Cell mediated immunity essay sample

Health & Medicine, Cancer

Cell Mediated Immunity

Cell mediated is one of the components of the immune response. it involves the expression of cells like natural killer cells, phagocytic cells and antigen-presenting cells. it also involves the release of various forms of cytokines. the varies ways by which cell mediated immunity protect the body includes the activation of macrophages and natural killer cells in order to empower them to destroy antigenic agents like pathogens. it also leads to the formation of substances that modulate the function of cells involved in cell-mediated immunity. In addition, cell-mediated immunity helps in protection of the body by leading to activation of T-lymphocytes that are specific to a particular antigen. this enables the T lymphocyte to cause apoptosis of these cells.

Cell mediated immunity to combat intracellular challenges can either be active or passive. The different forms of active immunity include immunization. Immunization can either be in form of antigen adjuvant vaccines, whole cell vaccines, dendritic cell vaccines, viral vectors and naked DNA vaccines. Passive forms of cell mediated immunity, on the other hand involves Adoptive cell transfer and Antigen specific T cells. Several models have been propounded to explain the concept of T cell memory generation. Some of these models include the model of Uniform potential, the model of Decreasing potential. Other models include the model of fixed lineage and the model of progressive differentiation.

In order for CD8 positive T cells to be functionally differentiated, they undergo a number of processes. An antigen-presenting cell initially presents the antigen to the T cell. This leads to its activation. Moreover, within 2-d

days, the activated call undergoes continuous proliferation to become the effector cells, which will mount an immune response against the offending antigen. Some of the effector cells die by apoptosis while some other ones persist in the body as memory T cells.

A regulator of CD8 positive cell differentiation is mTOR. mTOR regulates T-bet and Eomesoderin expression on CD8 positive T cells for effector and memory differentiation. moreover, T cell trafficking and survival regulated by the transcription factor KIf02 and IL-7a. transcription factors in FoxO also mediate lifespan extension. FoxO1, in the presence of T-bet is also responsible for regulating type I effector cell differentiation. Rapamycin is involved in the programming of C8 positive T cells in order to enhancing tumor immunity. T cell memory can be induced by the administration of vaccine. justification for this exercise lies in the fact that they quality and quantity of T cell is directly proportional to the outcome of some challenges like chronic illnesses. moreover, the application of modern concepts in CD8 positive T cell biology to vaccination can potentially lead to the production of memory T cells that have enhances tumor efficacy. some of these modern techniques involve the regulation of mTOR for stimulating vaccine induced CD8 positive T-cell differentiation. in another research, a regimen of Rapamycin was used to regulate vaccine- induced memory CD8 positive T cells and immunity.