Inflammation, oedema and wound healing

**Task, page 69**
The words in the correct order are…
Inflammatory, localised, heat, pain, redness, swelling, abrasion, chemical irritation, pathogens, frostbite, function

**Task, page 69**
Vascular phase = to clear away debris from site of inflammation; called hyperaemia [increased blood perfusion]

Cellular phase = destruction and removal of foreign material and microbes;

Main type of cell is neutrophils [sometimes called polymorphonuclear leucocytes or PMNs].

Acute inflammation prepares wound site for healing and repair.

Examples of inflammatory mediators…

<table>
<thead>
<tr>
<th>Mediator</th>
<th>Effect</th>
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<tbody>
<tr>
<td>Histamine</td>
<td>vasodilation; increased vascular permeability</td>
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<tr>
<td>Prostaglandins</td>
<td>vasodilation; increased vascular permeability</td>
</tr>
<tr>
<td>Leukotrienes</td>
<td>increase permeability of venules; makes Neutrophils stick down to site of inflammation</td>
</tr>
<tr>
<td>Kinins</td>
<td>increased vascular permeability; pain</td>
</tr>
<tr>
<td>Complement</td>
<td>increased vascular permeability; increased release</td>
</tr>
</tbody>
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of histamine; chemotaxis of neutrophils
**Task, page 70**

In chronic inflammation, the neutrophils have little or no role, as it is the macrophages that take over.

In chronic inflammation, macrophages get into alternating cycles of repair and tissue phagocytosis. As the tissue becomes more and more damaged, and less good tissue is left behind, scar tissue forms. So in terms of the lungs, there will be a thicker respiratory membrane for example, that will mean an increased diffusion distance for gaseous exchange, and possible loss of lung compliance.

**Task, page 70**

Regional inflammation of the skin is painful because pain receptors in the skin will be stimulated.

Granulation tissue is where you find new growth of capillary networks and fibroblasts secreting collagen to strengthen the tissue. It helps the tissue re-vascularise and have some basic structure.

The scab prevents fluid losses, and prevents entry of infectious microbes, dirt or chemicals.

Scar tissue is less strong as the tissue may contain fewer cells that would normally provide structure. If the collagen in a scar is arranged in a disordered manner, then this is less strong too.

**Task, page 71.**

Healing by primary intention is what occurs in the healing process of a clean, well structured wound e.g. a surgical incision that has been closed with sutures [stitches] Generally this should produce a stronger repair with less scar tissue

Healing by secondary intention is healing of a larger wound, that may contain debris that needs to be removed.

Healing by tertiary intention is healing of larger surgical wounds e.g if someone has had a mole removed along with surrounding tissues. The wound is allowed to build up it’s own granulation tissue, then is finally closed over with a suture.
Task, page 72
Interstitial fluid

Task, page 73
Net hydrostatic pressure is blood pressure and is the force that filters water out of the blood.

Net osmotic pressure is a measure of the power of osmosis to drag water back into the circulation from the tissues. Blood osmotic pressure is caused in part by having blood proteins that make blood hypertonic to the interstitial fluid, so we pull water back into blood.

Net filtration pressure is the difference between pressures promoting filtration of water out of capillaries and that osmotic pressure dragging the water back in. It varies across capillary beds, being higher at the arteriolar end, [because of filtration] and lower at venous end. This is the relationship between hydrostatic pressure and osmotic pressure.

When blood colloid osmotic pressure drops, then fluid remains in the interstitial space or in the tissues. This can lead to a reduction in the volume of blood that is circulating [hypovolaemia] and can lead to shock.

Pulmonary oedema occurs due to increased filtration. If too much fluid is leaked into the interstitium the person may ‘drown’ in their own secretions – diffusion distance increases and gaseous exchange is impaired.