

Tumors of the Nervous System

- Neuroglial tumors
- Neuronal tumors
- Choroid plexus tumors
- Mesodermal tumors
- Schwann cell tumors

NEUROGLIAL TUMORS

Astrocytoma

Oligodendroglioma

Ependymoma

Astrocytoma

- It originates from [astrocytes](#).
- Tumor is commonly found in the hemispheres of the brain, but may also be found in the thalamus, brain stem, cerebellum and spinal cord.
- Differentiated/Indifferentiated

Oligodendroglioma

- The tumor originating from oligodendroglia develops in the white matter of the hemispheres, in the frontal lobe. Sometimes it can also reach to ependymal or meningeal surfaces.

Ependymoma

- The tumor originating from the ependymal cells grows into the ventricles and metastasizes with the cerebrospinal fluid.

NEURONAL TUMORS

- ❑ Neuroblastoma

- ❑ Cerebral Neuroblastoma (Medullablastoma)

- ❑ Ganglioneuroma

(These tumors, which are very rare in pets, originate from primitive neuroepithelial cells.)

KOROID PLEXUS TUMORS

- ❑ Choroid plexus papilloma

- ❑ Choroid plexus carcinoma

(It can be seen everywhere where the choroid plexus is present, but it develops mostly in the fourth ventricle.) Papillomas are common, and carcinomas are rare.

MEZODERMAL TUMORS

- Meningioma

Meningioma

- The tumor originating from the leptomeninges is more common in the basal part of the brain. Sometimes it can be formed on the spinal cord or the optic nerve.
- Meningioma can be seen in dogs (7 years and over) and cats (9 years and older), is rarely encountered in sheep, horse and cattle.

SCHWANN CELL TUMORS

Schwannoma (Neuroma)

Neurofibroma

Neurofibrosarcoma

SCHWANN CELL TUMORS

- Tumors originating from Schwann cells in the peripheral nerve sheath are often found in older dogs (approximately 8 years old) and in older cattle (and sometimes in younger ones).
- The majority of tumors are seen in the skin. However, it can be found anywhere in the peripheral nervous system.

SCHWANN CELL TUMORS

- The tumors originating from Schwann cells are Schwannoma (Neuroma) - Neurofibroma - Neurofibrosarcoma and the microscopic structures of these tumors are very similar.

Lymphoid and Hematopoietic Tissue Tumors

- Lymphoid Tissue Tumor
(Lymphosarcoma)(=Lymphoma)(=Malignant lymphoma)
- Hematopoietic Tissue Tumors
Myoproliferative Disorders

Lymphosarcoma

- **They are classified in five groups according to their anatomical location;**

- **Multicentric lymphosarcoma**
- **Thymic lymphosarcoma**
- **Alimentary lymphosarcoma**
- **Dermal lymphosarcoma**
- **Solitary lymphosarcoma**

- **Cytologically, lymphosarcomas are classified as follows;**

- **Stem cell type (undifferentiated)**
- **Histiocytic type (reticulum cell)**
- **Lymphoblastic type (lymphocytic, less differentiated)**
- **Lymphocytic and proliferative type (well differentiated)**
- **Hodgkin-like type**

Lymphosarcoma (dog)

- It is a common tumor in dogs.
- Approximately 10% of tumor cases occur between 1-4 years, 80% between 5-11 years. The incidence decreases at older ages. Boxer breed is more sensitive than other races.
- The time between diagnosis and death of the tumor is 10 weeks in multicentric form and 8 weeks in alimental form. Dogs with lymphosarcoma over 12 years can live for a long time.

- Clinical findings *vary* according to *tumor type*.
- Bilateral - symmetric growth (normally 3 to 10 times) is noted in superficial lymph nodes in **multicentric form**.
- The cortex-medulla can not be distinguished on cut surfaces and it is pink-gray or cream color.
- In addition, **edema** is seen in lower jaw, leg, external genital organs, ventral sternum.
- Liver, spleen and even kidneys can grow diffusely or with multiple nodules.

Lymphosarcoma (dog)

- In the **alimentary form**, gastrointestinal tract obstruction, diarrhea and vomiting may develop.
- Growth of superficial lymph nodes and spleen are rarely seen.
- Microscopically; Polymphocytic, histiocytic, and lymphoblastic cell types *proliferate to close lymph node's general structure*.
- Similar cell proliferation can also be seen in the liver, kidney, lung, and intestine.

Lymphosarcoma (cat)

- It is the most common tumors.
- 50% of the cats with tumors are under 5 years of age (tumors may develop even in 6 months of age).
- The male cat is more sensitive than female ones.
- In cats, the agent of lymphosarcoma is a **retrovirus** (Feline Leukemia Virus-FeLV).
- The most common type in cats is **alimentary type**.
- It is followed by thymic, multicentric, leukemic and solitary types.

Bovine leukosis

- This disease, which is seen in many parts of the world and in our country, is actually a **lymphosarcoma**.
- It is seen as Sporadically in youngs, Enzootically in olds.
- The agent of Enzootic leukosis is "**Bovine Leukemia Virus**" of **retrovirus**.
- It is seen mostly in 5-8 years of age, there is growth in superficial lymph nodes in multicentric form.

Bovine leukosis

- The location of the tumor may vary according to the age of the animal.
- In young cattles (6-30 months), mostly *thymic form* is observed. Also, multicentric form, which also affects the hemopoietic tissue, is seen.
- In such animals, growth can occur in all lymph nodes, with extensive infiltrations in the bone marrow, and about half of the cases lesions can be observed in the thymus, heart, liver, spleen, kidneys and uterus.

Bovine leukosis

- In the aged animals, mostly multicentric form is found. Lymph nodes, heart, abomasum, kidneys, uterus, epidural fat tissue of the medulla spinalis, intestines, liver and spleen are the most affected areas.
- In the less common skin form, nodules develop in the head, neck, trunk and perineal region, but can be regressed with time.

HEMOPOIETIC TISSUE TUMORS

Myoproliferative Disorders

This term is used to describe the persistence and irreversible proliferation of more than a half of the elements in the bone marrow. It is a rare neoplastic lesion that can be seen in animals.

Granulocytic leukemia
Monocytic leukemia
Erythroleukemia
Erythraemic myelosis
Polycythemia vera
Megakaryocytic leukemia
Idiopathic
Thrombocythemia
Myelofibrosis

TERATOMA

- Teratomas are embryonal tumors that arise from germ cells. They are defined as being composed either of tissues that derive from all three of the germ layers (*ectoderm, endoderm and mesoderm*).
- A **teratoma** is a tumor made up of several different types of tissue.
- These tumors contain **hair**, **nerveous tissue**, glandular or epithelial lining of **bronchi**, **intestinum**, etc...

TERATOMA

- Teratomas are more common in the ovaries, testes, pharynx and sacrum of horses.
- It has been reported that one of four cases in horses are seen in cryptorchidic testes.
- Tumor macroscopically; round-oval, irregularly shaped, encapsulated or non-encapsulated. There may be cystic structures on the cross section.
- The teratomas in animals, unlike those in humans, are mostly benign. It can be taken by operation. However, it can sometimes metastasize by acquiring malignancy.

CANINE TRANSMISSIBLE VENEREAL TUMOR (CTVT)

- Also called as *Venereal granuloma, Sticker sarcoma, Histiocytoma, Contagious venereal tumor, Lymphosarcoma.*
- The cellular origin of the tumor **is not exactly known**. It was thought to originate from cells such as *lymphocytes, histiocytes, reticulum cells*, but the exact origin could not be determined.

CANINE TRANSMISSIBLE VENEREAL TUMOR (CTVT)

- The tumor can be transmitted by coitus directly through living tumor cells transplantation.
- Macroscopically; masses are in cauliflower appearance, sometimes with stalk, nodular, multilobulated, friable, hemorrhagic.

CANINE TRANSMISSIBLE VENEREAL TUMOR (CTVT)

- It is 0.5-10 cm in size, the surface may become ulcerated and secondary infections may develop. The tumor is formed in the vulva and vagina in female dogs and in the penis and preputium in male dogs. Sometimes, it can develop on the skin.

CANINE TRANSMISSIBLE VENEREAL TUMOR (CTVT)

- Tumor cells are uniform, round, oval or polyhedral.
- It has a hyperchromatic-large nucleus and has eosinophilic cytoplasm.
- Tumor cells arranged or grouped in *cords* interspersed with a thin connective stroma.
- Mitotic figures are common.
- Necrosis and hemorrhage may be seen in the tumor.

CANINE TRANSMISSIBLE VENEREAL TUMOR (CTVT)

- The CTVT cells have fewer [chromosomes](#) than normal cells. Dog cells normally have 78 chromosomes; The cancer cells contain **59 ± 5** chromosomes.

- The tumor was treated weekly with intravenous *vincristine*.
- Dramatic reduction in tumor size occurs after the first dose.