

Pathological Basis of Disease - 300889

Week 1

Introduction to Pathology

- Reading – Chapter 1 of Underwood Textbook
- Pathology started with the study of disease and the examination of tissues
- Production of a light microscope (in 1854) allowed for cellular pathology
- 20th Century - electromicroscope – how cells stick together and how they develop
- 1960s until now – immunopathology, molecular pathology, genetic pathology, quantitative pathology

Involvement of cellular components in disease

- Narrowing diagnosis of disease down to particular organs
- Cell membrane – changes in electro potential between cells
- If you block receptors, you have the potential to knock out a signalling mechanism in a cell

Involvement of secreted products in disease

- Collagen – building block of organs / tissues
- Immunoglobulins – detect, label and destroy foreign entities (such as viruses and parasites)
- Nitric oxide – chemical that is used by the body to attack microorganisms
- Hormones – diabetes mellitus
- Cytokines – signalling molecule of inflammatory system in the body
- Free radicals – tissue damage

Scope of Pathology

- Can be used clinically or experimentally
- Translational medicine / research – research that is done from bedside to bedside (such as what is found in the lab and what is then used on patients)
 - How to understand a disease to help people with the disease
- Cell culture – isolation of cells and trying to treat those cells with different compounds

Subdivisions of clinical pathology

- Histo – tissue
- Cyto – cell
- Haem – iron (blood)
- Micro – very small
- Toxic - poisons

Techniques of Pathology

- Light microscopy – identifies if there is a variation of cells
- Histochemistry – *will focus on this in the lab sessions*
- Immunohistochemistry – labelling or staining of a cell (Reacts to a particular element that has been added to a tissue)
- Immunofluorescence – fluorescent molecules which are reflected back
- Electron microscopy – looking at the organ level of the cell
- Cell cultures – very important – taking cells from a human and keep them alive and see how they react differently to a normal culture
 - Example – stem cell research
- Medical microbiology – look at cells at their most progressive and treat them at different chemical states

Learning Pathology

- General pathology – looking at pathology as a whole
- Systems pathology
- Disease oriented approach via case studies

Cause of Disease

- Chapters 2 and 3 of Underwood Textbook

Disease

- Abnormality + loss of normal health
- Need to have both or it is defined as a disease

Normality

- What is normal?
- Normal ranges – this will change depending on males and females
- Unusual not equal to abnormal

Responses to the environment

- Adaptation - it can either cause a disease or be a safeguard to a disease
- Failure to adapt

Disease characteristics

- Aetiology – cause
- Pathogenesis – mechanisms that produce disease
 - Example – granulation of tissue in the lungs (tuberculosis)
- Manifestations – structural features + clinical signs / symptoms
 - Example – Reduce the amount of oxygen in the blood, breakdown of the lung structure (tuberculosis)
- Complications / sequelae
 - Example – respiratory infections (tuberculosis)
- Prognosis – what we expect to happen
 - Remission (coming out of the disease – positive prognosis) and relapse (falling back into the disease – negative prognosis), morbidity (sum of all effects of the disease) and mortality (chance you will live through the event)

Aetiological agents of the disease

- Chemical
- Physical
- Microorganisms

