Session Learning Outcomes

This session aim to understand:

- The definition of disease process
- The concept of clinical medicine
- The role of clinical medicine in natural medicine studies
- Review of normal immune responses of the body
- Common clinical terminology
What is Health?

- Health and disease may be considered two extremes of a continuum.

- Health is defined as a state of complete physical and mental well-being.

- The healthy person is emotionally and physically capable of leading a full, happy and productive life that is free of anxiety, turmoil, and physical disabilities that limit activities.
What is Disease?

- An “acute or chronic illness that one acquires or is born with that causes physiological dysfunction in one or more body systems”.
- Generally has “specific signs and symptoms that characterize its pathology and identifiable etiology” Porth’s Pathophysiology. 9th edition.
- Diseases are conventionally classified in the following large groups:
  - Congenital and hereditary diseases
  - Inflammatory diseases
  - Degenerative diseases
  - Metabolic diseases
  - Neoplastic diseases
What is Clinical Medicine?

Clinical
- Pertaining to the bedside or to the clinic
- Founded on actual observation and treatment

Medicine
- The art and science of the diagnosis, treatment of disease and the maintenance of health
  The treatment of disease by non-surgical means
- Founded on actual observation and treatment
Clinical Medicine & Natural Medicine Principles

- **Vis medicatrix naturae** - the healing power of nature
- **Tolle causam** - identify and treat the causes
- **Primum non nocere** - first do no harm
- **Docere** - Doctor as teacher
- **Holistic** - treat the whole person
- **Prevention**
Why we need to learn Human Clinical Science?

- Understand how the body responds to disease
- Understand how modalities applied will interact with normal bodily processes
- Understand the western modalities and treatments to be able to assess how natural medicine modalities will interact with them
- Communicate with other health care professionals
# Lines of Defence - Revision

<table>
<thead>
<tr>
<th>First line of defence:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• skin and mucous membranes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Second line of defence:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Antimicrobial proteins (interferons, complement, Transferrins)</td>
</tr>
<tr>
<td>• Macrophages, NK cells, neutrophils</td>
</tr>
<tr>
<td>• Non specific cellular responses</td>
</tr>
<tr>
<td>• Fever</td>
</tr>
<tr>
<td>• Inflammation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Third line of defence</th>
</tr>
</thead>
<tbody>
<tr>
<td>• T cells – cell mediated immunity</td>
</tr>
<tr>
<td>• B cells – humoral or antibody mediated immunity</td>
</tr>
</tbody>
</table>
Structure of Antibody

Diagram of IgG heavy and light chains

Model of IgG molecule

Figure 22-17b Principles of Anatomy and Physiology, 11/e
© 2006 John Wiley & Sons

Figure 22-17a Principles of Anatomy and Physiology, 11/e
© 2006 John Wiley & Sons
# Antibody Isotypes

<table>
<thead>
<tr>
<th>Isotype</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IgG</td>
<td>Most abundant antibody in the blood – 80%</td>
</tr>
<tr>
<td>IgM</td>
<td>About 5-10% of all antibodies in blood and lymph</td>
</tr>
<tr>
<td>IgD</td>
<td>Represents only 0.2% of all antibodies</td>
</tr>
<tr>
<td>IgA</td>
<td>Makes up 10-15% of all antibodies</td>
</tr>
<tr>
<td>IgE</td>
<td>Represents only 0.01% of all antibodies</td>
</tr>
</tbody>
</table>

**Action of Antibody**

- **How do antibodies work?**

<table>
<thead>
<tr>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutralising</td>
</tr>
<tr>
<td>Immobilizing</td>
</tr>
<tr>
<td>Agglutination and Precipitation</td>
</tr>
<tr>
<td>Initiating the complement system</td>
</tr>
<tr>
<td>Enhancing phagocytosis</td>
</tr>
</tbody>
</table>
Immunological Memory

- Memory T-cells and memory B-cells form
- Memory cells respond rapidly on second exposure
Immunological Memory

- Measured through antibody titre (amount of antibodies in the serum)

- **Primary response:**
  slow rise first in the levels of Ig M and then Ig G after a period of several days.

- **Secondary response:**
  Accelerated, more intense response of the memory cells to subsequent encounters with the antigen.

Provides basis for vaccination against certain diseases
Immunological Memory

Antibody titer (arbitrary units)

Primary response

Secondary response

First exposure

Second exposure

Days

IgG

IgM

0
10
100
1000

0 14 28 42 56

Figure 22-19 Principles of Anatomy and Physiology, 11/e © 2006 John Wiley & Sons

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endeavour.edu.au
# Types of Immunity that develops upon encounter with various types of antigens

<table>
<thead>
<tr>
<th>Type of Immunity</th>
<th>How Acquired</th>
</tr>
</thead>
<tbody>
<tr>
<td>Naturally acquired active immunity</td>
<td>Following exposure to a microbe, antigen recognition by B cells and T cells and costimulation lead to antibody-secreting plasma cells, cytotoxic T cells, and B and T memory cells.</td>
</tr>
<tr>
<td>Naturally acquired passive immunity</td>
<td>Transfer of IgG antibodies from mother to fetus across placenta, or of IgA antibodies from mother to baby in milk during breast-feeding.</td>
</tr>
<tr>
<td>Artificially acquired active immunity</td>
<td>Antigens introduced during a vaccination stimulate cell-mediated and antibody-mediated immune responses, leading to production of memory cells. The antigens are pretreated to be immunogenic but not pathogenic; that is, they will trigger an immune response but not cause significant illness.</td>
</tr>
<tr>
<td>Artificially acquired passive immunity</td>
<td>Intravenous injection of immunoglobulins (antibodies).</td>
</tr>
</tbody>
</table>

Table 22-4 Principles of Anatomy and Physiology, 11/e © 2006 John Wiley & Sons
Medical & Clinical Terminology

**Signs**
- Objective evidence of a disease

**Symptoms**
- Subjective evidence of a disease
Medical & Clinical Terminology

Symptoms

- Evidence perceived by the patient

There are seven attributes of a symptom
- Its location
- Its quality
- Its quantity or severity
- Its timing
- Factors that make it better or worse
- The setting where it occurs
- Associated manifestations
Medical & Clinical Terminology

Disorder
- A disruption of or an interruption with normal functions or established systems

Disease
- A condition of abnormal vital function involving any structure, part, organ, or system of the body. A specific illness or disorder characterised by a recognisable set of signs and symptoms attributable to heredity, infection, diet or environment.
Medical & Clinical Terminology

**Condition**
- A state of being specifically in reference to physical or mental health and wellbeing

**Syndrome**
- A set of symptoms occurring together resulting from a common cause or appearing in combination to present a clinical picture of a disease or inherited abnormality
- e.g. Acquired Immunodeficiency syndrome, Syndrome X

**Diagnostics**
- Tests, observations or procedures providing information about a disease process
Medical & Clinical Terminology

**Diagnosis**
- Identification of a disease or condition
- The art of naming a disease or condition

**Differential diagnosis**
- Determining the difference and establishing the presence of a particular disease by elimination or exclusion.
- Is dependent on:
  - Signs
  - Symptoms
  - Assessment: Physical, Emotional
Medical & Clinical Terminology

Aetiology
- The study of all factors that may be involved in the development of a disease
  - idiopathic
  - iatrogenic

Pathogenesis
- development or sequence of events in a disease process

Pathophysicsiology
- The physiology of the disease process changing normal function
Medical & Clinical Terminology

**Epidemiology**
- The study of the determinants of disease events in populations (patterns and occurrences)
- Mortality - death rates
- Morbidity - disease rates
Medical & Clinical Terminology

Risk Factor
- Increase your chance of getting an illness?
- A factor that causes a person or group of people to be particularly susceptible to an unhealthy event
- Example
  - Immunosuppression - increases the incidence and severity of infection
  - Cigarette smoking - increases the risk of developing a respiratory or cardiovascular disease
# Descriptive Terms in Clinical Medicine

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute</td>
<td>Short term</td>
</tr>
<tr>
<td>Chronic</td>
<td>Long term</td>
</tr>
<tr>
<td>Prognosis</td>
<td>What is likely to happen</td>
</tr>
<tr>
<td>Exacerbation</td>
<td>Worsening / flare-up</td>
</tr>
<tr>
<td>Remission</td>
<td>Signs &amp; symptoms regress</td>
</tr>
<tr>
<td>Endogenous</td>
<td>Internal source</td>
</tr>
<tr>
<td>Exogenous</td>
<td>External source</td>
</tr>
</tbody>
</table>
# Medical Terminology

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apoptosis</td>
<td>Programmed cell death without inflammation</td>
</tr>
<tr>
<td>Atrophy</td>
<td>Decrease in cell tissue, or organ size or function</td>
</tr>
<tr>
<td>Cyanosis</td>
<td>Blue tinge to the skin or mucus membranes</td>
</tr>
<tr>
<td>Dysplasia</td>
<td>Disorganisation of tissue or change in cell size or shape</td>
</tr>
<tr>
<td>Dyspnea</td>
<td>Breathlessness, laboured or difficult breathing</td>
</tr>
<tr>
<td>Granuloma</td>
<td>A small nodular delimited aggregation of mononuclear inflammatory cells, or a collection of modified macrophages resembling epithelial cells, usually surrounded by a rim of lymphocytes.</td>
</tr>
</tbody>
</table>
## Medical Terminology

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gangrenous</td>
<td>Ischaemic injury (dry necrosis) often followed by infection (wet necrosis)</td>
</tr>
<tr>
<td>Caseous</td>
<td>Like cream cheese e.g Ghon complex in TB</td>
</tr>
<tr>
<td>Non-caseous</td>
<td>Liquifactive, haemorrhagic</td>
</tr>
<tr>
<td>Hyperplasia</td>
<td>Increase in cell numbers</td>
</tr>
<tr>
<td>Hypertrophy</td>
<td>Increase in cell size</td>
</tr>
<tr>
<td>Hypoxia</td>
<td>Lack of or decreased oxygen to the tissues</td>
</tr>
<tr>
<td>Infarction</td>
<td>Death of the tissues from irreversible hypoxia</td>
</tr>
<tr>
<td>Ischaemia</td>
<td>Inadequate delivery of oxygen to the tissues</td>
</tr>
<tr>
<td>Lesion</td>
<td>A zone of tissue with impaired function as a result of damage by disease or injury</td>
</tr>
</tbody>
</table>
# Medical Terminology

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metaplasia</td>
<td>Change of one mature tissue type into another e.g Barretts oesophagus</td>
</tr>
<tr>
<td>Oedema</td>
<td>Accumulation of fluid in the interstitial tissue spaces</td>
</tr>
<tr>
<td>Syncope</td>
<td>A temporary suspension of consciousness, faint or swoon</td>
</tr>
<tr>
<td>Tachycardia</td>
<td>Rapid heart rate. Generally over 100 beats per minute in an adult.</td>
</tr>
<tr>
<td>Tinnitus</td>
<td>A perceived sound with no external stimulus. Ringing, rushing or roaring noise in the ears.</td>
</tr>
</tbody>
</table>
Cellular Adaptation - Overview

Normal cells

Atrophy

Hyperplasia

Hypertrophy

Different replacement cells

Normal cells

Metaplasia

Neoplasia (malignancy)

Figure 1-1
Abnormal cellular growth patterns.

Cellular Responses - Atrophy

A decrease or shrinkage in cell size

Common cell type:
Skeletal and cardiac muscle, secondary sex organs and the brain

Causes:
Aging, lack of hormonal stimulation, HIV infection, disuse
Cellular Responses - Hypertrophy

An increase in the size of cells and consequently in the size of the affected organ

**Common cell type:**
Cardiac muscle, kidney cells

**Causes:**
- Increase in protein synthesis, decrease in protein degradation or both.
- Excess workload

Cellular responses - **Hyperplasia**

An increase in the number of cells resulting from an increased rate of cellular division

**Common cell type:**
- Epithelial, kidney cells, hepatocytes

**Causes:**
- Increased mitosis, growth factors, hormones

Cellular responses - **Dysplasia**

Often reversible abnormal changes in the size, shape and organisation of mature cells

**Common cell type:**
- Epithelial tissue of cervix, respiratory tract

**Causes:**
- As for hyperplasia

---

Cellular responses - **Metaplasia**

The reversible replacement of one mature cell by another, sometimes less differentiated, cell type

**Common cell type:**
- Epithelial cells

**Causes:**
- Irritants

Cellular responses - Neoplasia

The uncontrolled progressive multiplication of cells

**Common cell type:**
- Any fast dividing cells

**Causes:**
- Carcinogens
- Increased mitosis; loss of tumour suppressor genes that control cell division

Cellular responses - **Anaplasia**

The loss of differentiation of cells and their orientation to one another and their axial framework and blood vessels

**Common cell type:**
- Usually fast dividing cells, eg: hepatocytes

**Causes:**
- Loss of control of suppressor genes and the cellular differentiation process
Tissue & Organ Responses

- **Changes in tissue types**
  - Scar formation
  - Necrosis

- **Organ Responses**
  - Hypertrophy or atrophy of the organ
  - Altered function
  - Hyper or hypo-secretion of products
  - Overwork, exhaustion and organ failure
  - Loss of function
# The Effects of Cellular Adaptation

<table>
<thead>
<tr>
<th>Cellular Adaptation</th>
<th>Organ</th>
<th>Effect on the Body</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atrophy</td>
<td>Brain</td>
<td>Multiple effects</td>
</tr>
<tr>
<td>Hypertrophy</td>
<td>Heart</td>
<td>Weakens</td>
</tr>
<tr>
<td>Metaplasia</td>
<td>Trachea</td>
<td>Increased mucous etc.</td>
</tr>
<tr>
<td>Hyperplasia</td>
<td>Liver</td>
<td>Loss of metabolic processes</td>
</tr>
<tr>
<td>Neoplasia</td>
<td>Pituitary</td>
<td>Multiple effects</td>
</tr>
<tr>
<td>Hyperplasia</td>
<td>Prostate</td>
<td>Urinary retention</td>
</tr>
<tr>
<td>Dysplasia</td>
<td>Cervix</td>
<td>Painful intercourse</td>
</tr>
<tr>
<td>Anaplasia</td>
<td>Ovary</td>
<td>Infertility, low hormones</td>
</tr>
</tbody>
</table>
Atrophy

Hypertrophy

http://www.med.cmu.ac.th/student/patho/Lertlakana/017.jpg
Epidermal Hyperplasia

http://casereports.bmj.com/content/2009/bcr.09.2008.0845/F2.large.jpg
Prostatic Hyperplasia

http://www.uaz.edu.mx/histo/pathology/ed/ch_17/c17_51.jpg
Uterine Dysplasia
Normal – Dysplasia – Neoplasia

A Normal Epithelium
B Squamous Metaplasia
C Mild Dysplasia
D Moderate Dysplasia
E Severe Dysplasia
F Carcinoma insitu

Barrett’s Oesophagus

![Diagram of Barrett's Oesophagus](http://www.nature.com/nrc/journal/v3/n9/images/nrc1166-f1.gif)
Barrett’s Oesophagus

http://www.memorialhermann.org/uploadedimages/edc/editslide9.jpg
Liver neoplasia

http://www.ajronline.org/content/193/1/W7/F15.large.jpg
Abbreviations

- **Hx** History
- **Dx** Diagnosis
- **Rx** Treatment
- **c/o** complains of
- **pt** patient
- **cl** client

- **N/A** not applicable
- **1/7** 1 day
- **1/52** 1 week
- **1/12** 1 month
- **OTC** over the counter
- **Qd or die** every day
- **Bid or bd** twice a day
- **Tds** three times a day
- **qid** four times a day
- **Qod** every other day
- **ac** before meals
- **pc** after meals

- Search the internet under common medical abbreviations
Readings and Resources

Resources:

- **Set Textbooks:**

- **Additional textbooks:**
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