Damage to the body’s tissues can be caused by physical agents (e.g. sharp objects, heat, radiant energy, or electricity), microbial infection, or chemical agents (e.g. gases, acids and bases). The damage triggers a defensive response called inflammation. It is usually characterized by four symptoms: pain, redness, heat and swelling. The inflammatory response is beneficial and has the following functions: (1) to destroy the cause of the infection and remove it and its products from the body; (2) if this fails, to limit the effects on the body by confining the infection to a small area; (3) replacing or repairing tissue damaged by the infection. The process of inflammation can be divided into three distinct stages. These are described below.

### Stages in inflammation

<table>
<thead>
<tr>
<th>Increased diameter and permeability of blood vessels</th>
<th>Phagocyte migration and phagocytosis</th>
<th>Tissue repair</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood vessels increase diameter and permeability in the area of damage. This increases blood flow to the area and allows defensive substances to leak into tissue spaces.</td>
<td>Within one hour of injury, phagocytes appear on the scene. They squeeze between cells of blood vessel walls to reach the damaged area where they destroy invading microbes.</td>
<td>Functioning cells or supporting connective cells create new tissue to replace dead or damaged cells. Some tissue regenerate easily (skin) while others do not at all (cardiac muscle).</td>
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</tbody>
</table>

1. Outline the three stages of inflammation and identify the beneficial role of each stage:

   (a) 
   ____________________________

   (b) 
   ____________________________

   (c) 
   ____________________________

2. Identify two features of phagocytes important in the response to microbial invasion: ____________________________

3. State the role of histamines and prostaglandins in inflammation: ____________________________

4. Explain why pus forms at the site of infection: ____________________________