Mammary Tumors in Rodents
(Tumors or Cancer of Breast Tissue)

**Basics**

**OVERVIEW**

- Benign tumors or cancer (malignant tumors) of the mammary glands
- *Mammary* refers to a breast or mammary gland
- Rats—The hormone prolactin favors the growth of tumor cells. Because estrus (heat cycle) in rats happens every 3 to 5 days and stimulates release of prolactin, tumors grow rapidly. This growth can be accelerated by secretion of prolactin by the tumor itself, milk production, or a type of brain tumor called pituitary adenoma that secretes prolactin. Eighty percent of rat mammary tumors are benign (fibroadenomas) but can recur once removed. Twenty percent are malignant (adenocarcinomas); however, their potential for local invasion into muscles or surrounding tissues is slow, and metastasis (spread to distant sites) occurs late.
- Mice and gerbils—most mammary tumors are malignant (90% in mice), rapidly metastasize, are invasive, and are difficult to remove. In mice, tumor growth can be stimulated by the hormones prolactin, progesterone, and estrogen.
- Hamsters—most mammary tumors are benign

**GENETICS**

- In lab animals, it has been shown that certain strains of rats and mice are predisposed to developing mammary tumors.

**SIGNALMENT**

**Breed Predilections**

- Mammary tumors develop in 30% to 90% of intact female rats (depending on the strain of rat), and 0.5% to 16% of intact males. They are uncommon in rats younger than 1 year of age.
- Seen in 1%–6% of mice
- Tumors are rare in gerbils and hamsters.

**Mean Age and Range**

- Median age—1 to 2 years
- Uncommon in rodents less than 1 year old
**Predominant Sex**
- Female predominantly, but often occurs in male rats

**SIGNS**
- Single or multiple (less common) large, spherical, firm masses; usually not attached to deeper structures
- Growth can occur rapidly, becoming very large in a period as short as a few weeks.
- In rats and mice, tumors can be located on the neck, on the rear limbs on the underside of the body, over the shoulder regions, and on the flanks on the upper side of the body.
- In hamsters and gerbils, tumors are generally confined to the underside of the body on the chest and abdomen.
- Masses can become very large (up to one-third of the animal’s body weight) and can become ulcerated (superficial loss of tissue on the surface of the skin over the mammary tissue, frequently with inflammation)
- May be freely movable—implies benign behavior
- May be fixed to skin or body wall—implies malignant behavior or cancer

**CAUSES**
- In rats, many mammary tumors are caused by prolactin-secreting brain tumors (pituitary adenomas). There is a genetic predisposition in many strains.
- Mouse mammary tumor virus can cause the development of mammary adenocarcinoma and is passed through the placenta while in the womb and through the mother’s milk.

**RISK FACTORS**
- Intact female
- Chronic stress
- Obesity
- Prolactin-secreting pituitary tumor

**TREATMENT**

**HEALTH CARE**
- Surgery—Even very large masses are generally well tolerated by the animal; however, early surgical removal is recommended.
- Most are treated as outpatients following surgical excision.

**SURGICAL CONSIDERATIONS**
- Local surgical removal of a breast or mammary tumor (mastectomy), with wide and deep margins
- Spay or ovariohysterectomy (OHE) at time of surgical removal of the breast or mammary tissue (mastectomy) may enhance survival.

**MEDICATIONS**
- Medications presented in this section are intended to provide general information about possible treatment. The treatment for a particular condition may evolve as medical advances are made; therefore, the medications should not be considered all-inclusive.
- Chemotherapy with doxorubicin—reported to have induced partial remission in mice
- Chemotherapy with agents used to treat breast cancer in humans is generally not effective in rats, since agents in humans are generally used to block the effects of estrogens, not prolactin, which induces tumors in rats.

**FOLLOW-UP**

**PATIENT MONITORING**
- Postoperatively, monitor the suture line. Some rodents will chew sutures and open the wound. An Elizabethan collar may be needed.
- Monitor for signs of pain (reluctance to move, teeth grinding) postoperatively.
- Monitor the appetite.
- Recheck at 1 week to assess the healing of the surgical wound.
- See your veterinarian for a complete physical examination bimonthly to check for regrowth of tumors or new tumors.
PREVENTION/AVOIDANCE
• Ovariohysterecomy or castration may be helpful in preventing tumors or tumor recurrence after mass removal.

POSSIBLE COMPLICATIONS
• Infection following surgery
• Splitting open or bursting along the incision line (known as dehiscence) following surgery, especially if the pet chews on the sutures
• Regrowth of the tumors
• Distant spread of the cancer (known as metastasis) and death

EXPECTED COURSE AND PROGNOSIS
• The prognosis is fair in rats and hamsters, guarded in gerbils, and poor in mice.
• In rats, adenocarcinomas (malignant cancers) are rare but can spread to distant sites. Fibroadenomas (benign tumors) are common but do not spread. It is very common, however, for the tumors to come back, or for new tumors to develop.

KEY POINTS
• Always make a plan for evaluation and possible surgical removal of any lump in the mammary gland(s).
• Early detection and surgical intervention is best.
• Spaying after lump removal decreases the likelihood of developing new breast or mammary tumors.