# Etiology of tumors

- **Intrinsic factors (Predisposition)**
- Extrinsic factors

# Etiology of tumors

- **Predisposition:**

❖Age

❖Breed

❖Sex

❖Organ

❖Inheritance

# Etiology of tumors

- **Age:** Tumors occur in all ages, but usually in the elderly. While it is unknown why tumors are more common in older ages, the following points are emphasized:
  - Tumors need a latent period for development. With the advance of age, the tumors that have the longest latency period can have a chance to appear.
  - Long-lived organisms are more exposed to cancer-causing agents.
  - Older tissues may become more susceptible to cancer formation.
  - Hormonal imbalances occur at advanced ages.
  - At advanced ages, the immunity system may weaken and tumor formation may become easier.

In cats and dogs:
6-14 years old

In horse and cattles:
5-14 years old

# Etiology of tumors

- **Breed**
- Squamous cell carcinomas are very common in Hereford cattle because of lack of **pigment** around their **eyes.**
- Osteosarcomas are more common in large breed dogs (St. Bernard and Great Dane)
- Mammary cancers in dogs and cats,
- Penis cancers in horses,
- Mast cell tumor in boxer dogs are seen.

# Etiology of tumors

❖**Sex**

- Female **dogs** have more tumors than males
  (bacause of the large number of mammary tumors)
- In male **cats**, more tumors are formed than in females
  (because the large number of lymphoma in male cats)

# Etiology of tumors

❖ **Organ:**

❑ Human

♂ lung, skin and prostate cancers

♀ mammary cancers are more common.

❑ Dog

Basal cell carcinoma

Sweat gland cancer (skin)

Mast cell tumor (skin of hind limbs)

Bowel cancer (jejunum-rectum)

❑ Cat

Lymphoma (intestine or mediastinal lymph node)

❑ Horse

Papilloma (around the lips and nose)

Melanoma (periphery of the anus)

# Etiology of tumors

❖**Inheritance:**

Some individuals are more prone to cancer than others.

In humans, familial predispositions have been identified in terms of ovarian, mammary gland, colon, prostate tumors and malignant melanomas.

# Etiology of tumors

- Intrinsic factors
- **Extrinsic factors**

# Etiology of tumors

**Extrinsic factors:** The factors that cause cancer in humans and animals are called *carcinogens* or *oncogenes*.

- **Physical causes**
  a) Chronic irritations and trauma
  b) Ultraviolet rays
  c) X-rays
  d) Heat
- **Chemical causes**
  a) Polycyclic aromatic hydrocarbons
  b) Aromatic amines
  c) Azo pigments
  d) Other chemical substances
- **Oncogenic (cancer-causing) viruses**
- **Parasites**
- **Hormones**

# Etiology of tumors

## ❖Physical causes

Chronic irritations and trauma: These are mechanical effects such as pressure and friction. Respectively; tissue loss, chronic inflammation, regeneration, and neoplastic devolopment are formed.

- Nasal rings lead to fibroma in bulls
- Ear tags leads to papillomas in cattles
- Stomach ulcers may turn into carcinoma over time
- Osteosarcomas can be formed in fractures of long bones

# Etiology of tumors

## ❖Physical causes

Ultraviolet rays:

- In seamans and farmers working for long periods in the field, hyperkeratosis and hyperpigmentation especially in the hands and on the faces, are firstly formed. Over time, skin cancers can develop.
- Ultraviolet rays with a spectrum of 2800-3200 Aº have a carcinogenic effect.
- Skin cancers are more common in animals with light-skinned (have less pigment).

# Etiology of tumors

## ❖Physical causes

X-rays:

- Due to the lack of good protection of workers with x-rays, especially in the hands, firstly radiodermatitis and later skin cancers were seen as an occupational disease. Likewise, it has been observed that the incidence of leukemia is high among radiologists.
- Today, by taking the necessary precautions and using more advanced x-ray devices, the carcinogenic effect of x-rays has been reduced or eleminated.

# Etiology of tumors

## ❖Physical causes

**Heat:**

- Squamous-cell carcinoma of the skin occurs on the lower abdomen and inner thighs and is due to the use of a **kangri**, a baked clay pot weaved around with wicker-work, used as a source for warmth by people in Kashmir during cold weather (Kashmir/Indian, 1881) **(Kangri cancer).**

# Etiology of tumors

**Heat:**

- It is believed that the lower lip carcinoma in the pipe drinkers is formed by the warm effect of the pipe.
- Native Venezuelans smoke cigarettes by putting the burning side into the mouth to breathe much more smoke. In these people, palate cancer has been detected more frequently. It is suggested here that the role of tar is also effective.

# Etiology of tumors

## ❖Chemical causes

More than 700 chemical substances are known to be carcinogenic.

The idea that chemicals can make cancer was first proposed by British surgeon Percival Pott in 1775.

Pott suggested that scrotum cancers were common among chimney sweepers (6-10 years of age) because of exposure to coal or heat.

140 years after this observation, scientists started new research about cancer caused by tar.
In 1915, Yamagiwa and Ishikawa successfully induced **squamous cell carcinoma** by painting crude **coal tar** on the inner surface of rabbits' ears.

# Etiology of tumors

## ❖Chemical causes

a) Polycyclic aromatic hydrocarbons: They are strong carcinogenic chemical substances obtained from coal tar.
b) Aromatic amines: They are organic compounds consisting of an aromatic ring attached to an amine.
c) Azo pigments: Azo pigments are important in a variety of plastics, rubbers, and paints (including artist's paints).
d) Other chemical substances

# Etiology of tumors

❖**Oncogenic viruses**

| Virus | Genus | Tumor |
|---|---|---|
| DNA Virus | | |
| Adenovirus | Hamster | Various experimental tumors |
| **Herpesvirus** | | |
| **Marek virus** | **Chicken** | **Lymphosarcoma** |
| Rabbit herpesvirus | Rabbit | Lymphosarcoma |
| Guinea pig herpesvirus | Guinea pig | Lymphosarcoma |
| Herpesvirus Saimiri | Primates | Lymphosarcoma |
| Epstein-Barr virus | Human | Burkitt lymphoma |
| | | Nasopharyngeal carcinoma |
| Lucke virusu | Frog | Renal adenocarcinoma |
| Papovaviruses | | |
| Simian Virus 40 (SV40) | Hamster | Experimental sarcomas |
| Polyoma virus | Mouse | Numerous experimental tumors |
| **Papillomavirus** | **Cattle, Dog, Rabbit, Human** | **Papilloma** |
| Poxvirus | | |
| Yaba virus | Rhesus monkey | Histiocytoma |
| Shope fibroma virus | Rabbit | Fibroma, Mixomatosis |
| RNA Virus | | |
| **Retroviruslar** | Chicken | Lymphosarcoma, Sarcomas (Leukosis coplex and Reticuloendothelosis) |
| | **Cat** | **Fibrosarcoma, Lymphosarcoma, Leukemia** |
| | Mouse | Lymphosarcoma, Leukemia, Mammary tumors |
| | reptiles | Sarcomas |
| | Cattle | Lymphosarcoma |
| | **Sheep** | **Pulmonary adenomatosis** |
| | Human | T-cell tumors |

# Etiology of tumors

## ❖Parasites

- ❑ Gangylonema neoplasticum - Rat - Stomach - Papillomas and carcinomas
- ❑ Cysticercus fasciolaris - Rat - Liver - Sarcoma
- ❑ Eimeria stidae - Rabbit - Bile ducts - Papillary adenom
- ❑ Cnemidocoptes mutans - Chicken - Leg skin - Carcinoma
- ❑ Spirocerca lupi - Dog - Esophagus - Fibrosarcoma
- ❑ Gastrophilus horses - Horse - Stomach - Papillomas and carcinomas
- ❑ Clonorchis sinensis - Cat / Dog - Biliary tract - Cancer
- ❑ Schistosoma hematobium - Human – Urinary bladder- Cancer
- ❑ Schistosoma japonicum - Human - Rectum - Cancer

# Etiology of tumors

❖**Hormones**

- ❑Mammary cancer has been formed in mice given estrogen for a long time. Likewise, mammary cancer also occur in women with estrogen hormone **.**
- ❑Women who use diethylstilbestrol (DES) during their pregnancy can develop vaginal cancer when their daughters are 15-20 years old.
- ❑It is known that the hormonal state is effective in the development of canine mammary tumors.

# The clinico-pathological effects of tumors

- Local Effects
- Systemic Effects
  - Cachexia
  - Hypoglycemia
  - Anemia
  - Clotting disorders
  - Hyperglycemia
  - Ectopic hormone syndromes
  - Diarrhea
  - Fever
- Neuropathic Effects

# Treatment of tumors

- Surgical treatment

  Curative - Preventive - Diagnostic - Palliative

- Radiotherapy
- Chemotherapy
- Hormone therapy
- Immunotherapy