PAH DEM

PRIMARY EXAM PREPARATION PROGRAM

PATHOLOGY PROGRAM

The Exam:
- MCQ Paper – 60 questions, 90 minutes
  - Choose best response from 4 options
  - Must obtain scaled score of 10 or greater out of 20 to pass
  - Must pass all subject MCQs to be eligible to sit the viva

- Integrated viva
  - 4 integrated vivas – 4 questions in each viva - one question from each subject
  - Scaled score of 5 or greater out of 10 in at least two of the four vivas and have a total score of 20 or greater out of 40 to pass

Expectations as per the ACEM Training and Examination Handbook:
- Candidates are expected to have a detailed understanding of the general principles of the pathology of common diseases. Diseases of relevance to the practice of Emergency Medicine are particularly important and will be concentrated upon in the examination.

- Candidates are advised to familiarise themselves with the syllabus and MCQ matrix, as these outline the areas of most importance and are a guide to the examination content.

- Microbiology will not be examined as a separate subject, but those aspects that bear directly on infectious disease will be considered part of the syllabus.

- Genetic and molecular pathology are not emphasised in the pathology syllabus and exam.

Recommended Texts:
- *Robbins Pathologic Basis of Disease* Cotran, Kumar and Robbins (W B Saunders Company) – ensure you have the most recent edition
- Reference for pathophysiology as marked in the syllabus: *Review of Medical Physiology* W F Ganong (McGraw Hill) – ensure you have the most recent edition
Other Resources:

- ACEM website has many useful resources:
  - In ‘Training Program Information’ – ‘Primary Exam’ – there are exam dates, application forms, past viva papers, MCQ on-line practice and links to the Training and Examination Handbook.
  - In ‘Trainees Home’ – ‘Resources’ – ‘Non-ACEM Resources’ – Primary Exam’ there are practice MCQs from the NZ Primary Course
- Talk to trainees that have recently undertaken the exam – they will have acquired numerous useful resources that they would be happy to share.

Multiple Choice Matrix:

The more important the topic – the more questions:

- Cellular Injury (3)
- Tissue Response to Injury (5)
- Fluid and Haemodynamics (6)
- Immunity (4)
- Neoplasia (2)
- Infectious Diseases (5)
- Environmental Pathology (2)
- Cardiovascular System (7)
- Haemopoietic System (3)
- Respiratory System (6)
- Gastrointestinal System (1)
- Liver, Biliary Tract and Pancreas (4)
- Renal System and Genitourinary (6)
- Endocrine (2)
- Musculoskeletal System (2)
- CNS and the Eye (2)

Please note that the matrix provides weighting with respect to the MCQ component of the exam; it does not necessarily reflect the composition of the oral exam.
PATHOLOGY CURRICULUM

Please note that the ACEM Primary Examination Handbook allocates Level of Assessment (LOA) ratings to each curriculum topic. LOA 1 is designated ‘expert’; LOA 2 important’; LOA 3 ‘general’. This should help guide you as to the level of detail you will need to know on each topic.

1. **Cellular Injury and Adaptation**
   1.1 Cellular adaptation
   1.2 Mechanism of cell injury

2. **Acute and Chronic Inflammation**

3. **Tissue Renewal and Repair**
   3.1 Control of normal tissues
   3.2 Repair by healing, scar formation, and fibrosis
   3.3 Cutaneous wound healing
   3.4 Fibrosis

4. **Fluid and Haemodynamic Derangements**
   4.1 *Oedema*
   4.2 Hyperaemia and congestion
   4.3 Haemorrhage
   4.4 *Thrombosis*
   4.5 *Haemostasis*
   4.6 Embolism
   4.7 Infarction
   4.8 *Shock*

5. **Diseases of Immunity**
   5.1 *General features of the immune system*
   5.2 *Hypersensitivity reactions*
   5.3 Immunologic tolerance and causative mechanisms of auto immune disease
   5.4 Acquired Immunodeficiency Syndrome (AIDS)

6. **Neoplasia**
   6.1 Biology of tumour growth
   6.2 Epidemiology
   6.3 Molecular basis of cancer
   6.4 Carcinogenic agents
   6.5 Tumour immunity
   6.6 Clinical features of tumours

7. **Infectious Disease**
   7.1 General features of microbial activity including transmission
   7.2 Viral infections
   7.3 Bacterial infections including chlamydia, Rickettsia, mycoplasma
   7.4 General features of other infectious diseases -
fungi, protozoa, helminths
7.5 Principles of sterilisation and disinfection

8. **Environmental Pathology**
8.1 Personal exposure
8.2 Therapeutic drugs
8.3 Air pollution
8.4 Industrial exposure
8.5 Radiation
8.6 Physical injuries
8.7 Nutritional pathology

9. **Blood vessels**
9.1 Vascular response to injury
9.2 Arteriosclerosis
9.3 Atherosclerosis
9.4 Hypertensive vascular disease
9.5 Aneurisms and Dissections
9.6 Vasculitides
9.7 Veins and Lymphatics

10. **The Heart**
10.1 *Congestive heart failure
10.2 *Ischaemic heart disease
10.3 Valvular heart disease
10.4 Cardiomyopathies
10.5 Pericardial disease
10.6 Transplantation
10.7 Congenital heart disease

11. **Blood cell disorders**
11.1 Normal development
11.2 *Anaemias
11.3 Polycythaemia
11.4 Bleeding disorders
11.5 *Blood groups; transfusions
11.6 Leukopenia
11.7 Inflammatory white cell proliferation
11.8 Neoplastic white cell proliferation
11.9 Splenomegaly

12. **The Lung**
12.1 *Atelectasia
12.2 *Pulmonary congestion and oedema
12.3 *Obstructive airways disease
12.4 Diffuse interstitial disease
12.5 Disease of vascular origin
12.6 Pulmonary infections
12.7 Tumours
12.8 Pleural pathology
12.9 *Hyperbaric oxygen

13. The Gastrointestinal tract
13.1 Intestinal inflammatory disorders
13.2 Malabsorption Syndromes
13.3 Ischaemic bowel disease

14. Liver and Biliary Tract
14.1 General features of hepatic disease
14.2 Infectious Diseases
14.3 Alcoholic liver disease
14.4 Cholelithiasis
14.5 Cholecystitis

15. Pancreas
15.1 Acute pancreatitis
15.2 Chronic pancreatitis

16. Renal System
16.1 *Glomerular disease
16.2 Tubular and interstitial disease
16.3 *Hypertensive renal disease
16.4 Urinary tract obstruction
16.5 Urolithiasis
16.6 *Abnormalities in acid-base balance

17. Genitourinary
17.1 Testes
17.2 Prostate
17.3 The female genital tract
17.4 Gestational disorders – miscarriage, ectopic pregnancy
17.5 Gestational disorders - other

18. Endocrine
18.1 Pituitary
18.2 Thyroid
18.3 Parathyroid
18.4 Endocrine pancreas
18.5 Adrenal cortex and medulla

19. Musculoskeletal System
19.1 Bone remodeling, growth and development
19.2 Osteoporosis
19.3 Paget’s disease
19.4 Fractures
19.5 Osteonecrosis
19.6 Osteomyelitis
19.7 Arthritis
20. **Nervous System**
   20.1 Peripheral neuropathies
   20.2 Cerebral oedema and raised intracranial pressure
   20.3 Trauma
   20.4 Cerebrovascular disease
   20.5 Infections
   20.6 Demyelinating diseases
   20.7 Degenerative diseases
   20.8 Toxic and acquired metabolic diseases

21. **The Eye**

22. **Genetic Disorders**

23. **Head and Neck**
   23.1 Teeth and supporting structures

24. **Diseases of Childhood**
   24.1 Cystic fibrosis
   24.2 Sudden infant death syndrome

25. **The Skin**

*Review of Medical Physiology* W F Ganong (McGraw Hill) is recommended additional reading.
**STUDY AID (Based on a 22 week preparation)**

Make sure you 'pick and stick'. With respect to sitting this exam, make a commitment and stick to it. Avoid taking a 'toe in the water' approach, where you just see how your study goes for a few months before deciding whether to sit or not. If you go in 'half-hearted' you will be wasting your time. Once you have made your decision to sit, you can set about planning your intensive preparation.

This study aid suggests that you undertake to study the more important topics first (i.e. those from which many of the exam questions come from). In the following, I have not reproduced the curriculum in its entirety but tried to limit it to the most important topics. I have also applied my own ranking system to define which topics should be understood in the most detail; though this should also be reconciled with the LOA rating system the college applies to curriculum topics.

- ### - Understand in detail. Many questions are likely to come from this topic and the knowledge expected will be high.
- ## - Understand well.
- # - Understand in general.

The suggested time frames are suggestions only. It does start with generous time frames to cover the initial topics – in the belief you may take a little time ‘to warm to the task’. Feel free to cover more territory at a faster rate. Regardless you should have completed your run through of the curriculum by 15-16 weeks; thus allowing 6-7 weeks revision and focused exam practice.

As you study each topic have an understanding of how this topic is examined. Practice MCQ questions on the topic as you go, to check and consolidate knowledge. Similarly look to work in a study group and test each other with viva questions as you complete a section.

I have also added to the curriculum topics exam questions from vivas from the last few years. Use these as prompts to test your understanding of a topic. At the end of the day, you must be able to not only acquire knowledge but to organise it in a way that allows you to reproduce it in a format that is tailored to the exam.

It is very important that you learn the definitions of all the pathological terms / processes – this is particularly useful to recite in the oral exam to commence your answer (e.g. Q. What are the causes of hyperplasia? A. Hyperplasia is ...... The causes are...).

Similarly, many pathological processes are defined by a sequence of events (pathogenesis) which occurs in a certain time-frame – you need to know the events as well as the timing.
Depending on what other subjects you are studying simultaneously, look to study ‘like with like” (i.e. anatomy of the heart with CVS pathology; renal physiology with renal system pathology etc).

Study from the prescribed text(s) as this where the MCQs are referenced from and from where the oral exam questions are developed. Also note that the pictures / figures / tables are just important as the text. Often questions are based straight from what is displayed in these adjuncts.

**WEEK 1-4:**

These ‘foundation’ topics are important to know well – they form the basis of understanding for the rest of the syllabus. Take the time to know this well.

**General Definitions:**
- You must understand what is meant by the following general pathological terms. These are the aspects of a disease process that form the core of pathology:
  - Aetiology (cause)
  - Pathogenesis (the sequence of events in cells / tissues in the response to the cause)
  - Morphology (the structural and associated functional changes in the cells / tissues that are either characteristic of the disease or diagnostic of the aetiologic process)
  - Clinical significance (the nature of the morphological changes and their distribution in different organs / tissues influences normal function and determines the clinical features)

*The Normal Cell:*
- You should know the basic functional morphology of the cell – you need to know the normal to understand the abnormal
- Know the common structures found in most cells:
  - Cell membrane, intercellular connections, cell adhesion molecules, gap junctions, mitochondria, microtubules, nucleus and related structures, ribosomes, golgi apparatus etc

**Cellular Injury and Adaptation:**
- Definitions of cellular adaptation and cellular injury
- Mechanisms of cell injury
  - Ischaemic and hypoxic injury
    - Reversible cell injury
    - Irreversible cell injury
  - Free radical induced injury
- Morphology of cell injury
  - Necrosis
- Intracellular accumulations
- Subcellular alterations
- Cellular adaptation
Questions:
- What is reperfusion injury?
- What are the proposed mechanisms of reperfusion injury?
- What is hypertrophy?
- What are the types of hypertrophy?
- Give examples of physiologic and pathologic hypertrophy.
- How is hyperplasia different from hypertrophy?
- What is hyperplasia?
- What are the cellular mechanisms of physiological hyperplasia?
- Give examples of pathological hyperplasia.
- What is metaplasia?
- Give some examples.
- What is the mechanism causing metaplasia?
- How may metaplasia progress?
- What are the differences between hyperplasia and hypertrophy?
- Describe the different types of hyperplasia and give an example of each.
- What is atrophy?
- What are the causes of atrophy?
- Give some examples of atrophy.
- Describe the two different forms of pathological calcification and give an example of each.
- Describe the different principle pathological causes of hypercalcaemia with some clinical examples.
- What is apoptosis?
- Describe the physiologic situations where apoptosis occurs.
- List some important stimuli for apoptosis
- What is the difference between ischaemic and hypoxic injury?
- By what mechanism does ischaemic injury occur?
- Describe the morphologic intracellular changes that occur in ischaemic injury.
- Describe the types of damage that occur inside a cell after severe ischaemia.
• What are the morphological and chemical changes associated with early cell injury?
• What are the phenomena that characterize irreversible cell injury?
• Give an example of a protein that leaks across degraded cell membranes?

• What are the stages of ischaemic cell injury?
• Describe the sequence of events that occurs in reversible ischaemic cellular injury.
• Describe the morphological changes of irreversible ischaemic injury.

• What happens inside cells when they are injured?
• What is a free radical?
• What are the pathological effects of free radicals?

• Describe the cellular changes in necrosis.
• What are the patterns of tissue necrosis?

• What is reperfusion injury?
• What are the mechanisms of reperfusion injury?

• What is an infarct?
• What mechanisms lead to infarction?
• What factors determine the development of an infarct?

WEEK 5-6:

Acute and Chronic Inflammation: (###)
• Acute Inflammation:
  o Vascular changes
  o Cellular events
  o Chemical mediators
  o Ensure you know sequence of events and timing
• Chronic Inflammation:
  o Causes / Types
  o Cells and mediators
    • Macrophages
• Morphologic Patterns
• Systemic effects

Questions:
• Describe the role of complement in inflammation.
• Of the complement components, which are the most important inflammatory mediators?

• What are the defining pathological characteristics of chronic inflammation?
• List some causes of chronic inflammation.
• What is the complement system?
• Describe the main pathways by which complement activation occurs.
• What effects do the activated products of the complement system mediate in acute inflammation?

• Describe the sequence of cellular events in acute inflammation.
• Describe the vascular changes that occur in acute inflammation.
• What are the causes of the increased vascular permeability?

• In acute inflammation what changes occur in blood vessels?
• What are the mechanisms for the increased vascular permeability?

• What cell types are present in chronic inflammation?
• What processes mediate the persistent accumulation of macrophages seen in chronic inflammation?
• What products are released by activated macrophages in chronic inflammation?

• What are the characteristics of chronic inflammation?
• What are the causes of chronic inflammation?
• Why does macrophage accumulation persist in chronic inflammation?

• How do leucocytes get to an area of acute inflammation?
• What is the role of leucocytes in acute inflammation?

• Which mediators of inflammation are derived from cells?
• Which cells release histamine?
• What are the effects of histamines in an inflammatory response?

• What leucocyte types are characteristic of acute inflammation?
• How do leucocytes get to an area of acute inflammation?
• Why do neutrophils predominate in the inflammatory response in the first 6-24 hours?

• What are the different types of acute inflammation?
• What are the outcomes of acute inflammation?

• What are the chemical mediators of acute inflammation?
• What do they do?

**WEEK 7:**

**Tissue Renewal and Repair: (###)**
• Repair by connective tissue – granulation tissue
  o Cell and vascular changes / events
• Wound healing
  o Primary intention
- Secondary intention
- Mechanisms involved in repair
  - Growth factors
  - Matrix
  - Collagen
  - Wound strength
- Factors affecting inflammatory – repair response
  - Local
  - Systemic

Questions:
- Describe the order of events involved in healing by first intention.
- What important effects does PDGF have in relation to wound healing?
- What are the phases involved in scar formation?
- What are the local triggers of fibroblast migration and proliferation (at the site of injury)?
- What are the sources of these local triggers?
- Describe how angiogenesis occurs.
- What are the phases involved in scar formation?
- What are the local triggers of fibroblast migration and proliferation (at the site of an injury)?
- Describe the individual effects of 6 factors that can affect wound healing.
- Describe the process of skin wound healing by first intention. (Also describe the timeline of these steps).
- What systemic factors affect wound healing?
- What local factors impede wound healing?
- What is angiogenesis? Give some examples.
- What steps are involved in angiogenesis from pre-existing vessels?
- Describe the pathogenesis of fibrosis. Provide some examples.
- Describe the process of healing of an incised skin wound.
- What factors influence wound healing?

WEEK 8:

Fluid and Haemodynamic Derangements: (###)
- *Oedema
- Thrombosis
  - *Normal haemostasis
- Thrombosis
  - DIC
- Embolism
  - Types
- Infarction
- Shock

Questions:
- Describe the mechanisms of oedema formation.
- Describe the causes of oedema formation.
- How does increased hydrostatic pressure cause oedema?
- What is the pathogenesis of cardiac oedema?
- What factors govern the movement fluid between the vascular and interstitial spaces?
- What are the major mechanisms of oedema formation (with examples)?
- What is the pathogenesis of oedema?
- How is oedema categorized and provide some examples?
- What clinical conditions may cause fat embolism?
- What is the pathogenesis of fat embolism syndrome?
- What are the potential clinical sequelae of fat embolism?
- Describe the pathogenetic sequence of events in septic shock.
- How are specific organ systems affected in septic shock?
- What clinical conditions may cause fat embolism?
- What is the pathogenesis of fat embolism?
- What are the potential clinical sequelae of fat embolism?
- Describe the formation of a primary haemostatic plug after a vascular injury.
- How does this then become the secondary haemostatic plug?
- What are the two main roles of platelets in haemostasis?
- In haemostasis describe the sequence of events at the site of vascular injury.
- What factors restrict clotting to the site of vascular injury?
- What is an endotoxin?
- How does an endotoxin cause septic shock?
- How do microbes initiate septic shock?
- What are the effects of the mediators on the coagulation pathway?
- What are the consequent effects on tissues?
What factors lead to formation of a thrombus?

What conditions predispose to the development of pulmonary thromboembolism?
Where do pulmonary thromboemboli originate?
What are the potential clinical sequelae of pulmonary thromboembolism?
What are the non-thrombotic types of pulmonary embolism?

In the normal coagulation cascade what happens after Factor X is activated?
Describe the process of normal fibrinolysis.

What is the coagulation cascade?
What mechanisms restrict the activity of the coagulation cascade?

List the sequence of events in normal haemostasis after vascular injury.
Describe the creation of the primary haemostatic plug.

What is hypovolaemic shock?
Describe the stages of hypovolaemic shock.

What factors predispose to thrombus formation?
Expanding on hypercoagulable states, what are the broad categories and give examples of each type.

What is an embolus?
What types of emboli do you know of?

WEEK 9:

Immunity:
- General features of the immune system (###)
  - T cells, B cells, cytokines etc
- Hypersensitivity reactions (###)
  - Types
  - Events / timing
- Autoimmune diseases (#)
- AIDS (#)

Questions:
- What is Type 1 hypersensitivity?
- Describe the 2 phases that occur.
- List some agents that can cause Type 1 hypersensitivity.

- What is a Type I hypersensitivity reaction?
- What is the immune mechanism that causes it?
- What are the actions of mast cell mediators in Type I hypersensitivity?
• What is the late phase reaction?

• What is Type II hypersensitivity?
• Describe the different types of Type II hypersensitivity reactions and give examples of each.

• What is Type IV hypersensitivity?
• What is a delayed type of hypersensitivity reaction?
• What is T cell mediated cytotoxicity?

• What is Type III immune mediated hypersensitivity?
• What is the pathogenesis of Type III immune mediated hypersensitivity?
• What are the most common sites for immune complex deposition?
• Name some diseases caused by Type III immune mediated hypersensitivity.

• What are the cellular events in delayed type hypersensitivity?
• How does it differ in a naïve individual?

• What is a Type I hypersensitivity reaction?
• What are the primary mediators within the mast cell granules and their actions?
• What characterizes the second, late-phase reaction?

• What is antibody mediated hypersensitivity
• Describe the mechanisms which mediate the hypersensitivity response.
• List an example or examples for each mechanism.

• What diseases are caused by Type 4 hypersensitivity?
• Describe the tuberculin reaction.

• What are the major classes of lymphocytes?
• What is the role of each class of lymphocyte in the normal immune response?

**WEEK 10-11:**

**Cardiovascular System – Blood Vessels / Heart:**
• Atherosclerosis (###)
• Hypertensive vascular disease (##)
• Aneurisms and Dissections (# #)
• Congestive cardiac failure (###)
• Ischaemic heart disease (#####)
• Valvular heart disease (# #)

**Questions:**
• Describe the pathogenesis of aortic dissection
• How are aortic dissections classified?
• List the major risk factors for aortic dissection.
• Describe the morphological features of aortic dissection.
• What are the consequences of aortic dissection?

• What is the sequence of events in acute coronary artery occlusion?
• Describe the time course of myocardial injury after coronary occlusion.

• What are the causes of aortic valve stenosis?
• What is calcific aortic stenosis?
• What are the consequences of calcific aortic stenosis?

• What are the causes of acute pericarditis?
• What types of pericardial fluid exudate may be seen?
• Describe the clinical features.

• Outline the steps involved in the pathogenesis of atherosclerosis.
• List the potential causes of endothelial injury.

• Describe the differences between stable and vulnerable atherosclerotic plaque.
• What pathological changes can occur in these plaques?
• What are the consequences of these changes?

• What are the characteristics of hypertrophic cardiomyopathy?
• What are the complications of HCM?

• Describe the pathogenesis of aneurysm.
• What are the clinical consequences of an AAA?
• What is the risk of rupture of an AAA?

• What factors are thought to contribute to essential hypertension?

• What are the long term consequences of essential hypertension?
• Describe the clinical features of malignant hypertension.

• What factors predispose patients to infective endocarditis?
• Which organisms commonly cause infective endocarditis?
• What are the complications of infective endocarditis?

• What is cor pulmonale?
• What are the common causes of cor pulmonale?
• What are the major morphological features of cor pulmonale?

• What are the major causes of heart failure?
• What pathological processes can occur in the myocardium in heart failure?
• What are the pathological changes in the liver caused by heart failure?
• In myocardial infarction, what sequence of events leads to acute coronary artery occlusion?
• Describe the time course of myocardial injury after acute coronary artery occlusion.

**Renal System and Genitourinary**

- Urolithiasis (###)
- Urinary tract obstruction (##)
- Tubular and interstitial disease (##)

**Questions:**

- What are the manifestations of nephritic syndrome?
- What are the underlying processes responsible for these features?
- What are the causes of the nephritic syndrome?

- What are the types of urinary calculus?
- What is the pathogenesis of renal stones?

- What are the manifestations of the nephritic syndrome?
- What are the mechanisms of the oedema?

- Describe the aetiology and pathogenesis of post streptococcal glomerulonephritis.
- Describe the clinical features of post streptococcal GN.

- What conditions cause urinary tract obstruction?
- What are the clinical features of acute obstruction?
- What are the possible clinical sequelae of urinary tract obstruction?
- Describe the pathogenesis of effects of unrelieved obstruction of the ureter.

- What organisms cause acute pyelonephritis?
- What steps are involved in ascending infection?
- What are the features of chronic pyelonephritis?

- What causes acute kidney injury?
- How does urine output often change with time following acute kidney injury?

**Respiratory System**

- Obstructive airways disease (###)
- Pulmonary infections (###)
- Pulmonary congestion and oedema (##)
- Tumours (##)
- Hyperbaric oxygen (##)
Questions:
- Name some environmental triggers for atopic asthma.
- What are the pathological steps of the acute response?
- What cells are involved in the late phase response?
- Describe some of the inflammatory mediators involved.

- What is emphysema?
- What are the anatomical types of emphysema?
- What is the pathogenesis of emphysema?
- What is the role of cigarette smoke?

- Describe the pathogenesis of atopic asthma.
- What are the pathological features of asthma?
- Asthma can be categorized as atopic or non-atopic. What are the characteristics of each of these types?

- Describe the relationship between asbestos exposure and malignant mesothelioma.
- Where can malignant mesothelioma arise?

- What disorders can precipitate the Adult Respiratory Distress Syndrome, ARDS?
- What is the pathogenesis of ARDS?
- What are the conditions associated with ARDS?
- What are the outcomes of ARDS?

- What organisms commonly cause community acquired pneumonia?
- What conditions predispose to the development of pneumonia?
- What are the potential complications of pneumonia?
- How do atypical pneumonias differ from classical bacterial pneumonias?
- How is legionella pneumonia contracted?

Week 12-13:

Infectious Diseases
- General principles of microbial activity including transmission (###)
- Bacterial infections (###)
- Viral infections (##)

Questions:
- Describe the hepatitis D virus.
- How does hepatitis D cause hepatitis?
- Describe how the Hepatitis D virus infects the human body.
- How is Hepatitis D infection diagnosed?

- How can hepatitis B be transmitted?
- What are the potential outcomes following acute hepatitis B infection?
- What are the serum markers of acute infection with hepatitis B?
• Give some examples of clinical Herpes Simplex infection.
• After primary herpes simplex infection, how does reactivation occur?

• Name some clostridial diseases and causative organisms.
• What is the pathogenesis of gas gangrene?

• Describe the clinical course of Hepatitis A infection.
• How do the serological markers change with time in Hepatitis A infection?

• Describe the potential outcomes of acute hepatitis C infections in adults.
• How does the serology for Hepatitis C infection change in case of resolution?
• What causes hepatitis C infection?
• Describe the clinical course of hepatitis C infection.
• What are the risk factors for acquiring hepatitis C?
• What features of the hepatitis C virus make vaccine development difficult?

• Describe the pathogenesis of tuberculosis in a previously unexposed immunocompetent person.

• What microorganisms cause malaria?
• Regarding the pathogenesis of malaria, how does Plasmodium Falciparum differ from other species of Plasmodia?
• What factors can make people resistant to malaria?

• What is the clinical spectrum of candida infection?
• By what mechanisms do candida cause disease?
• Which immune responses are important for protection against candida infection?

• How does the influenza virus cause pneumonia?
• How does Influenza A cause epidemics and pandemics?

• What are the routes of transmission of Hepatitis C virus?
• What are the potential outcomes of infection?

• What are the 2 clinically significant Neisseria?
• Describe the pathogenesis of N. meningitidis infection.

• What are streptococci?
• Name some of the different types of streptococci and give examples of diseases they cause.
• What factors in streptococci contribute to their virulence?
• What post infection syndromes do streptococci cause?
• What are the normal barriers to infection by ingested pathogens in the gastrointestinal tract?
• Describe the barriers to infection that exist within the respiratory tract.
• What processes can disrupt the normal protective mucociliary action?

• Describe the structure and classification of influenza viruses.
• What is the difference between antigenic shift and drift?
• How does the human body clear primary influenza virus infection?

• What is the causative organism of cholera?
• Describe the pathogenesis of cholera.

• What are the organisms that cause infectious enterocolitis?
• Describe the pathogenesis of pseudomembranous colitis.
• What are the clinical features of pseudomembranous colitis?
• What are the risk factors for pseudomembranous colitis?
• What is the pseudomembrane?

• List the types of E.Coli enteritis and describe their features.

• How do microbial constituents initiate septic shock?
• What is the effect of endothelial cell activation and injury during septic shock?
• How does endothelial activation result in DIC?

• What is secondary tuberculosis?
• How may infection occur in secondary tuberculosis?
• Describe the pathological features in the lung of secondary infection with TB.

• Describe the pathogenesis of measles.
• What type of immune responses occur in measles?
• Describe some of the systemic features of measles virus infection.

• What types of organisms are the Clostridia?
• Name the organisms and the diseases they cause in humans.
• How does botulism toxin cause disease?

• What type of bacteria is Salmonella?
• Describe the pathogenesis of typhoid fever.
• What are the clinical features?

• Describe the virulence factors of staph aureus.
• What infections do the different species of staphylococci cause?
Blood Cell Disorders

- Anaemias (##)
- Bleeding disorders (##)
- Blood groups / transfusions (##)
- Inflammatory white cell inflammation (##)

Questions:

- What is the pathogenesis of pernicious anaemia?
- What are the clinical manifestations of the disease?

- What is Von Willebrands Disease?
- What are the effects on the clotting?

- What is haemophilia A?
- Why do patients with haemophilia A bleed?
- What is the association between clinical severity and Factor VIII levels?

- What is sickle cell disease?
- What are the major clinical features of sickle cell disease?
- What are the major precipitants for a sickle cell crisis in a prone individual?

- What is Disseminated Intravascular Coagulation?

- Describe the pathophysiology of DIC.
- List the major clinical disorders associated with DIC.
- What are the major mechanisms that trigger DIC?

- What are the haematological and clinical effects of Von Willebrands Disease?
- Describe the types of Von Willebrands Disease.

- What major clinical disorders are associated with DIC?
- What is the pathogenesis of DIC?
- What are the consequences of DIC?

- Classify haemolytic anaemias.
- Describe the common features of haemolytic anaemias.
- Give some important causes of intravascular haemolysis.

- What is the aetiology of Fe deficiency anaemia?
- What are the laboratory findings in Fe deficiency anaemia?
- What are the clinical features of Fe deficiency anaemia?

- What are the causes of thrombocytopenia?
- What is the pathogenesis of immune thrombocytopenic purpura?
Nervous System

- Trauma (###)
- Cerebral oedema and raised intracranial pressure (###)
- Cerebrovascular disease (###)
- CNS infections (##)

Questions:

- What are the different types of meningitis?
- What organisms commonly cause bacterial meningitis?
- What are the likely organisms causing bacterial meningitis in different age groups?
- What are the typical CSF findings in acute bacterial meningitis?
- How do the CSF findings typically differ between acute bacterial and viral meningitis?

- What is the most frequent cause of clinically significant SAH?
- Where are saccular aneurysms commonly located?
- What is the aetiology of saccular aneurysms?
- What factors increase the likelihood of rupture of these aneurysms?
- What are the pathological consequences of SAH?

- What is the morphology of a berry aneurysm
- What are the common sites of berry aneurysms?
- What is the natural history of a ruptured aneurysm?

- What are some of the causes of dementia?
- Describe the pathogenesis of Alzheimer's disease.

- What are the causes of cerebral infarction?
- What are the causes of focal cerebral infarction?
- What are the sources of cerebral thromboemboli?

- What are the clinical features of Multiple Sclerosis?
- What is the pathogenesis of Multiple Sclerosis?
- What might be found in CSF of a patient with MS?

- Describe the clinical features of Parkinsonism.
- What are the causes of Parkinsonism?
- Outline the possible pathogenesis of Parkinson's disease.

- What types of intracranial bleeding can be seen in a patient with a head injury?
- What sequence of events occur in an extradural haemorrhage?
- Define concussion and what are its clinical features?
Musculoskeletal
- Fractures (###)
- Osteomyelitis (##)
- Arthritis (##)

Questions:
- Describe the process of fracture healing.
- What factors may impede fracture healing?
- Describe the pathological features of gout.
- What are the causes of gout?
- What factors lead to osteoarthritis?
- Describe the pathological changes that occur in an affected joint.
- Describe the clinical features of osteoarthritis.
- Describe the pathogenesis of osteomyelitis.
- What bacterial organisms cause osteomyelitis?
- What are the changes in the bone that occur in osteomyelitis?
- Describe the morphological features of gout.
- What are the causes of gout?
- Describe the pathogenesis of acute gouty arthritis.
- What is the pathogenesis of rheumatoid arthritis?
- What are the extra-articular manifestations of rheumatoid arthritis?
- What are the long term complications of RA?

Week 14-15:

Gastrointestinal System (#)

Questions:
- By what mechanisms may Helicobacter pylori cause peptic ulcers?
- What complications may arise from peptic ulcer disease?
- What are the pathological features of Crohn's Disease?
- What are the extra-intestinal manifestations of Crohn's Disease?
- What are the pathological features of ulcerative colitis?
- What extra-intestinal manifestations occur in ulcerative colitis?
- What are the predisposing conditions for the development of ischaemic bowel?
- What are the clinical features of transmural infarction?
- Describe the intestinal response to an acute ischaemic insult.
- Which parts of the bowel are most susceptible to acute ischaemic injury and why?
• What are the causes of chronic gastritis?
• Describe the features of H pylori induced chronic gastritis.
• What are the complications of gastric ulcer?

Liver, Biliary Tract and Pancreas
• General features of hepatic disease (###)
• Infectious disorders (##)
• Alcoholic liver disease (##)
• Cholelithiasis (##)
• Cholecystitis (##)
• Acute pancreatitis (##)
• Chronic pancreatitis (##)

Questions:
• What are the pathological features of alcoholic liver disease?
• Are any of these conditions reversible with abstinence from alcohol?
• What changes occur at the cellular level in alcoholic hepatitis?
• What are the sequelae of liver cirrhosis?
• In end stage alcoholic liver disease what are the potential causes of death?

• What are the proposed pathogenesis and consequences of pre-eclampsia?
• Describe the clinical course of pre-eclampsia.
• Describe the morphological changes in the placenta.

• What are the causes of acute pancreatitis?
• Describe the pathogenesis of acute pancreatitis.
• What are the laboratory findings of acute pancreatitis?

• What are the major causes of portal hypertension?
• Classify portal hypertension giving examples for each.
• What are the major clinical consequences of portal hypertension due to cirrhosis?
• What mechanisms are involved in the formation of ascites?

• What are the risk factors for the development of cholesterol stones?
• Describe the pathogenesis of cholesterol stone formation.

• Describe the pathogenesis of acute calculous cholecystitis.
• What is the role of bacterial infection in acute cholecystitis?
• How does a calculous cholecystitis differ from this?
• Describe the clinical features of acute cholecystitis.

• What are the causes of acute liver failure?
• What are the clinical features of liver failure?
• What do you understand by hepato-renal syndrome?
• Outline the normal metabolism and elimination of bilirubin.
• What are the common causes of jaundice?

• What are the morphological features of chronic pancreatitis?
• What are the clinical consequences?

Endocrine
• Endocrine pancreas (##)

Questions:
• What is thyrotoxicosis?
• What are the important clinical features of thyrotoxicosis?
• What are the main causes of thyrotoxicosis?

• How are pituitary adenomas classified?
• Describe the somatic effects of one of the adenomas you have named.

• What is the pathogenesis of diabetic ketoacidosis?
• What are the long-term complications of diabetes?
• Describe the stages in the development of Type I Diabetes.
• What is the pathogenesis of Type II diabetes?
• What are the principal complications of Type II diabetes?

Neoplasia
• Biology of tumour growth (##)
• Clinical features of tumours (##)

Questions:
• Describe the steps involved in tumour invasion of the extracellular matrix.
• Describe possible mechanisms that influence the distribution of metastases.

• What is a paraneoplastic syndrome?
• What are the main types of paraneoplastic syndromes?
• What is the cause of cachexia in cancer?

Environmental
• Therapeutic drugs (##)

Questions:
• What is the function of Vitamin K?
• What are the causes of Vitamin K deficiency?
**Week 16-22:**
Revision and exam practice

**PROGRAM SUMMARY**

**WEEK 1-4:** The normal cell; Cellular injury and adaptation

**WEEK 5-6:** Acute and Chronic Inflammation

**WEEK 7:** Tissue Renewal and Repair

**WEEK 8:** Fluid and Haemodynamic Derangements

**WEEK 9:** Immunity

**WEEK 10-11:** Cardiovascular System – Blood Vessels / Heart:

**Week 12-13:** Infectious Diseases

**Week 14-15:** Gastrointestinal System

**Week 16-22:** Revision and exam practice