**CANCER 3**

**CELLULAR PATHOLOGY OF CANCER**

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DEFINITIONS AND TERMINOLOGY

Define metaplasia, dysplasia, neoplasia, tumour, malignancy, hamartoma, carcinoma, sarcoma, teratoma, lymphoma, leukaemia, metastasis

METAPLASIA

A reversible change in which one adult cell type (epithelial or connective tissue) is replaced by another adult cell type.

ADAPTIVE response where cells sensitive to the stressful stimulus - reflux of acid, cigarette smoke, etc - and are replaced by cells which can withstand the adverse environment e.g. respiratory columnar ciliated epithelium changes to squamous, squamous oesophageal to columnar/ intestinal

Or reprogramming of stem cells (reserve cells) to differentiate along a different pathway in response to signalling by cytokines, growth factors and extracellular matrix components.

DYSPLASIA

A reversible change in the histological (or cytological) features of epithelial cells including:

Loss of architectural orientation

Loss in uniformity of individual cells

Variability in size and shape

deeply staining nuclei (hyperchromatic), enlarged nuclei and nucleoli

mitotic figures abundant, in places where not usually found

an abnormal pattern of growth in which some of the histological features of malignancy are present, but at a non- or pre-invasive stage (ie premalignant)

DYSPLASIA is common in…

CERVIX - HPV infection

BRONCHUS - Smoking

COLON - Chronic Ulcerative Colitis

LARYNX - Smoking

STOMACH -Pernicious Anaemia

OESOPHAGUS-Barret’s metaplasia

NEOPLASIA, TUMOUR, MALIGNANCY

A tumour is an abnormal, autonomous proliferation of cells which are unresponsive to normal control mechanisms governing their growth, and which persists in proliferating even when whatever stimulus started it going has stopped

# FEATURES DISTINGUISHING BENIGN FROM MALIGNANT TUMOURS

## BENIGN

## DO NOT INVADE SURROUNDING TISSUES

## DO NOT METASTASISE

## ENCAPSULATED

## USUALLY WELL DIFFERENTIATED

## SLOWLY GROWING

## MITOSES NORMAL

## Not often fatal unless...

# … something goes wrong, like…

## In a dangerous place… meninges, pituitary

## secretes something dangerous… Insulinoma

## gets infected… bladder

## bleeds… benign gastric muscle tumours

## ruptures… cysts of ovary, liver adenoma

## gets torted (twisted) benign ovarian cyst infarcts

#### MALIGNANT

INVADE SURROUNDING TISSUES

SPREAD TO DISTANT SITES

NO CAPSULE

WELL TO POORLY DIFFERENTIATED

RAPIDLY GROWING

ABNORMAL MITOSES

# METASTASIS

## A metastasis is a discontinuous growing colony of tumour cells, at some distance from the primary cancer, most having got there by invasion of lymphatics or blood vessels

## There are common patterns of metastatic spread

## These depend on the lymphatic and vascular drainage of the primary site

## Lymph nodal involvement has a worse prognosis

## Dukes A colon - 90%, Dukes C - 30%

# NOMENCLATURE OF TUMOURS

# CARCINOMA

## A malignant tumour derived from epithelium

# SARCOMA

A malignant tumour derived from connective tissue (mesenchyme)

# LEUKAEMIA & LYMPHOMA

## Tumours of white cells, but Leukaemia are malignant tumour of primitive bone marrow-derived cells which circulate in blood stream.

# Lymphoma a malignant tumour of lymphocytes proliferating (usually) within lymph nodes

# TERATOMA

## A teratoma is a tumour derived from germ cells, which has the potential to develop into tumours of all three germ cell layers - ectoderm, mesoderm, endoderm

## They are common in the gonads, but occur in midline situations ouside the gonads (Pituitary, pineal, mediastinum, sacrococcygeal areas)

## In gonadal teratomas in males, all malignant

In gonadal teratomas in females, most benign

# HAMARTOMA

## An excessive but localised OVERGROWTH of cells and tissues native to the organ they are in. Cells are MATURE but ARCHITECTURALLY a jumbled-up version of what normally is there. Common in children, and should stop growing when they do, or may involute later in life. Common ones are haemangiomas, bronchial hamartomas, Peutz-Jegher polyps in the gut.

# BENIGN EPITHELIAL TUMOURS

## Of surface epithelium = PAPILLOMA skin, bladder, colon, etc

## Of glandular epithelium = ADENOMA glands or are secretory - mucin, thyroid colloid, bile, hormones occur in stomach, thyroid, breast, colon, kidney, pituitary, pancreas, parathyroid

# CARCINOMAs

## Squamous, adenocarcinoma, transitional cell carcinoma, basal cell carcinoma, and various qualifying names

## SARCOMAS

## A malignant tumour derived from CONNECTIVE TISSUE or mesenchymal cells Prefix indicates line of origin, e.g.

## Fat = LipoSARCOMA

## Bone = OsteoSARCOMA

## Cartilage = ChondroSARCOMA

Muscle = Rhabdomyosarcoma, Leiomyosarcoma

Nerve sheath = Malignant Peripheral Nerve Sheath Tumour

# DIFFERENTIATION OF TUMOURS

# Criteria for assessing differentiation of a malignant tumour

## If evidence of normal function still present - production of keratin, bile, mucin, hormones, etc., unlikely to be high grade

## If no evidence of this, could be high grade or even anaplastic

## Mitoses important, particularly when abnormal

## Some tumours require a standard mitotic count, so that a tumour with 15 mitoses/mm2 will behave more aggressively than one with 6

## Various grading systems - for Ca. Breast, prostate, colon

* no differentiation, called ANAPLASTIC carcinoma