

Terms in Second Class
October 12, 2020

Adoptive transfer of T cells: A therapy approach for cancer in which a patient's T cells are removed from the body, modified and expanded, and returned to the patient.

Antigen presentation: The display of antigen on the surface of a cell in the form of peptide fragments bound to MHC molecules. T cells recognize antigen when it is presented in this way.

Apoptosis: A form of cell death common in the immune system, in which the cell activates an internal death program. It is characterized by nuclear DNA degradation, nuclear degeneration and condensation, and the rapid phagocytosis of cell remains. Proliferating lymphocytes experience high rates of apoptosis during their development and during immune responses.

B cell lymphoma: A cancer of B cells; different cancers arise from different stages of B cell development.

B cell receptors: The cell-surface receptor on B cells for specific antigen. It is composed of a transmembrane immunoglobulin molecule (which recognizes antigen) associated with the invariant Ig α and Ig β chains (which have a signaling function). On activation by antigen, B cells differentiate into plasma cells producing antibody molecules of the same antigen specificity as this receptor.

Biologics: Agents used as drugs that have a biological origin, such as antibodies or receptors.

Bispecific T cell Engagers: A type of antibody that can bind to two different antigens at the same time. Bispecific antibodies are being studied in the imaging and treatment of cancer. They are made in the laboratory.

CD20: A surface marker on B cells; retained by B cell lymphoma cells.

CD3: A surface marker on T cells, part of the signaling complex of the TCR.

CD4: A surface marker on Helper T cells, a co-receptor with the TCR that binds to MHC on the antigen presenting cell.

CD8: A surface marker on Cytotoxic T cells, a co-receptor with the TCR that binds to MHC on the antigen presenting cell.

Cell-cycle arrest: Cell cycle arrest is a stopping point in the cell cycle, where it is no longer involved in the processes surrounding duplication and division.

Checkpoint Inhibitors: Approach to tumor therapy that attempts to interfere with the normal inhibitory signals that regulate lymphocytes

Chimeric Antigen Receptor T cells: Similar to adoptive transfer of T cells, but the TCR is replaced by an engineered antibody and signaling molecules.

Clonal selection: The process by which one of the many T cells or B cells is activated and then proliferates.

Co-stimulatory molecules: Cell-surface proteins on antigen-presenting cells that deliver co-stimulatory signals to naive T cells. Examples are the B7/CD80/CD86 molecules on dendritic cells, which bind to CD28 on naive T cells.

CTLA-4: A high-affinity inhibitory receptor on T cells for B7 molecules; its binding inhibits T-cell activation.

Cytotoxic T cell: A CD8+ T cell that is capable of killing infected or altered cells that display a particular antigen.

Fc Region of antibody: Constant region of an antibody.

Granzyme B: An enzyme secreted by cytotoxic T cells that causes apoptosis (death) of target cells.

Helper T cell: A CD4+ T cell that helps macrophages, helps B cells make antibodies, or helps cytotoxic T cells develop.

IL-1: A cytokine produced by active macrophages that has many effects in the immune response, including the activation of vascular endothelium, activation of lymphocytes, and the induction of fever.

IL-12: An activating interleukin for T cells.

Immunosuppression: Cells and molecules that inhibit an effective immune response.

Mast cells: A large granule-rich cell found in connective tissues throughout the body, most abundantly in the submucosal tissues and the dermis. The granules store bioactive molecules including the vasoactive amine histamine, which are released on mast-cell activation. Mast cells are thought to be involved in defenses against parasites and they have a crucial role in allergic reactions.

MHC: Major Histocompatibility Complex, a protein that binds peptides and presents them to T cells.

PD-1: Programmed death-1, a receptor on T cells that when bound by its ligands, PD-L1 and PD-L2, inhibits signaling from the antigen receptor. Target of cancer therapies aimed at stimulating T-cell responses to tumors.

Peptide: A short chain of amino acids, often derived from a larger protein.

Perforin: the protein secreted by cytotoxic T cells that makes a hole in targeted cells.

Provenge: An FDA approved dendritic cell vaccine for prostate cancer that targets prostatic acid phosphatase.

Regulatory T cells Tregs: CD4 T cells that inhibit T-cell responses and are involved in controlling immune reactions and preventing autoimmunity.

Rituximab: A monoclonal antibody that binds to CD20.

Somatic recombination: Rearrangement of nucleotides in DNA that results in the transcription and translation of diverse antibodies and TCRs.

Th1: A subset of effector CD4 T cells characterized by the cytokines they produce. They are mainly involved in activating macrophages but can also help stimulate B cells to produce antibody

Th17: A subset of CD4 T cells that are characterized by production of the cytokine IL-17. They help recruit neutrophils to sites of infection

Th2: A subset of effector CD4 T cells that are characterized by the cytokines they produce. They are involved in stimulating B cells to produce antibody, and are often called helper CD4 T cells

Toll like receptors: Innate receptors on macrophages, dendritic cells, and some other cells, that recognize pathogens and their products, such as bacterial lipopolysaccharide. Recognition stimulates the receptor bearing cells to produce cytokines that help initiate immune responses

Tumor microenvironment: Other cells besides cancer cells that make up a tumor, and often contain immunosuppressive cells.

Type I interferons: Several related families of cytokines originally named for their interference of viral replication.

Vaccination

The deliberate induction of adaptive immunity to a pathogen by injecting a dead or attenuated (nonpathogenic) live form of the pathogen or its antigens (a vaccine). More generally applied, can be nucleic acids (DNA or RNA) that encode the antigen, or loading of dendritic cells ex vivo.

Active vs passive Vaccination

Active vaccination causes B cells to secrete antibody or T cells to become activated; passive vaccination delivers pre-made antibody or antiserum that provides transient protection.

Prophylactic vs therapeutic Vaccination

Prophylactic vaccination creates protection before the actual pathogen arrives; therapeutic vaccination attempts to thwart an ongoing illness or existing tumor.

Variable regions of antibodies and TCRs: A part of the antibody protein that varies in each B cell; similar region of TCRs. The gene sequence of that region is rearranged during development to encode different amino acid sequences, resulting in binding to different antigens.