Causes of disease

- **Disease** occurs when the host shows signs and symptoms caused by the pathogen

- Pathogens cause disease by damaging the cells of the host and by producing toxins

For an infection to take hold and cause disease, an organism must:
- attach itself to host tissues
- penetrate host cells
- colonise and reproduce within the host tissue

- In order to gain entry, the pathogenic organism needs to bind or adhere to the host.
- There are molecules called **ligands** found in the bacterial cell walls and outer viral coat, which bind to receptor molecules in host cell's membrane.
- Each ligand can bind to a specific receptor e.g. *streptococcus aureus* can bind to the cells lining of the throat.
- This is called **HOST SPECIFICITY** and the process of attachment is called **SPECIFIC ADHERENCE**.
- The ligand is composed of polysaccharides and are genetically controlled.
- The glycocalyx also helps bacteria to adhere to host cells.
- The host cell receptors contain proteins and the genes for these receptors vary, so some people are more susceptible than others.

- The pathogen enters host cells by **ENDOCYTOSIS** (an infolding of the cell membrane) or by producing enzymes which damage cell membranes.
- They invade phagocytes by the **mucilaginous capsule**, and when they enter the cell, they can not be attached by further phagocytes.
- The bacteria can start reproducing and this is called **COLONISATION**.

**Infection by a pathogen**

- **Attachment**
- **Penetration**
- **Colonisation of host tissues**
- **Pathogen numbers increase in host tissues**

- **Release of toxins**
- **Stimulation of immune response**
- **Disruption of cell metabolism and function**
- **Damage to host cells**
- **New pathogens leave host cells**