ANSWERS

For each practice report, you should have: (1) drawn a labelled diagram and described how the tissue differs from normal; (2) written a paragraph of description, with an interpretation of the changes you have noted (including any "special" stains that might help in interpretation); and (3) provided an identification of the pathological process.

SLIDE GROUP A

26.1 Lung

Dense cellular infiltrates, mainly neutrophils but some macrophages, in the bronchi and areas of adjacent lung parenchyma, with patchy collapse of alveoli and widespread vasodilatation. Changes are of recent purulent inflammation of bronchi and lung, due to acute broncho-pneumonia. (Pathological process: acute inflammation resulting in broncho-pneumonia).

SLIDES GROUP B

26.2 Skin

Within the fibrotic thickened dermis, there is a chronic abscess with a cavity containing neutrophils (cells of acute inflammation) forming pus in the centre, surrounded by granulation tissue (capillaries and fibroblasts) with dense infiltrates of plasma cells and a few lymphocytes and macrophages (cells of chronic inflammation). (Pathological processes: abscess formation with acute and chronic inflammation with granulation tissue and fibrosis).

26.3 Stomach

In the gastric mucosa there is a large ulcer. In the underlying and surrounding tissues, there are many lymphoid follicles. The ulcer floor consists of necrotic tissue infiltrated by neutrophils (cells of acute inflammation) merging into the underlying muscle. In places, there are capillaries and fibroblasts, characteristic of granulation tissue underlying the necrotic and acutely inflamed ulcer floor. There are chronic inflammatory cells (lymphocytes, macrophages and plasma cells) intermingled with and below the granulation tissue. Healing by repair is seen with fibrosis present below the granulation tissue, indicating the chronic nature of the ulcer with underlying scar tissue. At the rolled edges of the ulcer, there is regeneration of the glandular epithelium of the mucosa in an attempt to heal the defect by regeneration.

The appearance is of a **chronic benign peptic ulcer** of the stomach. (Pathological processes: ulceration with necrosis, acute and chronic inflammation with granulation tissue repair and regenerative wound healing).

26.4 Spleen

There are some dark lymphoid follicles present throughout the spleen, which are all about the same size and distributed uniformly. But there are many other rounded structures, which are variable in size and haphazardly distributed; most have pink or eosinophilic centres and consist of pale elongated or plump cells with a few large, multinucleated cells. These are aggregates of macrophages, both epithelioid macrophages and multinucleate giant cell macrophages, forming granulomas. Most of the granulomas show central necrotic cell death in the form of amorphous eosinophilic material (caseation) in the centre of the granulomas. The macrophages are usually surrounded by a rim of lymphocytes. The appearance is that of multiple necrotising granulomas and is characteristic of **miliary (blood-borne) tuberculosis**. A Ziehl-Neelsen stain should be performed to confirm the presence of acid and alcohol-fast bacilli (mycobacteria). (Pathological processes: miliary (blood-borne) tuberculosis with caseating granuloma formation (also called granulomatous chronic inflammation) - an example of Type IV Hypersensitivity).

SLIDES GROUP C

26.5 Lung

The section includes segments of a moderate sized artery, the lumen of which is occluded by laminated thrombo-embolic tissue. The 'laminae' are zones of red cells, white cells and fine, pale pink granules and threads (platelets and fibrin). An abnormal area of the lung shows some of the alveoli filled by pink, acellular material, (fluid containing protein or lysed red blood cells) and other alveoli filled by red blood cells. The lung alveolar wall structure is blurred with **pyknotic** nuclei and indistinct cytoplasm, indicating infarction with necrosis of the cells of the alveolar walls. The rest of the lung is very abnormal with over-expanded air spaces within more solid looking areas, and some vasodilatation with many alveolar macrophages, some containing carbon particles, as does a node near the artery. The appearance is that of a recent **pulmonary red infarct** with the causative **thrombo-embolus within the pulmonary artery**, presumably an embolus from a deep venous thrombosis elsewhere, such as the deep veins of the calf muscles. (Pathological processes: infarction of pulmonary tissue with evidence of thrombo-embolism).

[History: An elderly patient, confined to bed with congestive cardiac failure developed thrombosis in the calf veins. Increasing breathlessness developed over the next few days before death occurred]

26.6 Left ventricle

Extensive eosinophilia of cardiac muscle fibres combined with loss of nuclei (karyolysis) indicating sheets of necrotic cells, together with the presence of basophilic fragments between them, (the remains of the nuclei of neutrophils, which infiltrated the area as part of the acute inflammatory response), all indicate **recent acute myocardial infarction.**

Laminated **endocardial thrombosis** is present over the infarct (called a mural thrombus). *This is a secondary event; it is NOT THE CAUSE OF THE INFARCT.*

Around the edge of the dead muscle there is pale tissue containing capillaries, fibroblasts and a few brown macrophages. The presence of this **granulation tissue** shows that enough time has elapsed for the process of organisation to have commenced. Similarly, the eosinophilic fibrinous exudate over the surface of the heart, **pericarditis**, is undergoing organisation (granulation tissue formation).

There has been a large fairly recent **acute myocardial infarct** in the left ventricle, which is accompanied by **endocardial thrombosis and pericarditis**. It is undergoing organisation. (Pathological processes: infarction of myocardium with thrombosis, fibrinous pericarditis, acute inflammation and organization/repair by granulation tissue).

SLIDES GROUP D

26.7 Colon

Arising from the mucosa of the colon is a proliferation of closely packed columnar cells showing little evidence of cytoplasmic mucin. Mostly they form elongated and branching glandular structures showing a disordered pattern of growth. In one focus, the pattern is more complex and more chaotic with haphazard budding. The cells which form this focus are even more tightly packed, have a higher nuclear/cytoplasmic ratio and the nuclei are no longer confined to the base of the cells. Mitotic figures are more frequent than elsewhere.

The appearance overall is that of a **colorectal adenoma** forming an adenomatous polyp (showing moderate dysplasia) arising from the large intestine, but in one area the features show severe dysplasia, but there is no definite evidence (in the section examined for this report) that it has invaded the muscularis mucosae. (Pathological process: benign neoplasia of glandular epithelium: **adenoma**).

(Some, but not all of the sections, show the stalk of the polyp clearly).

26.8 Liver

Two larger and some smaller rounded pale areas are seen at low power. Strands of cells line empty-looking spaces containing large cubical cells arranged in clumps and occasionally acini with some mucin. The large cells show variable nuclear size and shape (pleomorphism) indicating that they are malignant.

The surrounding liver appears compressed and atrophied. The areas described do not resemble any normal tissue, but the glandular arrangement of the epithelial cells suggests this is **an adenocarcinoma** and multiple deposits favour secondary spread to the liver. The gastro-intestinal tract is the most likely primary site for early spread to the liver and this adenocarcinoma originated in the stomach. (Pathological process: metastatic malignant neoplasia of glandular epithelium: **metastatic adenocarcinoma**).

26.10 Lymph node

The two larger nodes are extensively replaced by abnormal tissue in which there is deep pink laminated material, often arranged as whorls; this is **keratin** and it is immediately surrounded by large cells with features of squamous cells. Some contain kerato-hyaline granules. At the edges of the epithelial areas, the cells resemble the basal cells of the skin but are quite pleomorphic and contain frequent mitotic figures.

The appearance is that of metastases of well differentiated or **keratinising squamous carcinoma**. The primary tumour would probably be found in the area (e.g. skin or oesophagus) drained by these nodes. (Pathological process: metastatic malignant neoplasia of squamous epithelium: **metastatic squamous carcinoma**).

26.11 Large intestine

A mass of disorderly glandular tissue arises from the mucosa of the bowel. It consists of columnar epithelium but the individual cells lack cytoplasmic mucin although they are able to secrete mucin. The columnar cells are crowded, have a high nuclear/cytoplasmic ratio. The nuclei of the cells show pleomorphism, enlargement, hyperchromatism and increased mitotic figures. The proliferating mass of glands and glandular tissue undermines the adjacent mucosa, extends into the submucosa and penetrates the underlying muscle of the muscularis propria. This is a malignant neoplasm of glandular epithelium invading down into muscle.

The appearance is that of **a moderately well differentiated adenocarcinoma** of large bowel which invades the muscle coats but does not penetrate the full thickness of the bowel. (Pathological process: malignant neoplasia of glandular epithelium: **adenocarcinoma**).