

Defence Against Infectious Disease (6.3)

<p>Definitions of key terms (6.3.1 & 6.3.5)</p> <p>Pathogen: A disease-causing micro-organism, virus or prion</p> <p>Antigen: A substance that the body recognizes as foreign and can evoke an immune response</p> <p>Antibody: A protein produced by certain white blood cells (B lymphocytes, plasma cells) in response to an antigen</p>	<p>Antibiotics (6.3.2)</p> <ul style="list-style-type: none"> • Antibiotics block specific metabolic pathways in bacteria (<i>e.g. bacterial enzymes, translation via 70S ribosomes</i>) • Viruses invade host cells and utilise their metabolic pathways • Antibiotics are not effective against eukaryotic cells and hence are not effective against viruses
<p>Role of skin & mucous membranes (6.3.3)</p> <p><i>1st Line of Defence:</i> Surface Barriers</p> <p>Skin</p> <ul style="list-style-type: none"> • Physical barrier against infection • Sebaceous glands secrete lactic & fatty acids • Creates an acidic environment (<i>prevents growth</i>) <p>Mucous Membranes</p> <ul style="list-style-type: none"> • Lines openings (<i>trachea, nose, vagina, urethra</i>) • Mucus contains lysozymes (<i>kills pathogens</i>) • Mucus is sticky and can trap pathogens 	<p>Outline phagocytosis (6.3.4)</p> <p><i>2nd Line of Defence:</i> Non-Specific</p> <ul style="list-style-type: none"> • Phagocytes are irregularly shaped leucocytes that ingest pathogens • Membranous projections called pseudopodia surround the pathogen and engulf it to form a vesicle (phagosome) • This fuses with the lysosome, destroying the pathogen
<p>Explain antibody production (6.3.6)</p> <p><i>3rd Line of Defence:</i> Specific / Adaptive</p> <ul style="list-style-type: none"> • B lymphocytes develop in the bone marrow and each produce one type of antibody • Antibodies are found on the surface of the lymphocyte and detect a specific antigen • Macrophages may present antigens to B lymphocytes, activating them (T_H cells needed) • The B cell differentiates and makes clones (plasma cells) that produce the antibody • Some of the clones become memory cells, surviving for years until re-infection 	
<p>Cause & effects, transmission and social implications of AIDS (6.3.7 & 6.3.8)</p> <p>Cause & Effects</p> <ul style="list-style-type: none"> • AIDS is caused by HIV (a retrovirus) which infects helper T cells (<i>via the CD4+ T-cell receptor</i>) • It integrates its genetic material into the host genome via reverse transcriptase • HIV destroys T_H cells needed for antibody production leading to suppressed immunity • The body cannot fight off pathogens and becomes susceptible to opportunistic infections <p>Transmission</p> <ul style="list-style-type: none"> • HIV is exchanged via bodily fluids (<i>blood transfusions, unprotected sex, needles, breast feeding</i>) • Use of a condom may prevent transmission of HIV via sex • Some people are immune to HIV infection (<i>they lack the CD4+ receptor on their T_H cells</i>) <p>Social Implications</p> <ul style="list-style-type: none"> • HIV-infected individuals may face discrimination, leading to unemployment and poverty • Death can lead to increased numbers of orphans and incapacitate a nation's workforce • Treatments can be very expensive and unavailable in poorer countries 	