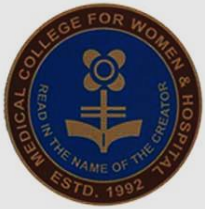


NEOPLASIA

Tumour Immunity

Clinical aspects of neoplasia

- **Professor Tamanna Choudhury**
- **HOD, Pathology**
- **MCWH**



References:

- **Robbins & Cotran Pathologic Basis of Disease- 9th edition**
- **IMAGES- Above mentioned book & internet**



IMMUNE SURVEILLANCE

(close observation)

- It is the normal function of the immune system- **scan** the body for emerging tumour cells and destroy them
- Tumour cells are recognized by the immune system as **non- self** and destroyed



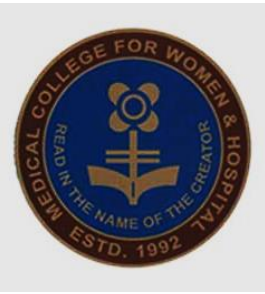
Antitumour Effector Mechanism

- **CD8+ CTLs**, natural killer (**NK**) cells and activated macrophages – is the dominant antitumour mechanism
- In general antitumour **antibodies** play a much lesser role



TUMOUR ANTIGENS

Antigens are present in tumours that elicit an immune response

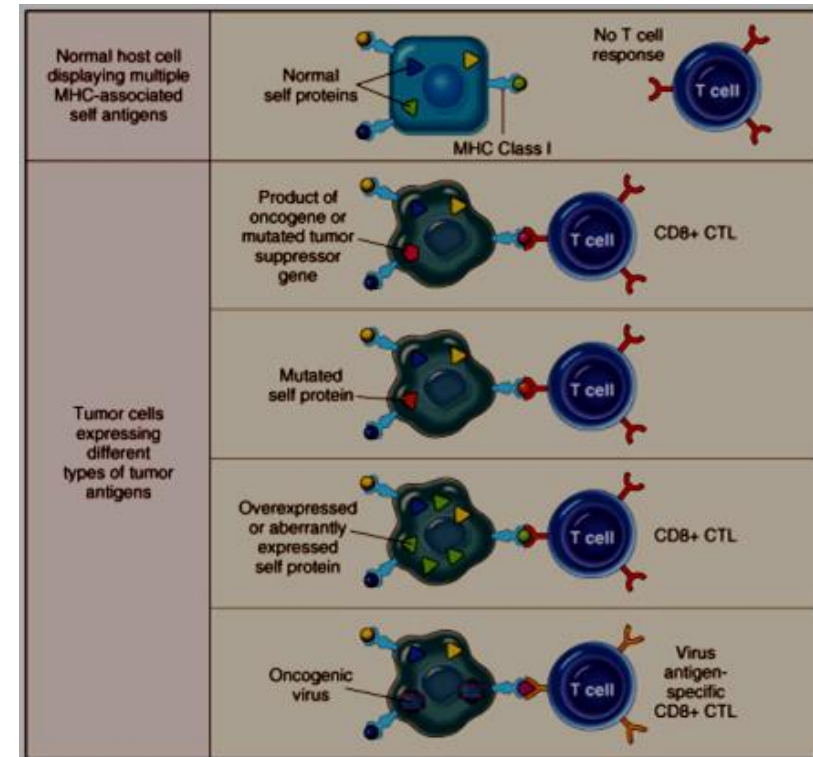


TUMOUR ANTIGENS

Main classes of tumour antigens

are:

- Products of Mutated genes
- Overexpressed or Aberrantly Expressed Cellular Proteins.
- Tumour Antigens Produced by Oncogenic Viruses (HPV and EBV)
- Oncofetal Antigens.
- Altered Cell-Surface Glycolipids and Glycoproteins.
- Cell Type-Specific Differentiation Antigens





Mechanisms by which tumors evade the immune system

(EVADE: escape or avoid)

<p>Anti-tumor immunity</p>	<p>Tumor cell Tumor antigen MHC molecule T cell specific for tumor antigen</p>	<p>T cell recognition of tumor antigen leading to T cell activation</p>
<p>Immune evasion by tumors</p>	<p>Failure to produce tumor antigen</p> <p>Antigen-loss variant of tumor cell T cell</p>	<p>Lack of T cell recognition of tumor</p>
	<p>Mutations in MHC genes or genes needed for antigen processing</p> <p>Class I MHC-deficient tumor cell T cell</p>	<p>Lack of T cell recognition of tumor</p>
	<p>Production of immuno-suppressive proteins</p> <p>Immunosuppressive cytokines (e.g., TGF-β)</p>	<p>Inhibition of T cell activation</p>

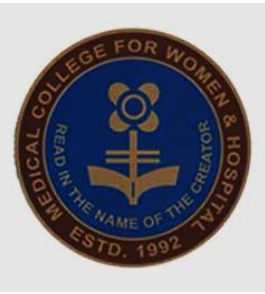


CLINICAL FEATURES OF TUMOURS



CLINICAL FEATURES OF TUMOURS

- All tumours have potential for morbidity and mortality
- All masses require anatomic evaluation
(Histodiagnosis)



EFFECTS OF TUMOURS ON HOST

Malignant tumours are far **more threatening** to the host than benign tumors are

Both types of neoplasia may cause problems because of

- (1) location and impingement on adjacent structures,
- (2) functional activity such as hormone synthesis,
- (3) bleeding and secondary infections when they ulcerate through adjacent natural surfaces, and
- (4) initiation of acute symptoms caused by either rupture or infarction.



EFFECTS OF TUMOURS ON HOST

- **Local and hormonal effects**
- **Cancer cachexia (wasting)**
- **Paraneoplastic syndromes**



EFFECTS OF TUMOURS ON HOST

- **LOCATION** – Pituitary adenoma- can compress & destroy the gland
Gut- obstruction, ulceration, bleeding
- Tumours of endocrine glands may produce **HORMONES**
(β -cell adenoma) → *hypoglycemia*
- Erosive growth, expansile pressure- on any natural surface- **ULCERATION, SECONDARY INFECTION**
- **BLEEDING** (malena, haematuria)- neoplasm of the gut & urinary tract
- Torsion of tumour in mobile organ → **INFARCTION**



EFFECTS OF TUMOURS ON HOST

Cancer cachexia

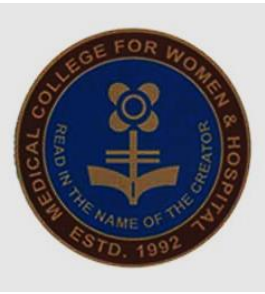
- **Progressive loss of body fat and lean body mass with profound weakness, anorexia and anemia**
- This **wasting syndrome** is referred to as **cachexia**



EFFECTS OF TUMOURS ON HOST

Cancer cachexia

- Associated with **equal loss of both fat and lean muscle**
- Elevated basal metabolic rate

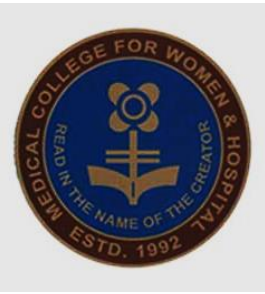


EFFECTS OF TUMOURS ON HOST

Cancer cachexia

Its cause is multifactorial

TNF- α - is the leading suspect



Differences between cachexia and starvation

Cachexia	Starvation
Calorie expenditure is high & BMR is increased	Adaptational lowering of BMR
Equal loss of fat & muscle	Muscle mass is relatively preserved at the expense of fat stores



Paraneoplastic Syndromes

Symptom complexes in cancer bearing patients that **can not readily be explained** either by the anatomic distribution of the tumour or by the elaboration of hormones indigenous to the tissue from which the tumour arose

These occurs in 10% of patients with malignant disease

INDIGENOUS: originating or occurring naturally in a particular place; native.



Paraneoplastic Syndromes

Despite their relative infrequency, paraneoplastic syndromes are **important to recognize**, for several reasons:

- **Earliest manifestation of an occult neoplasm**
- **Can cause significant clinical problems & even be lethal**
- **May mimic metastatic disease**



Paraneoplastic Syndromes

Clinical Syndromes	Major Forms of Underlying Cancer	Causal Mechanism
<i>Endocrinopathies</i>		
Cushing syndrome	Small cell carcinoma of lung	ACTH or ACTH-like substance
Syndrome of inappropriate antidiuretic hormone secretion	Small cell carcinoma of lung; intracranial neoplasms	Antidiuretic hormone or atrial natriuretic hormones
Hypercalcemia	Squamous cell carcinoma of lung	Parathyroid hormone-related protein (PTHrP),
Hypoglycemia	Fibrosarcoma	Insulin or insulin-like substance
Carcinoid syndrome	Bronchial adenoma (carcinoid)	Serotonin, bradykinin



Paraneoplastic Syndromes

Paraneoplastic Syndromes	Major Forms of Underlying Cancer	Causal Mechanism
<i>Nerve and Muscle Syndromes</i>		
Myasthenia	Bronchogenic carcinoma	Immunologic
Disorders of the central and peripheral nervous systems	Breast carcinoma	
<i>Dermatologic Disorders</i>		
Acanthosis nigricans	Gastric carcinoma	Immunologic; secretion of epidermal growth factor
Dermatomyositis	Bronchogenic, breast carcinoma	Immunologic



Paraneoplastic Syndromes

Clinical Syndromes	Major Forms of Underlying Cancer	Causal Mechanism
<i>Osseous, Articular, and Soft Tissue Changes</i>		
Hypertrophic osteoarthropathy and clubbing of the fingers	Bronchogenic carcinoma	Unknown
<i>Vascular and Hematologic Changes</i>		
Venous thrombosis (Trousseau phenomenon)	Pancreatic carcinoma	Tumor products (mucins that activate clotting)
Anemia	Thymic neoplasms	Unknown

Thank you

