

CELL-MEDIATED IMMUNE FUNCTION 101

WHAT IS CELL-MEDIATED IMMUNE FUNCTION?

Cell-mediated immune function is the process by which T-lymphocytes protect the body from damage by signaling nearby cells how to respond to specific biological threats within the body. If antibodies are the ninja-like special forces of a biological invasion, the cell-mediated immune response is the front line of soldiers engaging in hand-to-hand combat.

THE TWO SIDES OF THE HUMAN IMMUNE SYSTEM

Biology textbooks divide the immune system into two general categories – that which we are born with, and that which we develop over a lifetime. Although overlap exists, immune cells generally fall into one of these categories, whose functions are quite different.

Humans are born with the ability to launch a cell-mediated immune response, as this is a more biologically primitive way of dealing with pathogens. As the first line of defense against pathogens, it is often associated with the clinical symptoms that accompany infections – fever, myalgia, fatigue and pain. This type of immune response (cell-mediated) typically precedes an antibody response. **Evidence suggests that in some cases, an effective cell-mediated immune response can effectively eliminate a pathogen even before detectable antibodies are manufactured.**

In short, a cell-mediated immune response is any immune response that does not involve antibodies.

The Immune System – Commonly used terms for the two types of immunity

Cell-Mediated Immunity	Antibody-Mediated Immunity
Born with it	Developed over a lifetime
T-lymphocytes	B-lymphocytes
T-cells	B-cells
Cytokines	Antibodies
Innate Immunity	Adaptive Immunity
Inborn immunity	Acquired immunity
Inflammation response	Humoral Immunity
Th1*	Th2*
Immune response	Immunity

**Th1/ Th2 refers to T-helper cells 1 and T-helper cells 2. Their functions can overlap, so this is a general categorization of these special cells.*

SPECTRACELL'S IMMUNIDEX SCREEN QUANTIFIES CELL-MEDIATED IMMUNE FUNCTION

T-lymphocytes (a type of white blood cell) are the key player of the cell-mediated immune response. They protect us by telling other cells what to do. Since T-cells must physically contact an infected cell in order to destroy it, they are said to provide cell-mediated (versus antibody-mediated) immunity. SpectraCell has been measuring cell-mediated immune function on T-lymphocytes since the early 1990s in the Immunidex Screen, which is a part of the more comprehensive MNT (Micronutrient Test).

CELL FUNCTION VS. CELL MEDIATED IMMUNE FUNCTION – WHAT'S THE DIFFERENCE?

Cell function refers to all the metabolic work a cell does, including respiration, detoxification, growth, repair – all are cellular functions, and they occur in different types of cells throughout the body. However, cell-mediated immune function is a very specific role unique to immune cells.

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WHY THE T-LYMPHOCYTE IS SUCH A SUPERSTAR

Lymphocytes are made by stem cells in our bone marrow. Some stay in the bone marrow and are thus called B-cells (B for Bone marrow) where they reside until needed for antibody production as the result of an infection. But most lymphocytes leave the bone marrow and are sent to the thymus, which is an organ located in our chest. When lymphocytes in the thymus mature, they become T-cells (T for Thymus). T-cells do not secrete antibodies (unlike B-cells). T-cells are known for their cell-mediated immune response, which sets the course for an effective response to infection. (Note: The terms T-cell and B-cells are often used interchangeably with T-lymphocyte and B-lymphocyte.)

When T-cells mature, they take on different roles in the immune response, becoming very specialized and adaptable to their environment. Some T-cells cause inflammation while other T-cells quell inflammation. Their functions are highly orchestrated with precise feedback mechanisms in place – one of the marvels of the immune system is its potential adaptability. T-cells balance inflammatory cytokines (chemicals secreted by a cell) with anti-inflammatory cytokines in order to maintain the delicate balance between launching a strong attack without too much damage to healthy cells.

A well-functioning T-cell is imperative to our health.

WHY IS IT IMPORTANT TO UNDERSTAND CELL-MEDIATED IMMUNE FUNCTION?

Because it keeps us healthy from both exogenous threats (infection) and endogenous threats (tumors) and it can be measured. SpectraCell's Immunidex Screen quantifies the ability of a T-cell to respond to its environment. Your Immunidex Score is a direct measure of cell-mediated immune function.

Recently published research suggests that a decrease in lymphocytes caused by a pathogenic virus is closely correlated to disease progression (study done on SARS-CoV-2 patients). In other words, T-lymphocytes that cannot grow and reproduce profoundly compromise a person's ability to fight infections and may worsen prognosis.

The ability of a T-lymphocyte to respond to its environment is quantified in SpectraCell's Immunidex Screen.

REFERENCES

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