Immune response to infection by Virus

IMMUNITY TO VIRUSES

When person get infected by virus, the body immunity get activates and kills the virus.

• The analysis of the innate and adaptive immune response to viruses

• This provides fundamental insight into the functioning of the immune system.

TYPES OF IMMUNITY TO VIRUS

1. Cytotoxic 2. NK cells 3. Interferon 4. Antibodies

VIA CYTOTOXIC • A special cell of the immune system called a T cell circulates looking for infections.

• One type of T cell is called a cytotoxic T cell because it kills cells that are infected with viruses with toxic mediators.

• Cytotoxic T cells have specialized proteins on their surface that help them to recognize virally-infected cells.

• These proteins are called T cell receptors (TCRs).

• Each cytotoxic T cell has a TCR that can specifically recognize a particular antigenic peptide bound to an MHC molecule.

• If the T cell receptor detects a peptide from a virus, T cell releases cytotoxic factors to kill the infected cell and, therefore, prevent survival of the invading virus

MECHANISM

NK CELLS • Some viruses stop the MHC molecules from getting to the cell surface to display viral peptide.

• Another special cell called a natural killer cell or NK cell.

• NK cell finds a cell displaying fewer than normal MHC molecules it releases toxic substances.

• In a similar way to cytotoxic T cells, which kill the virally-infected cell.

• Cytotoxic factors are stored inside compartments called granules.

• In both cytotoxic T cells and NK cells, when contact with an infected cell triggers cytotoxic releases.

• Enzymes called granzymes are stored in, & also released from granules enters the target cell through pore made by Perforin.

• They initiate a process known as programmed cell death or apoptosis, causing the target cell to die.

• Another released cytotoxic factor is granulysin, which directly attacks the outer membrane of the target cell, destroying it by lysis .

VIA INTERFERONS • Virus infected cell produce and release small protein call Interferons.

• Interferons prevent replication of viruses.

• They also act as signaling molecules that allow infected cells to warn nearby cells of a viral presence.

• This signal makes neighboring cells increase the numbers of MHC class I molecules upon their surfaces, so that T cells surveying the area can

VIA ANTIBODIES • Before virus get the chance to infect a cell, viruses can also be removed from the body by antibodies.

1. The antibodies neutralize the virus.

2. Many antibodies can work together, causing virus particles to stick together in a process called agglutination.

• Agglutinated viruses can make an easier target for immune cell.

3. The activation of phagocytes.

• A virus-bound antibody binds to receptors, called Fc receptors, on the surface of phagocytic cells and triggers a mechanism known as phagocytosis, by which the cell engulfs and destroys the virus.