INTRODUCTION
The understanding of pathology is vital in the understanding of clinical medicine. Pathology is all about understanding disease – how it arises, its patterns, complications and how it causes symptoms and signs. An appreciation of the appearance of disease is helpful in gaining this understanding and to be able to correlate morphological changes with clinical features and the results of laboratory and radiological investigations.

In relation to macroscopic pathology specimens or images in resource sessions and examinations, you may be asked
• for a diagnosis
• for a description
• about the predisposing factors and/or causes of the disease
• about the pathogenesis of the disease
• about the potential complications of the disease and how they arise
• to explain a patient’s clinical symptoms and signs or investigation results in light of the pathological abnormalities present
• to describe the expected histological abnormalities in the abnormal areas
etc.

Powers of observation, seeking important features and description are important in medicine generally, not just in pathology. They are important when examining patients and interpreting radiological images. As soon as a patient walks into a room you should be observing them (are they fat, thin, pale, jaundiced, short of breath etc). Specific site, size, colour, texture etc are also important for describing lumps, skin lesions etc on a patient, so the observational and descriptive skills which you learn in pathology have a broader application. Accurate documentation using appropriate terminology is also a vital skill for medical practitioners. Examining and describing pathology specimens not only helps you to gain an understanding of disease but also helps you to gain skills in these other areas.

Even if you are not asked for a description of a pathology specimen, you need to have an approach to examining a specimen in order to seek relevant features to aid you in making a diagnosis, just as you need an approach to clinical history taking and examination. Firstly, to appreciate the abnormal, you need to have a knowledge and understanding of the normal, in this case anatomy. You also need to have some background knowledge and understanding of basic pathological processes and their appearances, and the diseases of different organ systems, before you can hope to recognise a disease or process. This will help you to work out what the disease or process is if you don’t readily recognise it.

Definite diagnoses cannot be made on every specimen, and in reality, pathological diagnoses are largely made on histological examination, not just macroscopic appearances. However, in all cases you should be able to formulate a preferred diagnosis or reasonable list of differential diagnoses. Just as in clinical practice, you will not become proficient in diagnosing something if you have only seen one case. Exposure to a variety of cases to experience the variability in morphology will help your understanding and diagnostic ability greatly.

Your observational, diagnostic and descriptive skills will improve with time and practice as you learn more pathology. Some pathological abnormalities are easy to recognise, but even so, make sure you understand why this is the diagnosis and be able to recognise and describe the features, such that you can defend your diagnosis if necessary.

OVERVIEW OF THE ASSESSMENT OF PATHOLOGY POT SPECIMENS
In general
• look at the entire specimen, not just the front
• identify and orientate the organ/tissue
• identify the abnormality/ies and from your knowledge of pathology look for relevant features to help you make the diagnosis
• use any clinical information given to you – it is often (but not always) relevant
• if you can’t make a diagnosis, at least make a list of differential diagnoses
• be able to correlate the pathological features with the clinical features (clinicopathological correlation) i.e. explain how the pathological features have caused the patient’s symptoms and signs. You should also be able to do this in reverse i.e. describe the underlying pathology in view of a patient’s symptoms and signs.

MACROSCOPIC ASSESSMENT AND DESCRIPTION
1) Recognition of tissue and orientation. Look at the front of the specimen first (the one with the number and the coloured dot on the top). However, always also look at the back (and sides) of a pot – they may contain important information. Make sure you can
recognise the organ or tissue and orientate the specimen (i.e. left vs right, front vs back, left ventricle vs right ventricle etc) if necessary.
A good description should start by stating what the specimen is.

2) Description of the abnormality. Decide and state whether the organ is of normal size, or too small (is it atrophic or from a child?) or too large (hypertrophic, hyperplastic, other?). Identify the abnormality. Is it:
   Focal: a single abnormality in one area.
   Features that can be useful in the diagnosis and description of focal lesions include
   • size: approximate dimensions can be given
   • shape
   • colour: What colour is it? Is it all one colour or is it many colours (variegated)? Does it look homogenous (all the same the whole way through)? Does it look reddened or dark brown, suggesting vasocongestion/hyperaemia and/or haemorrhage? Does it look grey (altered blood) and friable (falling to bits), suggesting necrosis
   • consistency: this can be difficult to assess in a specimen in a pot which you can’t touch, but even just by looking you can get some idea. Does it look solid or firm? Firm pale tissue may be tumour or fibrosis. Does it look friable (as if it’s falling to pieces) suggesting necrosis? Some lesions are cystic - there may be one or many (polycystic), or cavitated (there is a cavity from loss of tissue following necrosis).
   • margins: are they well defined, poorly defined or irregular, or is there a rim of fibrous tissue around the lesion (encapsulated)? Malignant neoplastic lesions typically have diffuse/irregular/infiltrative margins (and may also demonstrate necrosis) whereas benign neoplastic lesions tend to have well defined and sometimes encapsulated margins (however there are many exceptions!).
   • surface: for a lesion in an epithelial lined structure, assess and describe whether it is protruding from the surrounding epithelium (polypoid). Is the lesion ulcerated (surface is replaced by necrotic slough rather than healthy epithelium)? Is the surface smooth or irregular or does it have a papillary or villous configuration?
   Multifocal: this means that there is more than one distinct lesion in the specimen. All the comments regarding the description of focal lesions apply here as well. In addition, it may be important to note any variation between lesions.
   Diffuse: means involving the entire or majority of an organ/tissue or lobe. Some of the above features may also be of use for assessing and describing a diffuse process e.g. consistency, colour.

Learn to describe the site of an abnormality using appropriate anatomical terms e.g. at the apex of the left upper lobe, in the anterior aspect of the left ventricular myocardium (not, for example, ‘at the top of the pot’).
Try to avoid using the diagnosis in your description (what if your diagnosis is wrong?) e.g. the myocardial infarct shows....

NB. The term lesion is a useful word. It tends to be used for focal abnormalities.

3) Think about and look for other relevant features, the presence or absence of which may help your diagnosis e.g. are there any enlarged local lymph nodes that may support your diagnosis of malignancy? Think about complications of the disease that may be present in the specimen e.g. transtentorial herniation with a space occupying lesion. If present, describe them. It may also be useful to state relevant negatives in your description.
Other pathologies. Have a look at the rest of the specimen to see if there are any other abnormalities. If they are present, describe them.

Descriptions should not be long but should be succinct and demonstrate appropriate use of terminology. The description should include important features that are used to make the diagnosis, and other important features e.g. size, location. Someone else reading a good description should be able to make the diagnosis without having seen the specimen.

4) Formulate a preferred diagnosis or differential diagnosis. This should be as specific as possible (e.g. in general, a diagnosis of ‘tumour’ is insufficient - is it likely to be benign or malignant, primary or secondary, what type is it likely to be? Rather than just cholecystitis, is it acute or chronic? Is it an old or a recent myocardial infarct?) and should include all the major clinically significant abnormalities in the specimen (that may or may not be related to each other); sometimes there will be more than one. If you aren’t able to make a diagnosis or differential diagnosis, at least try and identify which of the broad groups of pathological processes the abnormality fits into using the pathological or surgical sieve. Or work through a list of the conditions that you know of that occur in the particular organ, and exclude those that seem unlikely from the features, thus narrowing the list of possible diagnoses.

The surgical/pathological/diagnostic sieve is a tool for formulating differential diagnoses, whether in clinical situations or for looking at pathology pots, especially when the diagnosis is not obvious. The categories include congenital, genetic, traumatic, inflammatory (infection and immunological), vascular, degenerative, environmental, endocrine, metabolic, nutritional, neoplastic, psychiatric, iatrogenic and idiopathic.
A number of mnemonics exist for helping to remember the categories. One is: TIN CAN BED PAN. This is short for: Trauma, Inflammatory, Neoplastic, Congenital, Arteriovenous, Neurological, Blood, Endocrine, Drugs, Psychogenic, Allergic, Not known.
The specimens in the pots have been fixed or preserved. Following fixation, the colours of tissues are not well preserved, they fade, or may look greyer than normal. For example, when fresh, haemorrhage, areas of vasocongestion/hyperaemia and thrombi are generally dark red. In the pots they may look dark red, but are often black or dark grey/brown. Dark red, black or dark grey/brown areas thus generally indicate excessive amounts of blood that may represent haemorrhage or dilated congested blood vessels (usually as a result of acute inflammation or venous obstruction) if in the tissues, or thrombus if in a vessel or chamber of the heart.

Many students think that necrosis looks black/dark brown. This is only so in certain situations (where there has been haemorrhage or alteration of haemoglobin) and in many instances necrosis looks pale. Also remember that necrosis has a lot of causes, not just infarction. Haemorrhagic infarcts are often dark red/grey/brown/black because of haemorrhage. Pale or anaemic infarcts are mainly pale due to lack of blood but they may have associated red/grey etc areas due to small amounts of haemorrhage in and around the dead tissue, surrounding vasodilatation from the acute inflammatory response or vascular granulation tissue formation in healing, depending on their age. You should learn the situations and organs in which pale and haemorrhagic infarcts occur. Necrosis in a malignant tumour typically looks pale but it may look greyish (and friable) due to small amounts of bleeding associated with the necrosis. Gangrene (e.g. of appendix or foot) looks black because of the presence of altered haemoglobin, following diffusion of red blood cells from dead vessels.

Many organs have attached yellow or slightly orange coloured tissue, often not seen in anatomy prosections as it has been dissected away. This material is fat/adipose tissue and is normal. Learn to recognise it, as it is commonly mistaken as being pathological.

Off-white or pale grey tissue tends to represent connective tissue or tumour (though not all tumours are white). Connective tissue may be normal or abnormal (scar/fibrosis).

Muscle tends to look a bit like cooked meat i.e. grey-brown.

There are many other features and terms that you should learn to recognize and use e.g. cyst, abscess, cavitation, polyp/polypoid (and polyps may be sessile or pedunculated), villous or papillary architecture, ulceration.