QUESTION 31 Immunology

Which one of the following cells of the immune system is most reliant on its release of mediators into the extracellular fluid surrounding the organism in order to carry out its role in eradication of foreign organisms?

A. Neutrophils.
B. Eosinophils.
C. Macrophage.
D. Cytotoxic T lymphocytes.
E. Natural killer cells.

Answer B

A & C Polymorphonuclear Neutrophils + Macrophages
- attracted to the enzyme cascade from complement system (C3,C5,C6-9, histamine, leucokotriene B4 & TNF)
- phagocytic cells
- organisms adhere to their surface
- activate the engulfment process
- taken into the cell
- fuse with cytoplasmic granules
- conversion of O₂ to reactive oxygen intermediates
- synthesis of NO and release of O₂-dependent factors from granules

B. Eosinophils
- for killing parasites, ex Helminths
- Helminths activate the complement pathway through their coating with C3b to the receptors of the eosinophils
- eosinophil launch its extracellular attack → release of major basic protein, cationic protein
- damages parasite membrane

C. Cytotoxic T lymphocytes
- control of intracellular infections
- has individual antigen receptor which recognizes antigen
- T-helper and cytotoxic t cells
- T helper cells see antigen with class II MHC (Major Histocompatibility Complex) on the surface of macrophages, release cytokines which then help B cells to make antibody and in others activate macrophages and enable them to kill intracellular parasites
- Cytotoxic T cells recognize specific antigen plus class I MHC on surface of virally infected cells which are killed before the virus replicates, also release γ- interferon which make surrounding cells resistant to viral spread

d. NK cells
- kills viruses
- large granular lymphocytes
- recognises structures on high molecular weight glycoproteins which appear on surface of virally infected cells which differentiate them from normal cells
- activation of of NK cell through perforin/granzyme and separate Fas-mediated pathway
- leading to apoptosis (programmed cell death)