

Difference Between T Cell Dependent and Independent Antigens

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Key Difference - T Cell Dependent vs Independent Antigens

In the context of immunology, antigens are specific molecules which have the ability to induce a particular immune response thereby producing antibodies accordingly. Antibodies are specific to antigens. Antigen presenting cells are a type of accessory cells that develop complexes with Major Histocompatibility Complexes (MHC) to displays antigens. T cell lymphocytes are specific cells or a subset of white blood cells which recognize antigens selectively. Depending on the T cell lymphocytes, antigens are of two types; T cell-dependent antigens and T cell independent antigens. **T cell-dependent antigens cannot stimulate the direct activation of B cells in the production of antibodies without the assistance of T cells whilst T cell independent antigens have the ability to induce direct stimulation of B cells in the production of antibodies without the assistance of T cells.** This is the **key difference** between T cell-dependent and independent lymphocytes.

What are T Cell Dependent Antigens?

T cell-dependent antigens are antigens that don't have the capacity of direct stimulation of B cells in the production of antibodies without the assistance of T cells. This helps in the production of cytokines. Cytokines can be either interferons, interleukins or growth factors. Cytokines involved in the activation, differentiation, and proliferation of B cells.

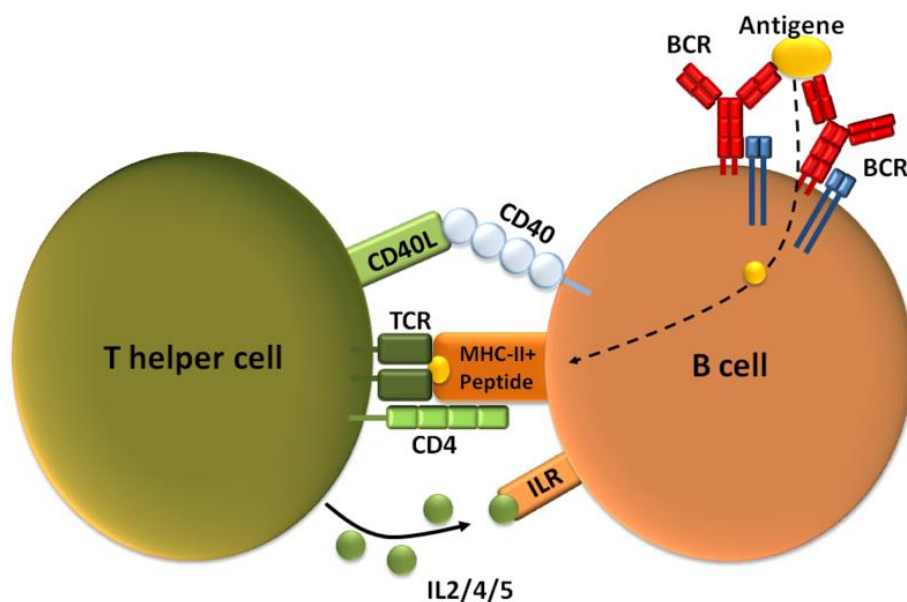


Figure 01: T Cell Dependant B Cell activation

T cell-dependent antigens are proteins. Many antigen determinants are present in T cell-dependent antigens.

What are T Cell Independent Antigens?

T cell-independent antigens are a type of antigens which has the ability to induce direct stimulation of B cells in the production of antibodies without the assistance of T cells. T cell-independent antigens are polymeric antigens such as polysaccharides. The responses induced to T cell independent antigens are different from a response that is induced to a typical antigen. They possess the same antigenic determinants with many repetitions, and this is a characteristic feature of T cell independent antigens.

Many types of these antigens possess the ability to activate B cell clones which are specific to the antigens. This process is known as polyclonal activation. These antigens are further subdivided into two categories; Type I and Type II. The subdivision occurs according to the ability of Type I and Type II cells to polyclonally activate B cells. Type I T cell independent antigens are considered as polyclonal activators whilst Type II cells are not such activators. Type I antigens possess an essential B cell activating activity which induces the direct proliferation of and differentiation of B lymphocytes which occur without the stimulation of B cells. These antigens function independently of their BCR specificity. The activation of B cells occurs via Toll-like receptors that are present on the surface of B cells once the BCR stimulation is completed.

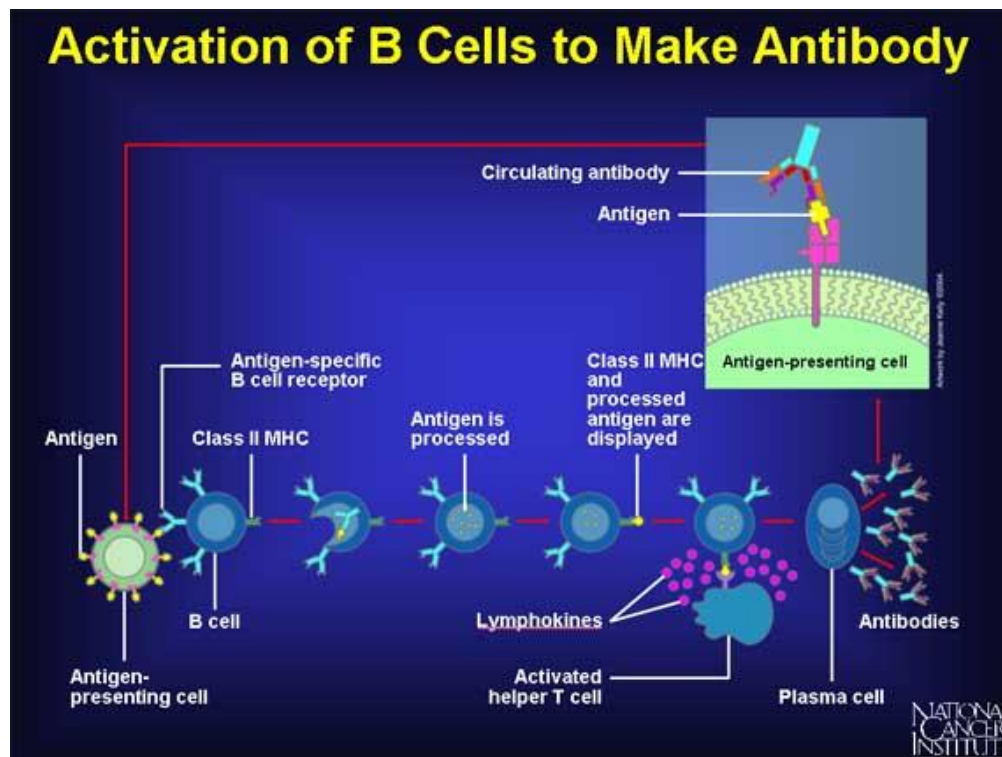


Figure 02: Direct activation of B Cells by antigens

Type II antigens consist of repetitive structures known as epitopes. These cells lack the activity of B cell activation. Type II antigens activate only mature B cells. They energize the immature B cells which prevent the involvement of immature B cells in any response of the immune system. These antigens are considered to be resistance to degradations and therefore tends to persist for longer for longer periods of times carrying out the specific functions of the immune system.

What is the Similarity Between T Cell Dependent and Independent Antigens?

- Both types of antigens involved in different immune responses which induce the production of antibodies by the activation of B cells.

What is the Difference Between T Cell Dependent and Independent Antigens?

T Cell Dependent Antigen vs T Cell Independent Antigen	
T cell-dependent antigens are the antigens which cannot stimulate the direct activation of B cells in the production of antibodies without the assistance of T cells.	T cell-independent antigens are the antigens which have the ability to induce direct stimulation of B cells in the production of antibodies without the assistance of T cells.
Chemical Nature	
T cell dependent antigens are proteins.	T cell-independent antigens are polysaccharides; polymeric antigens which also can be either glycolipids or nucleic acids.
Secondary Isotypes	
IgG, IgE, and IgA are the secondary isotypes of T cell dependent	IgG and IgA are the secondary isotypes of T cell independent antigens.

Summary - T Cell Dependent vs Independent Antigens

Antigens are specific molecules which have the ability to induce a particular immune response in the production of antibodies accordingly. Antigen-presenting cells display antigens through MHC molecules. According to the interaction of antigens with T cells, two types of antigens are present. They are T cell-dependent antigens and T cell independent antigens. T cell-dependent antigens cannot stimulate the direct activation of B cells in the production of antibodies without the assistance of T cells. These antigens consist of follicular B cells, and secondary response can be induced due to the presence of memory B cells. T cell-independent antigens have the ability to induce direct stimulation of B cells in the production of antibodies without the assistance of T cells. They can be further subdivided into two categories; type I and type II. This is the difference between T cell dependent and T cell independent antigens. Both types of antigens involved in different immune responses which lead to the production of antibodies by the activation of B cells.

Reference:

1. "T dependent and t independent antigens." LinkedIn SlideShare, 15 Jan. 2017. Accessed 3 Oct. 2017. [Available here](#)
2. Janeway, Charles A, and Jr. "B-Cell activation by armed helper T cells." *Immunobiology: The Immune System in Health and Disease. 5th edition.*, U.S. National Library of Medicine, 1 Jan. 1970. Accessed 3 Oct. 2017. [Available here](#)

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2. 'Activation of B cells to make antibody' By Jeanne Kelly (Public Domain) via [Commons Wikimedia](#) [Available here](#)

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