Neoplasia

Definitions - neoplasia : new growth
tumour : swelling

↓

by Rupert Allan Willis.

PREMOLECULAR ERA.

↳ "New growth - Neoplasm
- Abnormal mass of tissue.

- Growth : Exceeds and is uncoordinated with that of normal tissue.
: Persists after cessation of causative stimuli

MOLECULAR / MODERN ERA

Defn → defined as → disorder of cell growth
→ Triggered by a series of acquired mutations of a single cell
→ And its clonal progeny.

So an abnormal mass of tissue which differs from the normal tissue in:

1) Growth
2) Differentiation
3) Function
4) Organization.

All tumors

↓

Two basic components

Neoplastic cells	Reactive stroma
→ Constitute tumor parenchyma	→ connective tissue → blood vessels → Cells of immune system.
→ Classification & biologic behaviour is based on this & nomenclature.	→ Growth & spread are dependent on stroma.

NOTE: Amt of neoplastic cells & stroma varies.

All tumors.

Benign	Malignant
→ Relatively innocent	→ Often deadly.

BENIGN TUMORS.

- Histogenic classification
- Suffix - "oma"
- mesenchymal cells follow this rule !

eg:- Fibroblast - Fibroma
Cartilage - Chondroma
Smooth muscle - Leiomyoma.

Papilloma - Benign tumor with finger-like projection.
Adenoma - Benign epithelial tumor arising from glands or forming a glandular pattern.

Benign epithelial tumors

NOMENCLATURE CAN BE BASED ON

Cells of origin
→ Renal tubular adenoma

Macroscopic architecture
→ Papilloma
→ Cystadenoma
→ Polyp

Microscopic pattern
→ Adenoma
→ Derived from glandular epithelium
→ May or may not form glands.

NOTE: Malignant tumors NOMENCLATURE follows the same rule as benign with few additions

Sarcomas
↳ Tumor arising in solid mesenchymal tissues (bone, muscle)
eg: Fibrosarcoma
Chondrosarcoma
leiomyosarcoma.

Carcinomas
↳ describes malignant tumor of epithelial origin
eg: Squamous cell Carcinoma
Adenocarcinoma (common in glandular)

Leukemias
↳ malignant tumors from blood forming cells

Lymphomas
↳ Lymphoid cells.

Exceptions for '-oma' - Melanoma
- Seminoma
- Mesothelioma
- Lymphoma

} malignant ~~lympho~~ neoplasms.

Cancer Vs Carcinoma.

→ Common term used to describe all malignant neoplasms.

↳ specific term to describe malignancies from epithelial cells.

MIXED TUMORS

- Single neoplastic cell can differentiate into different types of cells eg: Pleomorphic adenoma of the salivary gland.
  - → The epithelial components are admixed with myxoid stroma.
  - → But both are derived from a single clone which is capable of producing both cell types.

TERATOMA

- These tumors contain mature / immature cells which are derived from more than one germ cell layer.
- Sometimes all three!
- These tumors originate from totipotential germ cells.
  eg: Ovary, testis, embryonic rests.

HAMARTOMA - abnormal tissue site - normal.

- Benign masses.
- Disorganized, but contain cells indigenous to the involved site (composed of the elements which are normally found at that site)
- eg: Hamartomas in the lung / heart etc.

ectopic rest of normal tissue → CHORIOSTOMA — normal tissue ectopic site.

- Heterotopic rest of cells
- Excess of normal tissue in abnormal location!!!
- eg: Pancreatic tissue as a small mass, can be seen in the stomach or small intestine.

Gross diff b/w Benign & malignant : On macroscopy

Features	Benign	Malignant
• Boundaries	Encapsulated / well circumscribed	Irregular / poorly circumscribed
• Surrounding tissue	Often compressed	Usually invaded
• Size	Usually small	Often large
• Secondary changes	Less often	More often.

HALLMARKS OF CANCER.

→ All cancers displays (8) fundamental changes.

1. Self sufficiency in the growth signals — means these tumors can proliferate without any extra signals
2. Insensitivity to antigrowth / growth inhibitory signals
   - ↳ don't respond to molecules that inhibit the no growth of normal cells.
3. Evasion of Apoptosis
   - ↳ known resistant to the programmed cell death → limitless replicate potential (↳ immortality)

4. Limitless replicative potential - Immortality
5. Sustained angiogenesis - ~~The ability to invade and metastasize.~~
6. The ability to invade and metastasize.
7. Reprogramming energy metabolism
8. Evasion of Immune system.

(other 2 accelerating factors → Genomic Instability
→ Tumor promoting inflammation

Oncogenes

- They promote unregulated proliferation / Autonomous cell growth (self sufficiency in growth signals)
- The unmutated counter parts of oncogenes are "Protooncogenes"

Point mutation
Chromosomal translocation
Gene amplification

Protooncogenes → Oncogenes
↓ encodes
Proteins → Oncoproteins
Growth factor → results in → Normal growth
↓ No need for growth factor
Malignant growth