Tumour pathology 1

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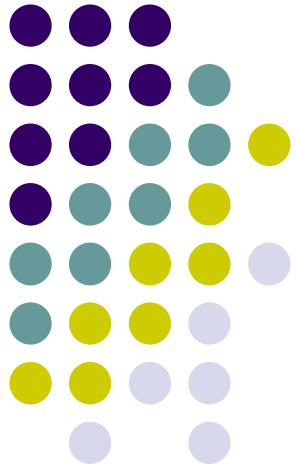
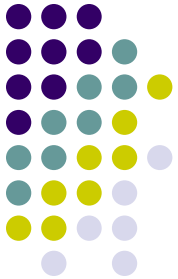
Dept. of pathology



Objectives

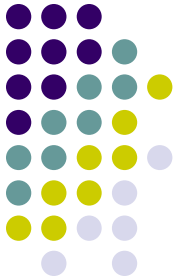
- Definition of neoplasia
- Epidemiology and predisposition to neoplasia
- Nomenclature of tumors

Neoplasia



- New growth
- Neoplasm/tumour
- Oncology(‘ oncos’ - tumor) – study of tumours

Neoplasia - definition



- British oncologist - Willis
- ‘Neoplasm is an abnormal mass of tissue ,the growth of which exceeds and is uncordinated with that of normal tissue, persists in the same manner after cessation of the stimulus which evoked the change’

Neoplasia

- Proliferation → abnormal
  - excessive
  - uncordinated
  - autonomous
  - purposeless

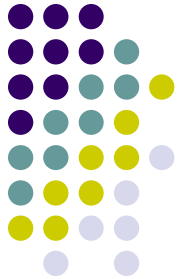
- Growth continues after the removal of the signals which initiated

Neoplasia

- Genetic alterations

- Excessive and unregulated proliferation
- No control by physiological growth regulation stimuli
- Cells proliferate regardless of the local environment or host factors
- Tumours are clonal – Entire cell population of cells in a tumour arises from a single cell

Epidemiology and cancer incidence



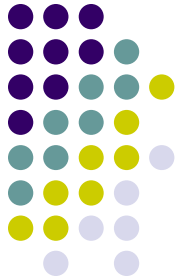
- National cancer registers are maintained in each country- incidence and the mortality rates
- Cancer incidence change with time due to many factors-

➢ Detections of predisposing factors and

‘ adjusting life styles

➢ Tests to detect preneoplastic stages and early cancers reduce the incidence of certain cancers-pap smears ,mamogram etc

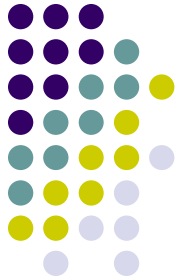
Epidemiology and cancer incidence cont



Many factors play a role

- A) Geographical and environmental factors
- B) Age
- C) Genetic predisposition
- D) Nonhereditatory factors -Premalignant and predisposing conditions

A)Geographical and environmental factors



- Climate , soil , water , diet , habits and customs
- Cigarette smoking
- Tobacco
- Betal nut
- Industrial factors – Arsenic,asbestos
- Constituents on diet –Low fiber diet , diet rich in animal fat

A)Geographical and environmental factors cont.

- Europeans and Americans – lung, breast , colon
- Africans – Skin ,cervix
- Japanese - Stomach
- Indians – Cervix , breast

B)Age

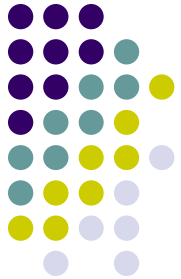
- Most cancers occur in late life(>55 yrs)
- Reasons – accumulation of somatic mutations and reduced immune competence
- Children also affected with different tumours

eg – Leukaemias

Primitive neoplasms – Neuroblastomas

Retinoblastomas

C) Genetic predisposition to cancer

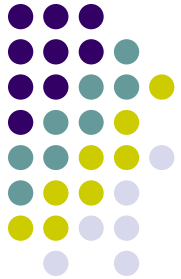


- < 10% (or even less) have inherited mutations that predispose to cancer

1) Autosomal dominant inherited cancer syndromes

- Usually involves a point mutation of a tumour supressor gene
  - Retinoblastoma (RB gene)
  - Familial adenomatous polyposis (APC gene)
  - Li- Fraumeni syndrome (p 53)

2) Defective DNA repair syndrome

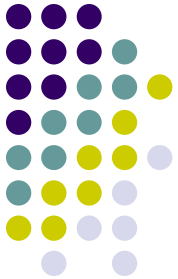


- Group of cancer predisposing conditions characterized by defective DNA repair with resultant DNA instability
- Usually has a AR inheritence
  - Ataxia telengiectasia
  - Xeroderma pigmentosum
  - HNPCC (Hereditary non-polyosis colonic cancer)

3) Familial cancers

- Cancer occur at higher frequency in certain families without a clearly defined pattern of transmission
- Colon , breast , ovary ,brain, melanoma,lymphoma
- Early age at onset
- Occuring in two or more close relatives
- Multiple / bilateral cancers

D)Nonhereditory predisposing conditions- precancerous conditions

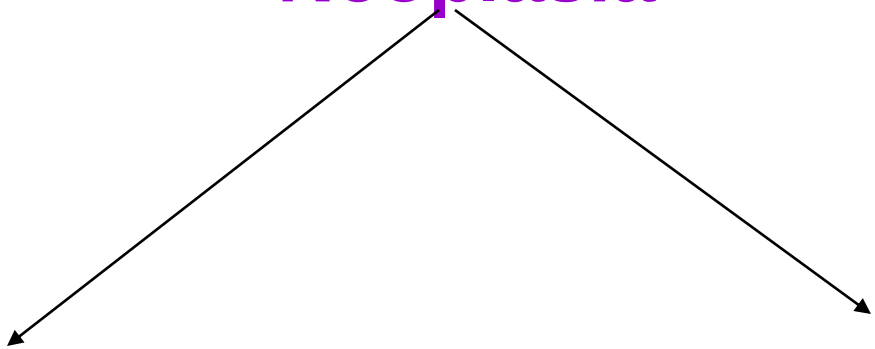


- Majority will not give rise to cancers
- However there is an increased risk of cancer

Eg-

- Chronic atrophic gastritis of pernicious anaemia
- Solar keratosis of skin
- Ulcerative colitis
- Leukoplakia – oral cavity , vulva , penis
- Cirrhosis
- Villous adenoma of the colon
- Cervical intraepithelial neoplasia
- Ductal carcinoma in situ

Neoplasia



Benign

- Slow growing
- Localized
- Not much harm

Malignant

Rapidly growing

Spreads

Death

(Cancer – crab)

Neoplasia

- Components of a tumour-
  - Neoplastic cell population
  - Supportive framework –connective tissue and blood vessels

- ‘oma’ – usually to benign tumours
- Carcinoma – epithelial malignancy
- Sarcoma -Malignant mesenchymal tumours

Nomenclature

- Why is it important

- It is the language by which the nature and the significance of tumours are categorized.

Nomenclature

- Cell of origin/microscopy/macroscopy used for the nomenclature

Benign tumours

- Cell of origin

  Epithelial – adenoma
- Cystic epithelial tumours - Cystadenomas
- Finger like projections (Macro/micro) – Papilloma

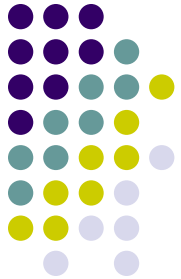
Nomenclature

Malignant

- Sarcoma (Greek Sar = fleshy) –Malignant mesenchymal tumour

- Carcinoma – malignant cells derived from any epithelium of the three germ cell layers

Nomenclature of tumours cont.



Malignant tumours with –oma

- Seminoma
- Melanoma
- Mesothelioma
- Lymphoma

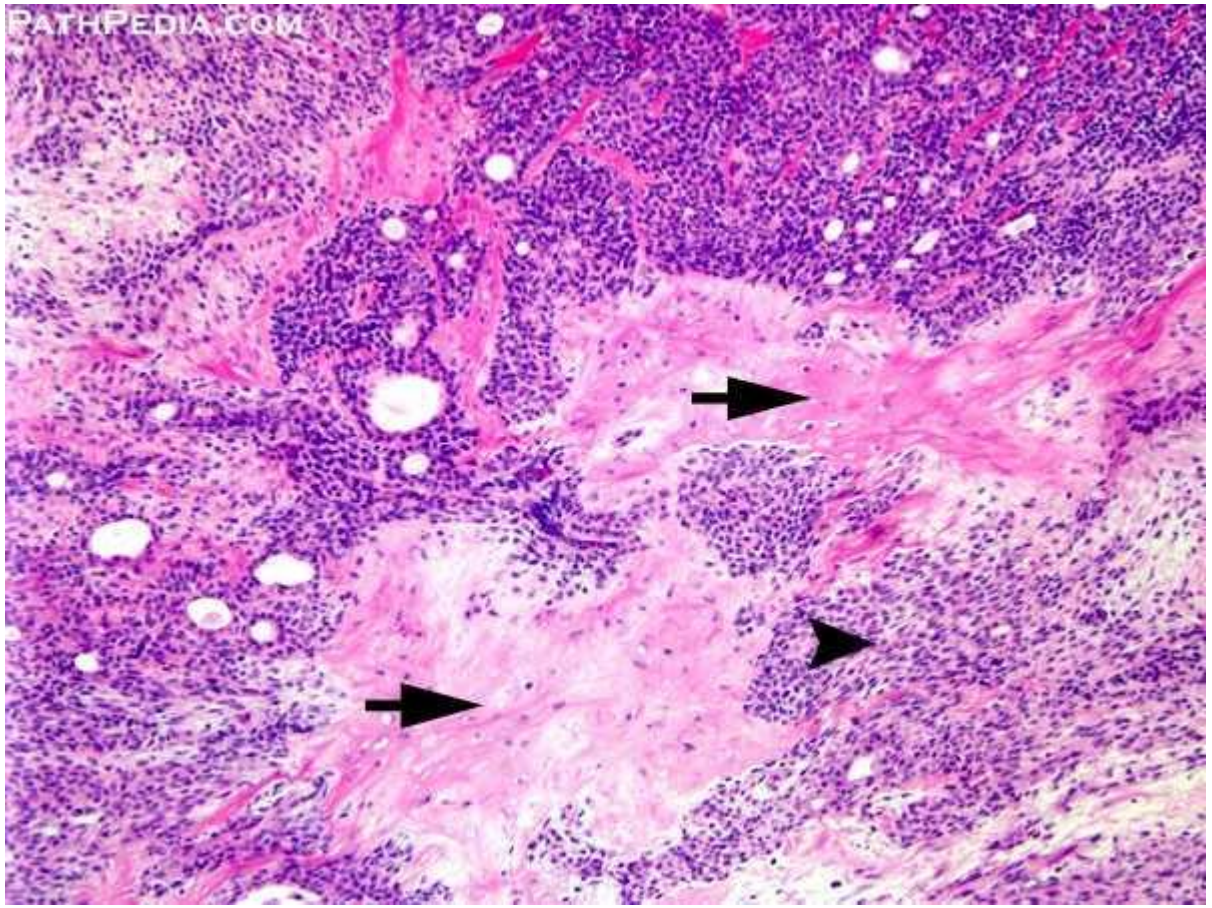
Special categories of tumors

1)Mixed tumors

- Neoplasms are monoclonal
- Divergent differentiation of a single neoplastic clone along two lineages – Mixed tumours
- Mixed tumour of the salivary gland

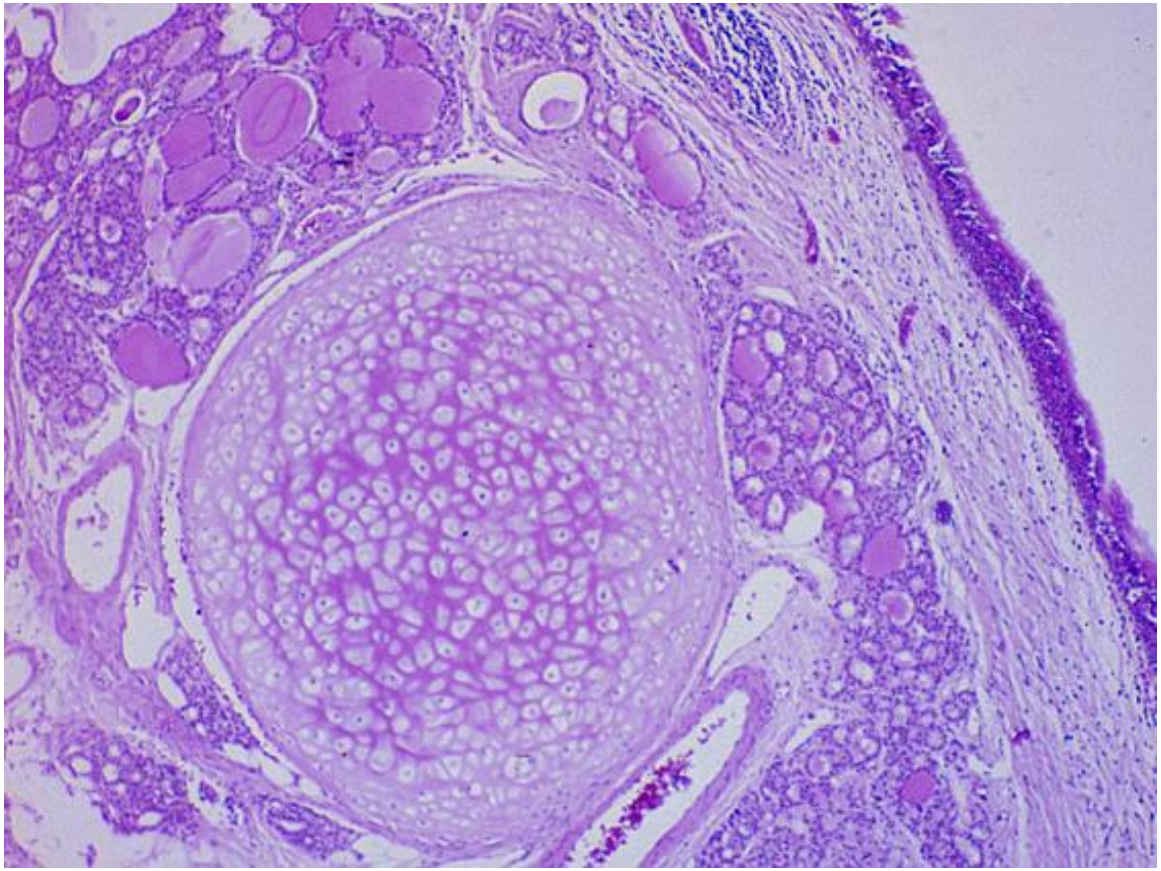
2) Teratoma

- Mixture of tissue types-ectoderm
  mesoderm
  endoderm
- Benign/ malignant



Pleomorphic adenoma of the salivary gland

Both epithelial and mesenchymal elements are seen

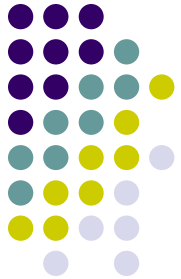


Teratoma

Tumour of more than one germ cell origin

Originate from totipotential cells – ovary and testis

Special categories of tumour cont.



3)Blastoma

- Tumours arising from embryonal/partially differentiated cells
- Affected age group < 5 years usually

eg - Nephroblastoma

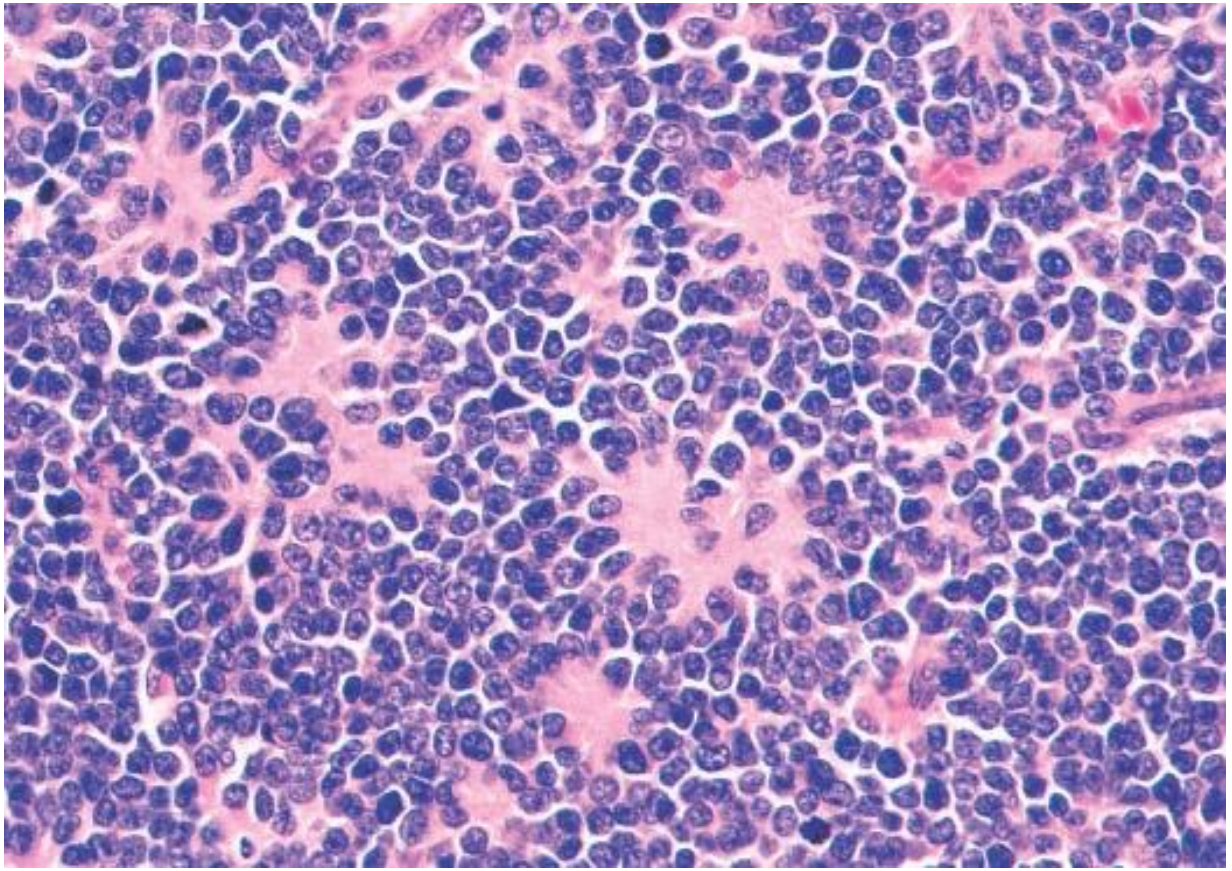
Neuroblastoma

Hepatoblastoma

Medulloblastoma

Choriostoma –not a tumour

Ectopic islands of normal tissue

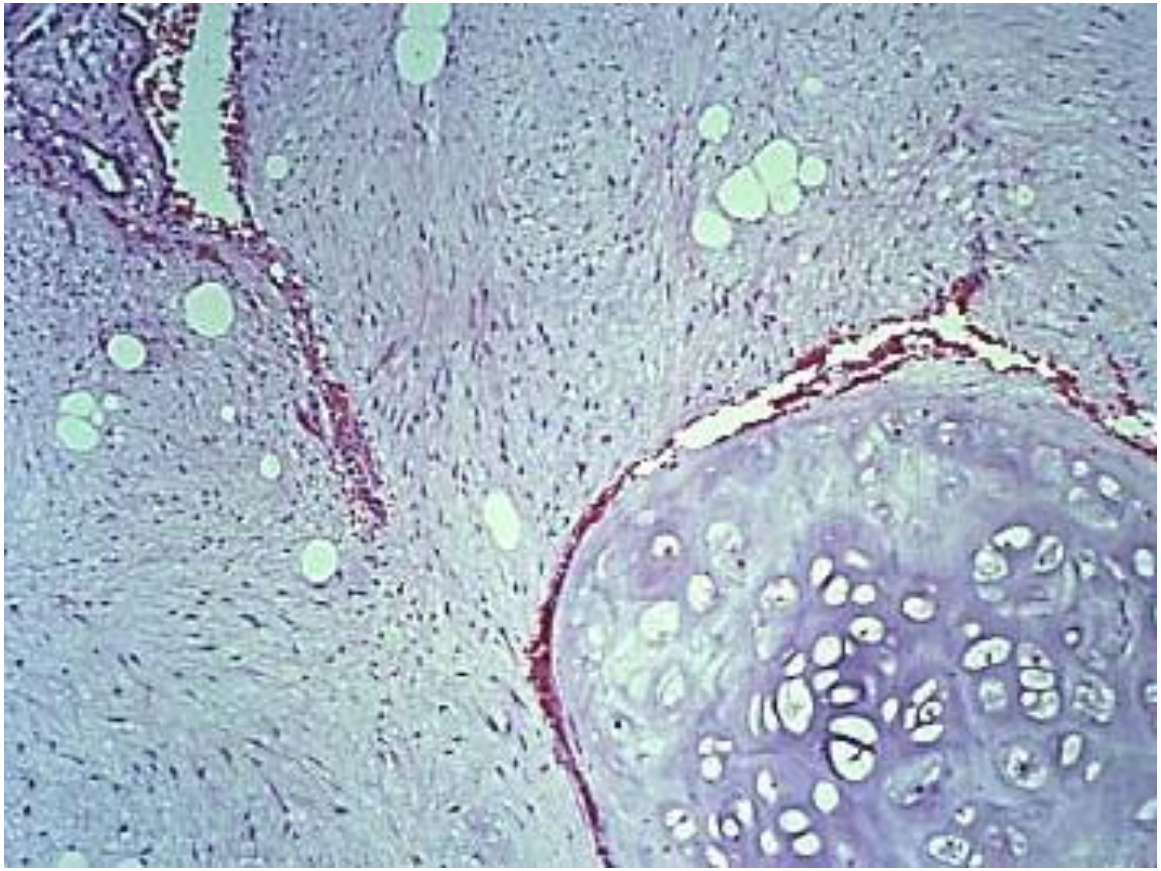


Blastomas

Neuroblastoma

Hamartoma

- Disorganized arrangement of tissue of a particular site (cells/ tissue are indigenous to that site)
- Initially thought as malformation
- Now – clonal rigin



Hamartoma – Chondroid hamartoma of the lung

Cartilage fat and respiratory epithelium found in normal lung tissue arranged in a disorganized pattern

Choriostoma

- Not a tumour
- Heterotropic rest – Focus of tissue from another organ

Nomenclature of tumours

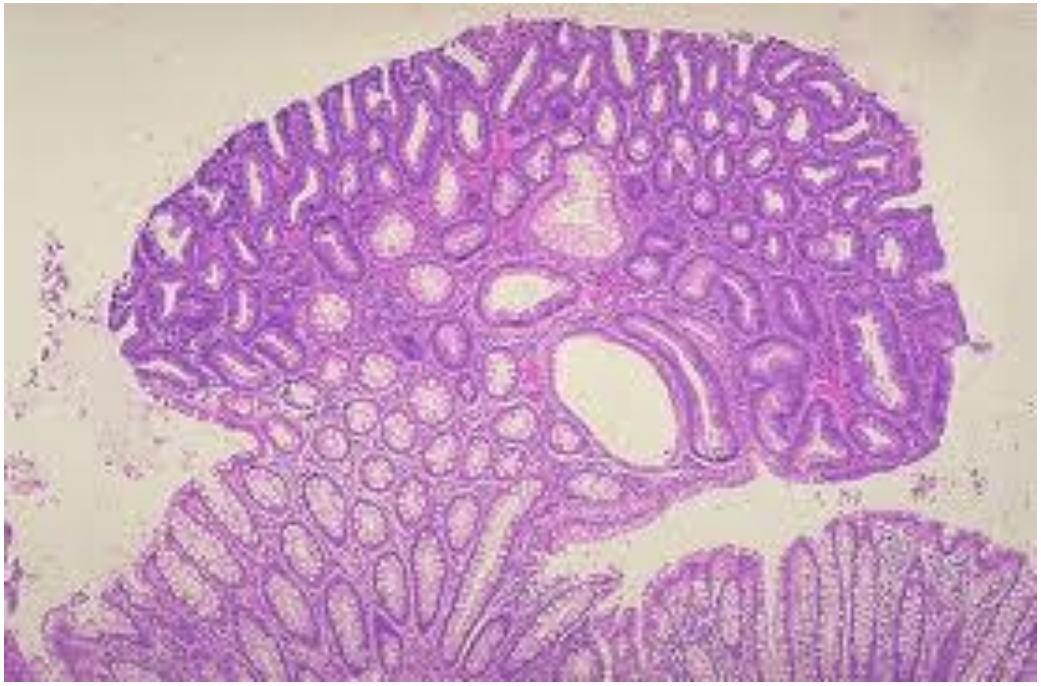
Tissue of origin	Benign	Malignant
Epithelial		
Stratified squamous		
Glands/ducts		
Respiratory epithelium		
Liver cells		

Nomenclature of tumours

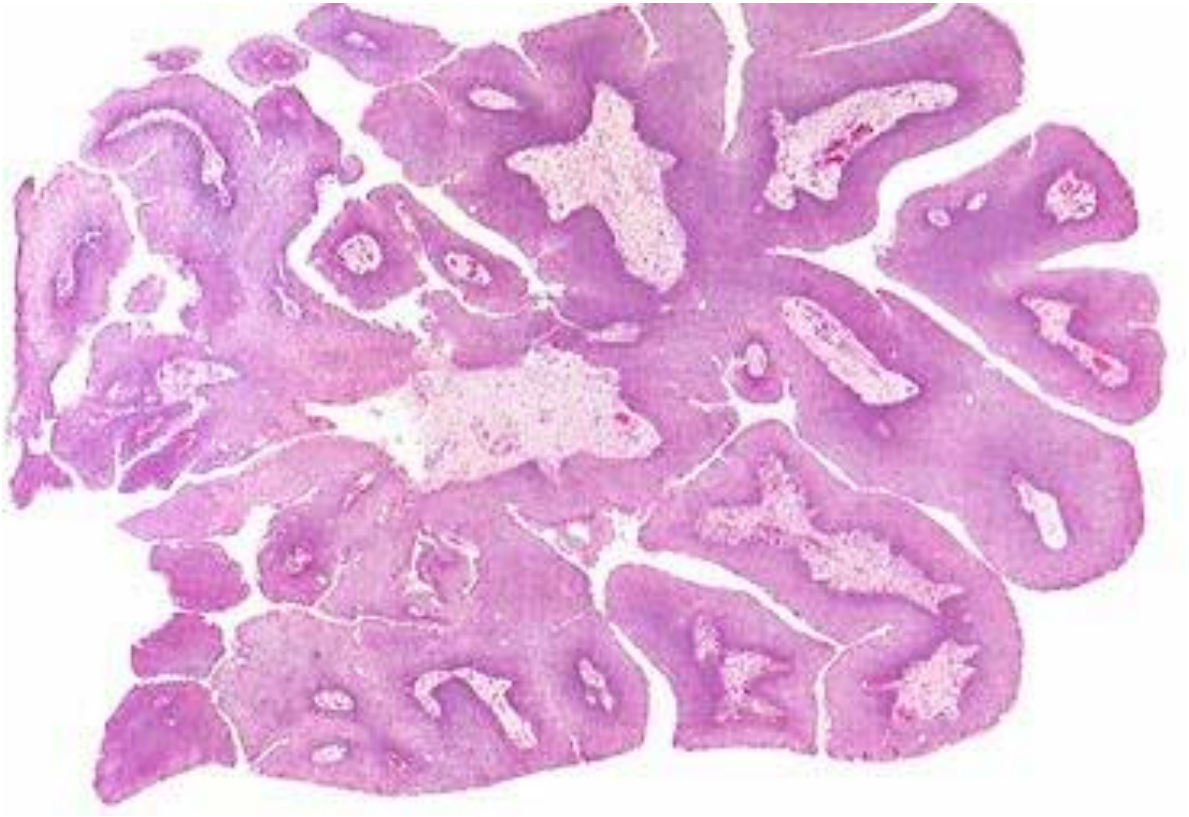
Tissue of origin	Benign	Malignant
Epithelial		
Stratified squamous	Squamous cell papilloma	Squamous cell carcinoma
Glands/ducts	Adenoma	Adenocarcinoma
	Papilloma	Papillary carcinoma
Respiratory epithelium	Bronchial adenoma	Bronchogenic carcinoma
Liver cells	Liver cell adenoma	Hepatocellular carcinoma

Benign tumours

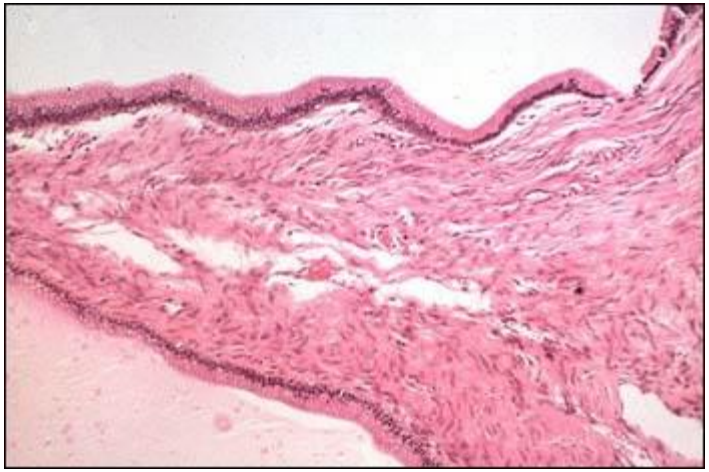
- Adenoma



Squamous cell papillomas

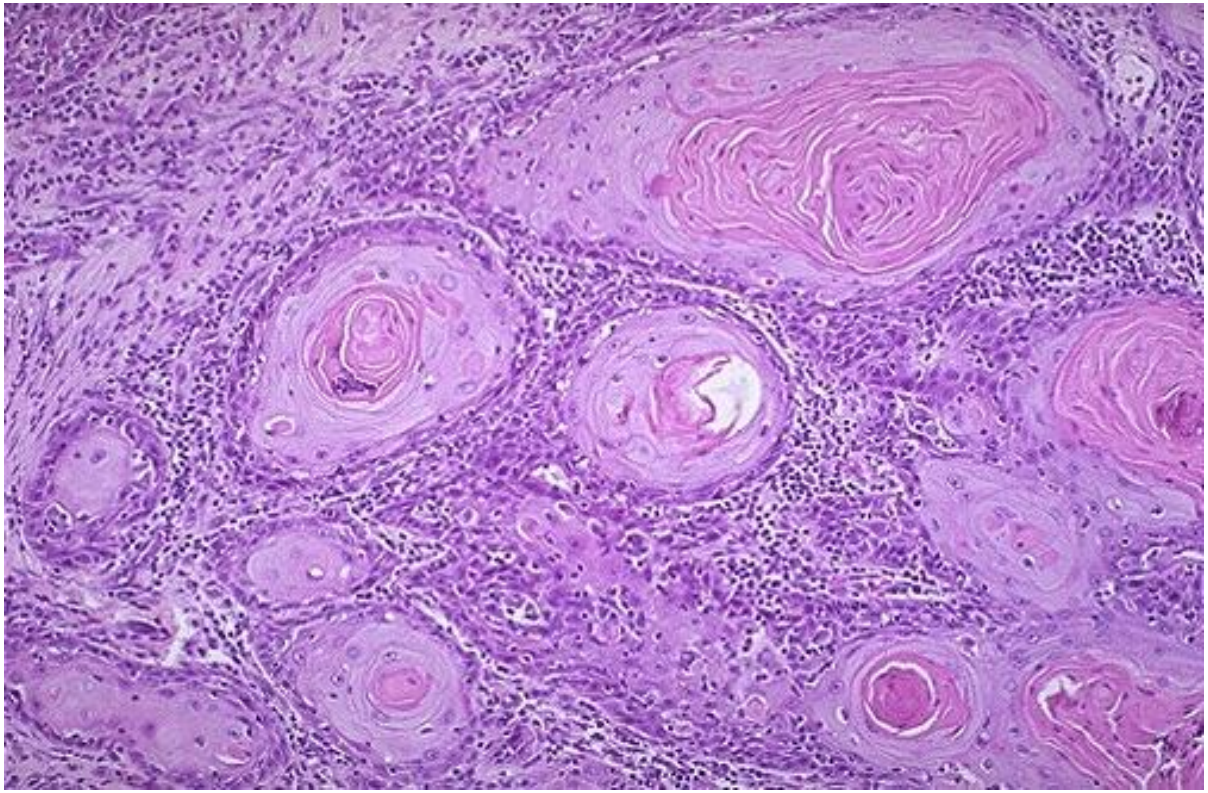


Cystadenoma

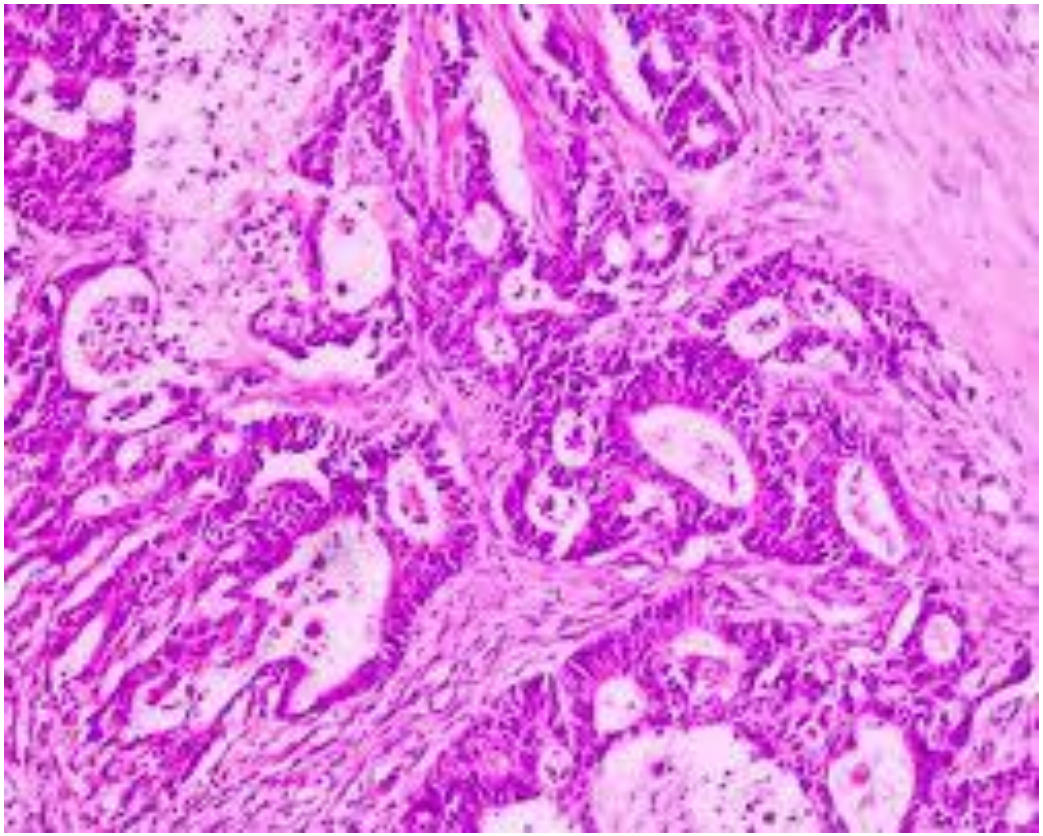


Malignant tumours

- Squamous cell carcinoma



Adenocarcinoma

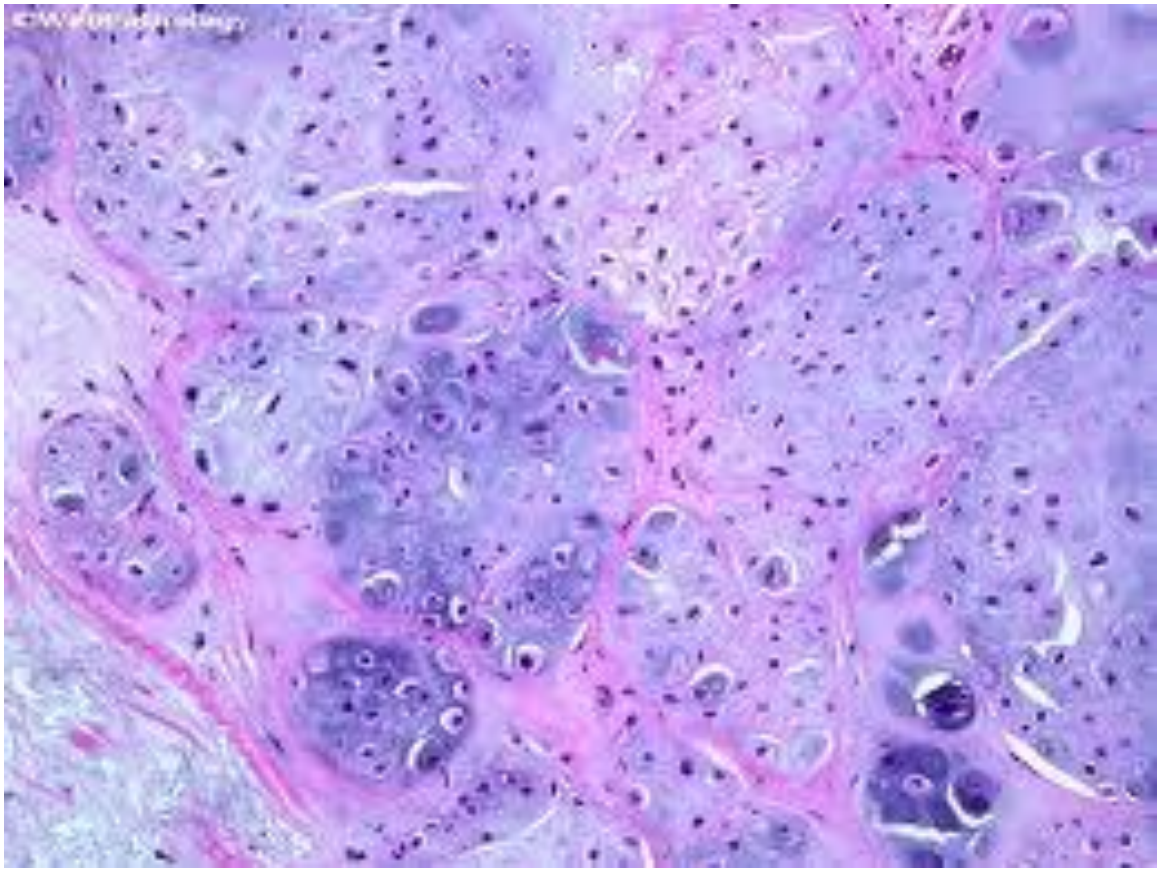


Nomenclature of tumours

Tissue of origin	Benign	Malignant
Connective tissue and derivatives		
Fibrous tissue		
Adipose tissue		
Cartilage		
Bone		
Smooth muscle		

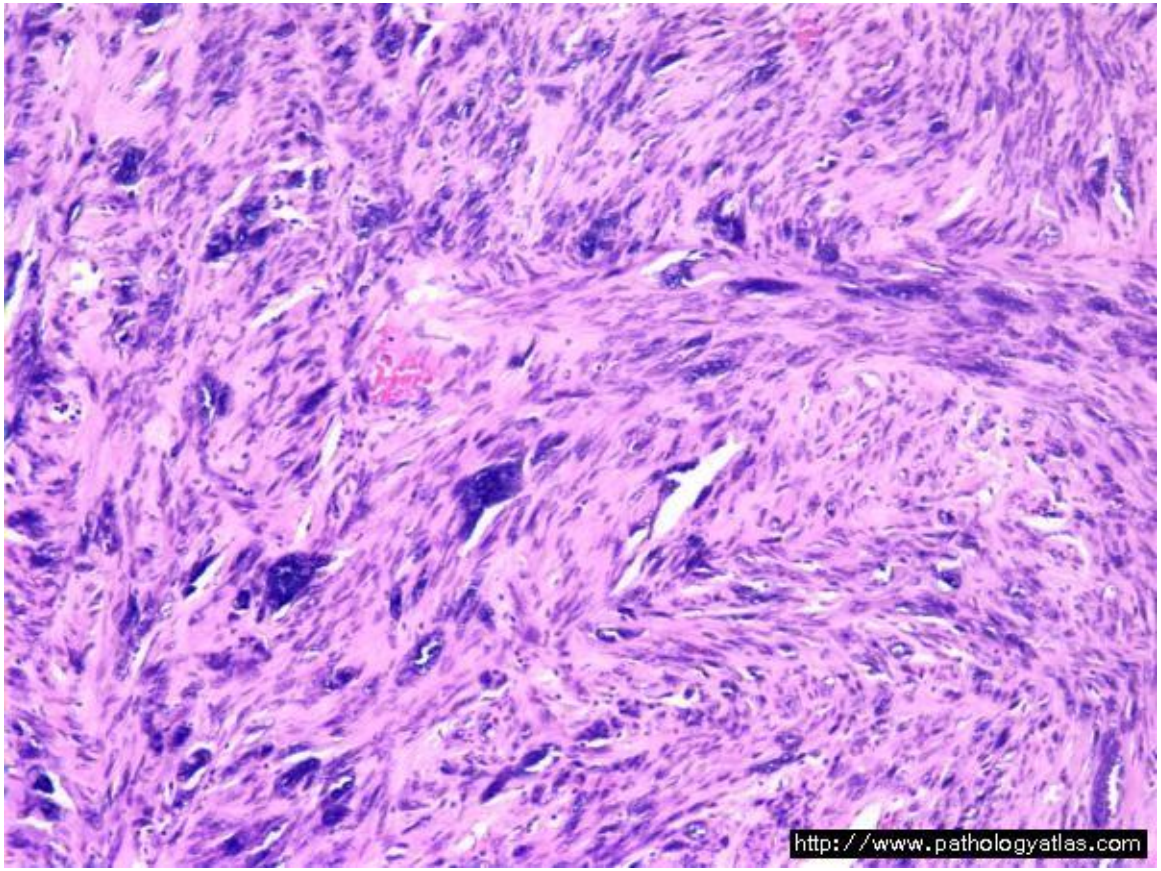
Nomenclature of tumours

Tissue of origin	Benign	Malignant
Connective tissue and derivatives		
Fibrous tissue	Fibroma	Fibrosarcoma
Adipose tissue	Lipoma	Liposarcoma
Cartilage	Chondroma	Chondrosarcoma
Bone	osteoma	osteosarcoma
Smooth muscle	Leimyoma	Leimyosarcoma



Chondrosarcoma

Malignant tumour with a chondroid matrix and cells



Leiomyosarcoma

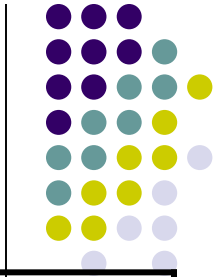
Tumour formed of bundles of smooth muscle cells.

Note the cellular atypia

Nomenclature of tumours

Tissue of origin	Benign	Malignant
Haemopoietic cells		
Lymphoid tissue		
Melanocytes		

Nomenclature of tumours



Tissue of origin	Benign	Malignant
Haemopoietic cells		Leukaemia
Lymphoid tissue		Lymphoma
Melanocytes	Naevus	Melanoma