Histopathology: chronic inflammation

These presentations are to help you identify, and to test yourself on identifying, basic histopathological features. They do not contain the additional factual information that you need to learn about these topics, or necessarily all the images from resource sessions.

This presentation contains images of basic histopathological features of chronic inflammation and examples of some relevant diseases.

Before viewing this presentation you are advised to review relevant histology, relevant sections on chronic inflammation in a pathology textbook, relevant lecture notes and relevant sections of a histopathology atlas.

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(The histopathology of chronic inflammation is introduced in semester 2, year 1)
Lymphocytes: small dark round nucleus with little cytoplasm. Lymphocytes are about the same size (or a little larger) as a red blood cell in tissue sections but are smaller than macrophages and neutrophils.
Plasma cells (e.g. black arrows): oval cell with eccentric nucleus. The nucleus is round (similar in size to a lymphocyte) with ‘clockface’ chromatin. The cytoplasm is somewhat basophilic due to the presence of abundant rER. Sometimes a pale area next to the nucleus is seen indicating the site of the Golgi apparatus. The cells with a bilobed nucleus and strongly eosinophilic cytoplasm are eosinophils (yellow arrows).
Macrophages (e.g. black arrows) have an oval, bean or kidney shaped nucleus, generally at the edge of the cell, and moderately abundant cytoplasm. They are larger than red blood cells, and similar in size, or larger, than neutrophils (as seen in tissue sections).
Macrophages containing haemosiderin, a golden brown pigment derived from haemoglobin following the phagocytosis of red blood cells. Identify the entire cell and its nucleus (examples outlined in yellow). There are many plasma cells here also (e.g. black arrows).
Macrophages containing black carbon in the lung

Macrophages that have phagocytosed lipid: foamy macrophages
Granulomatous inflammation is a particular form of chronic inflammation characterized by the presence of epithelioid (resembling epithelial cells) macrophages +/- multinucleate giant cells. It results from a type 4 hypersensitivity response. Multinucleate giant cell of Langhans type (outlined in black) in tuberculosis with nuclei dispersed around the edge of the cell, with background lymphocytes (small dark nuclei, minimal cytoplasm e.g. black arrows) and epithelioid macrophages (e.g. yellow arrows). The visible differences between normal and epithelioid macrophages are subtle (and students needn’t concern themselves with them).
Granulomatous inflammation: Well circumscribed granuloma (outlined in black) with many epithelioid macrophages (some indicated by yellow arrows) and a multinucleate giant cell (outlined in red). The granuloma is surrounded by fibrous tissue and chronic inflammatory cells.
Birefringent (shiny) suture material (yellow arrows) that has been phagocytosed by giant multinucleate macrophages (outlined in black).
Granulation tissue and scar are generally also components of chronic inflammatory responses as the reparative response accompanies the ongoing tissue damage.
Very low power view of a chronic peptic ulcer of the stomach. This one only penetrates into submucosa. There are classically several layers in the base of a chronic peptic ulcer (difficult to appreciate the detail here)
a) necrotic slough and acute inflammatory exudate (yellow star)
b) granulation tissue (red star)
c) scar tissue (blue stars)
Patchy aggregates of lymphocytes (seen as dark areas/tiny dark dots due to their high N:C ratio on this low power) are also noted around the ulcer (black arrows). Make sure you can identify the layers of the wall.
M: mucosa       SM: submucosa
MP: muscularis propria
S: serosa
Atherosclerosis results from a low grade chronic inflammatory response to chronic stresses on the endothelium resulting in endothelial dysfunction with increased permeability to monocytes and blood lipids. Macrophages in the intimal plaque phagocytose lipids (→ foam cells) and these and other cells release factors that attract lymphocytes (dark dots indicated by yellow arrows) and stimulate smooth muscle cell migration from the media. These cells, normally responsible for making extracellular matrix in the media, now produce excessive amounts of matrix (black stars) in the intima. Both images are fairly low power views. Image B is taken from the area outlined in black in image A.