, slow bone resorption, and lower blood calcium levels.
- **Chemotherapy:** Chemotherapy drugs given orally or intravenously inhibit tumor growth and decrease pain.
- **Hormone therapy:** Some hormones promote the growth of certain cancers. Certain medications can be used to inhibit hormonal action on tumors and mitigate cancer growth.
- **Radiation therapy:** High-energy rays are used to destroy cancer cells or to slow their growth.