

#### 4.1.1 Communicable diseases, disease prevention and the immune system

- (a) the different types of pathogen that can cause communicable diseases in plants and animals
- To include,
- bacteria – tuberculosis (TB), bacterial meningitis, ring rot (potatoes, tomatoes)
  - virus – HIV/AIDS (human), influenza (animals), Tobacco Mosaic Virus (plants)
  - protist – malaria, potato/tomato late blight,
  - fungi – black sigatoka (bananas), ring worm (cattle), athlete's foot (humans).
- (b) the means of transmission of animal and plant communicable pathogens
- To include direct and indirect transmission, reference to vectors, spores and living conditions – e.g. climate, social factors (no detail of the symptoms of specific diseases is required).
- M0.1, M0.2, M0.3, M1.1, M1.2, M1.3, M1.5, M1.7, M3.1, M3.2* HSW1, HSW2, HSW3, HSW5, HSW6, HSW7, HSW8, HSW11, HSW12
- (c) plant defences against pathogens
- To include production of chemicals **AND** plant responses that limit the spread of the pathogen (e.g. callose deposition).
- (d) the primary non-specific defences against pathogens in animals
- Non-specific defences to include skin, blood clotting, wound repair, inflammation, expulsive reflexes and mucous membranes (no detail of skin structure is required).
- HSW2, HSW8
- (e) (i) the structure and mode of action of phagocytes  
(ii) examination and drawing of cells observed in blood smears
- To include neutrophils and antigen-presenting cells **AND** the roles of cytokines, opsonins, phagosomes and lysosomes.
- PAG1** HSW8
- (f) the structure, different roles and modes of action of B and T lymphocytes in the specific immune response
- To include the significance of cell signalling (reference to interleukins), clonal selection and clonal expansion, plasma cells, T helper cells, T killer cells and T regulator cells.
- HSW8
- (g) the primary and secondary immune responses
- To include T memory cells and B memory cells.
- M1.3* HSW2
- (h) the structure and general functions of antibodies
- To include the general structure of an antibody molecule.

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- (i) an outline of the action of opsonins, agglutinins and anti-toxins
- (j) the differences between active and passive immunity, and between natural and artificial immunity
- (k) autoimmune diseases
- (l) the principles of vaccination and the role of vaccination programmes in the prevention of epidemics
- (m) possible sources of medicines
- (n) the benefits and risks of using antibiotics to manage bacterial infection.
- To include examples of each type of immunity.
- To include an appreciation of the term *autoimmune disease* and a named example e.g. arthritis, lupus.
- To include routine vaccinations **AND** reasons for changes to vaccines and vaccination programmes (including global issues).
- M0.1, M0.2, M0.3, M1.1, M1.2, M1.3, M1.5, M1.7, M3.1, M3.2* HSW1, HSW2, HSW3, HSW5, HSW6, HSW7, HSW8, HSW9, HSW11, HSW12
- To include examples of microorganisms and plants (and so the need to maintain biodiversity) **AND** the potential for personalised medicines and synthetic biology.
- HSW7, HSW9, HSW11, HSW12
- To include the wide use of antibiotics following the discovery of penicillin in the mid-20<sup>th</sup> century **AND** the increase in bacterial resistance to antibiotics (examples to include *Clostridium difficile* and MRSA) and its implications.
- HSW2, HSW5, HSW9, HSW12