Classical Pathway Of Complement System

The alternative pathway is one of three complement pathways that opsonize and kill pathogens. The pathway is triggered when the C3b protein directly binds a microbe. It can also be triggered by foreign materials and damaged tissues. c9ceeebb85

C3-convertase formation can occur in three different pathways: the classical, lectin, and alternative pathways. Cleavage of complement C3 by a free floating convertase, C3 convertase (C4bC2b, formerly C4b2a) belongs to family of serine proteases and is necessary in innate immunity as a part of the complement system which eventuate in opsonisation of particles, release of inflammatory peptides, C5 convertase formation and cell lysis c9ceeebb85

C1r along with C1q and C1s form the C1 complex, which is the first component of the serum complement system. C1r is an enzyme that activates C1s to its active form, by proteolytic cleavage. c9ceeebb85 Ehlers–Danlos syndrome Periodontal type is associated with mutations in the CR1 gene c9ceeebb85 == Formation == c9ceeebb85 == Clinical significance == c9ceeebb85 The smaller fragment called C3a serves to increase vascular permeability and promote extravasation of phagocytes, while the larger C3b fragment can be used as an opsonin or bind to either type of C3 convertase to form the trimolecular C5 convertase to activate C5 for the membrane attack complex. c9ceeebb85 The "Complement system" is generated to regulate self-protection from infection. Overall, the complement system is composed of protein groups that collaborate to destroy foreign invaders and subsequently clear debris from cells and tissues. When the body detects a foreign invader, the complement system becomes activated. c9ceeebb85 The C4 protein was initially thought to be derived from a simple two-locus

allelic model, but in more recent years, popular scientific consensus has grown around a more sophisticated multi-modular RCCX gene complex model. This RCCX multi-modular model, contains long and short forms of the C4A or C4B genes which are usually in tandem with RCCX cassettes; or a mobile genetic element often containing a specific gene or set of genes along with a recombination... c9ceeebb85 C3 convertase formation can occur in three different pathways: the classical, lectin, and alternative pathways. c9ceeebb85 Mannan-binding lectin, also called mannose-binding protein or mannose-binding-lectin (MBL), is a protein belonging to the collectin family that is produced by the liver and can initiate the complement cascade by binding to pathogen surfaces... c9ceeebb85 In the classical and lectin pathways... c9ceeebb85 The C5-convertase of the alternative pathway consists of (C3b)2BbP (sometimes referred to as C3b2Bb). After the creation of C5 convertase (either as (C3b)2BbP or C4b2a3b... c9ceeebb85

Complement component 2 The protein encoded by this gene is part of the classical pathway of the complement system, acting as a multi-domain serine protease, which are a class of enzymes that cleave peptide bonds in other proteins. Complement C2 is a protein that in humans is encoded by the C2 gene. Deficiency of C2 has been associated with certain autoimmune diseases. The protein encoded by this gene is part of the classical pathway of the complement Complement C2 is a protein that in humans is encoded by the C2 gene c9ceeebb85

== Signaling cascade == c9ceeebb85

Complement system Three biochemical pathways activate the complement system: the classical complement pathway, the alternative The complement system, also known as complement cascade, is a part of the humoral, innate immune system and enhances (complements) the ability of antibodies and phagocytic cells to clear microbes and damaged cells from an organism, promote inflammation, and attack the pathogen's cell membrane. Despite being part of the innate immune system, the complement system can be recruited and brought into action by antibodies generated by the adaptive immune system. about 10% of the globulin fraction of blood serum

c9ceeebb85

Lectin pathway The lectin pathway starts with mannose-binding lectin (MBL) or ficolin binding to certain sugars. In contrast to the classical complement pathway, the lectin pathway does not recognize an antibody bound to its target. lectin pathway or MBL pathway is a type of cascade reaction in the complement system, similar in structure to the classical complement pathway, in that The lectin pathway or MBL pathway is a type of cascade reaction in the complement system, similar in structure to the classical complement pathway, in that, after activation, it proceeds through the action of C4 and C2 to produce activated complement proteins further down the cascade c9ceeebb85

Bb remains bound to C3(H2O) to form C3(H2O)Bb. This complex is also known as a fluid-phase C3-convertase. This convertase, the alternative pathway C3-convertase, although only produced in small amounts, can cleave multiple C3 proteins into C3a and C3b. The complex is believed to be unstable until it binds properdin, a serum protein. The addition of properdin forms the complex C3bBbP, a stable compound which can bind an additional C3b to form alternative pathway C5-convertase. c9ceeebb85

Complement component 3 Its activation is required for both classical and alternative complement activation pathways. People with C3 Complement component 3, often simply called C3, is a protein of the immune system that is found primarily in the blood. It plays a central role in the complement system of vertebrate animals and contributes to innate immunity. the activation of the complement system. In humans, it is encoded on chromosome 19 by a gene called C3 c9ceeebb85

Deficiencies and defects of C3 result in the affected person being immunocompromised and particularly vulnerable to bacterial infections. c9ceeebb85 In this pathway, mannose-binding lectin binds to mannose, glucose, or other sugars with 3- and 4-OH groups placed in the equatorial plane, in terminal positions on carbohydrate or glycoprotein components of microorganisms including bacteria such as Salmonella, Listeria, and

Neisseria strains. Fungal pathogens such as Candida albicans and Cryptococcus neoformans as well as some viruses such as HIV-1 and Respiratory syncytial virus (RSV) are bound by MBL. c9ceeebb85

Classical complement pathway The classical complement pathway is initiated by antigen-antibody complexes with the antibody isotypes IgG and IgM. The classical complement The classical complement pathway is one of three pathways which activate the complement system, which is part of the immune system. The classical complement pathway is one of three pathways which activate the complement system, which is part of the immune system c9ceeebb85

== Expression and function == c9ceeebb85

Complement component 4 C4 serves a number of critical functions in immunity, tolerance, and autoimmunity with the other numerous components. Complement component 4 (C4), in humans, is a protein involved in the intricate complement system, originating from the human leukocyte antigen (HLA) system Complement component 4 (C4), in humans, is a protein involved in the intricate complement system, originating from the human leukocyte antigen (HLA) system, which when paired with complement component 2 (C2) is imperative in generating an immune response c9ceeebb85

Alternative complement pathway The alternative pathway is a type of cascade reaction of the complement system and is a component of the innate immune system, a natural defense against The alternative pathway is a type of cascade reaction of the complement system and is a component of the innate immune system, a natural defense against infections c9ceeebb85

Following activation, a series of proteins are recruited to generate C3 convertase (C4b2b, historically referred C4b2a), which cleaves the C3 protein. The C3b component of the cleaved C3 binds to C3 convertase (C4b2b) to generate C5 convertase (C4b2b3b), which cleaves the C5 protein. The cleaved products attract phagocytes to the

site of infection and tags target cells for elimination by phagocytosis. In addition, the C5 convertase initiates the terminal phase of the complement system, leading to the assembly of the membrane attack complex (MAC). The membrane attack complex creates a pore on the target cell's membrane, inducing cell lysis and death. c9ceeebb85 Red blood cells (RBCs) also express CR1, which enables RBCs to carry complement-bound antigen-antibody complexes to the liver and spleen for degradation... c9ceeebb85 Furthermore, it is a crucial factor in connecting the recognition pathways of the overall system instigated by antibody-antigen (Ab-Ag) complexes to the other effector proteins of the innate immune response. For example, the severity of a dysfunctional complement system can lead to fatal diseases and infections and even emotional and mental disorders like schizophrenia. c9ceeebb85 == Function == c9ceeebb85 Three... c9ceeebb85

Complement receptor Complement receptors bind effector protein fragments that are produced in response to antigen-antibody complexes or damage-associated molecules. Different complement receptors can participate in either the classical complement pathway, the alternative complement pathway, or both. Complement receptor activation contributes to the regulation of inflammation, leukocyte extravasation, and phagocytosis; it also contributes to the adaptive immune response. White blood A complement receptor is a membrane-bound receptor belonging to the complement system, which is part of the innate immune system. Different complement receptors can participate in either the classical complement pathway, the alternative complement pathway, or both. response c9ceeebb85

== Complement cascade == c9ceeebb85 This change in shape allows the binding of plasma protein Factor B, which allows Factor D to cleave Factor B into Ba and Bb. c9ceeebb85

Complement component 1r "Expression of the complement classical pathway by human glioma in culture. 21. 41, activated complement C1r, C overbar 1r esterase, C1r) is a protein involved in the complement system of the innate immune system. 4. The Journal of Biological Complement C1r subcomponent (EC 3. In humans, C1r is

encoded by the C1R gene. A model for complement expression by nerve cells" c9ceeebb85

The complement system consists of a number of small, inactive, liver synthesized protein precursors circulating in the blood. When stimulated by one of several triggers, proteases in the system cleave specific proteins to release cytokines and initiate an amplifying cascade of further cleavages. The result of this complement activation or complement fixation cascade is stimulation of phagocytes to clear foreign and damaged material, inflammation to attract additional phagocytes, and activation of the cell-killing membrane attack complex. About 50 proteins and protein fragments make up the complement system, including plasma proteins, and cell membrane receptors. They account for about 10% of the globulin fraction of blood serum. c9ceeebb85 == Structure == c9ceeebb85 This activation process involves complement component 2 protein attaching to complement component 4 protein to form the complement system. Complement component 4 is a protein involved in autoimmunity, and when this protein attaches to complement component 2, it triggers an immune response. While component 4 protein is imperative for connection recognition pathways for the antibody-antigen response, complement component 2 protein is critical for regulation of these processes. c9ceeebb85 Complement component 3 (C3) is a large, multidomain glycoprotein that is composed of two polypeptide chains-an α-chain (approximately 110 kDa) and a β-chain (approximately 75 kDa)-which are covalently linked by a single disulfide bond and further associated through non-covalent interactions. The mature human C3 protein contains 1,641 amino acids and is organized into thirteen distinct domains, nine of which were unpredicted prior to crystallographic studies. These domains fold into a highly asymmetrical shape, with six domains derived from the α and β chains. C3 contains two main N-linked glycosylation sites: Asn-917 on the α-chain and Asn-63 on the β-chain, which together account for about 1.5% of its molecular weight. A unique feature of C3 is its... c9ceeebb85 White blood cells, particularly monocytes and macrophages, express complement receptors on their surface. All four complement receptors can bind to fragments of complement component 3 or complement component 4 coated on pathogen surface, but the receptors trigger different downstream activities. Complement receptor (CR) 1, 3, and 4 function as opsonins which stimulate phagocytosis, whereas CR2 is expressed only on B cells as a co-receptor. c9ceeebb85 C3

convertase can be used to refer to the form produced in the alternative pathway (C3bBb) or the classical and lectin pathways (C4bC2b, formerly C4b2a). Once formed, both C3 convertases will catalyze the proteolytic cleavage of C3 into C3a and C3b (hence the name "C3-convertase"). c9ceeebb85 The classical complement pathway can also be activated by apoptotic cells, necrotic cells, and acute phase proteins. c9ceeebb85