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## C4 complement blood test high

A complement C4 (also known as a complement component 4, or simply C4) is a test to measure the level of C4 proteins you have in your blood. These proteins play a role in how your immune system functions and defends your body from harmful bacteria and viruses. Monitoring your C4 protein levels can help doctors to diagnose and monitor certain chronic medical conditions. Here is what you need to know about complement component 4 proteins, who can benefit from a C4 complement blood test, and information about C4 test results. Complement component 4 (C4) is a type of special protein that is found on the surface of certain cells and in blood plasma. It is part of a group of almost 60 proteins that make up your complement system that works alongside your immune system. These complement proteins help to fight viral and bacterial infections and rid your body of dead cells and other foreign material. Rarely, genetic variations can cause some people to have lower levels of C4 protein, which gives them a greater risk of developing infections and some types of autoimmune diseases like lupus, rheumatoid arthritis, and systemic sclerosis. Doctors use information from C4 test results to gauge how people with some chronic diseases or autoimmune disorders are responding to treatments or to help them diagnose certain diseases. C4 tests are useful because after an injury, illness, or infection when your body is actively fighting inflammation the amount of C4 protein in your blood changes. Your doctor might also want you to take a C4 test if you show signs of chronic infections, kidney problems, hepatitis, or autoimmune diseases like rheumatoid arthritis and lupus.Lupus can cause rashes, fevers, joint pain, and organ damage. There is currently no cure for lupus, and treatment focuses on managing symptoms to reduce inflammation. If you have lupus, your doctor might order a C4 test to see how well your body is responding to treatment. People with lupus will have low levels of complement C4 protein during flare-ups. These levels increase to a normal range after the inflammation passes.C4 tests are done using a simple blood draw that is usually taken from a vein either on the inside of your elbow or on the back of your hand. You don't need to do anything special to prepare for the test, but make sure you let your doctor know about any medications or supplements you are taking beforehand.C4 testing does not have any inherent risks of its own but does carry the same risks that all blood tests involving needles have, such as:Stinging or pain at the puncture siteBleedingBruisingLightheadednessSorenessInfectionA normal range for C4 test results is between 15 and 45 milligrams per deciliter. This range might differ slightly depending on the measurements and specimens used to complete the test. Make sure to talk with your doctor about your results and what they might mean based on your medical history.Low complement C4 levels under 15 milligrams per deciliter might indicate some types of health problems and conditions such as:MalnutritionLupusLiver diseases such as hepatitis and cirrhosisInherited genetic deficienciesHereditary angioedema (swelling under the skin)Certain kidney diseases or kidney rejection after a transplantChildhood diseases like diabetes mellitus and Henoch-Shönlein purpuraLow complement C4 levels can also be the result of improper storage or transportation of your blood sample.There are several reasons why you might have high complement C4 levels over 45 milligrams per deciliter. If you have had a recent injury or infection, you're likely to have more C4 in your blood. High complement C4 levels can also be found in people with cancer or inflammatory bowel disease like ulcerative colitis. People with lupus normally have low complement C4 levels, especially when the disease is actively causing inflammation. If you have lupus, high levels of C4 can indicate that your body is responding to treatments or medications you are taking to manage your condition. It is important to remember that each person will have different results depending on their gender, age, genetic predisposition, and previous or underlying health conditions. You should talk about your C4 test results with your doctor and ask any questions you might have. You'll get your C4 complement test results as a number in milligrams per deciliter (mg/dL). Generally, an acceptable range is 14 mg/dL to 45 mg/dL. Ask your healthcare provider what a normal range is for you.What do low levels of C4 mean?Low C4 protein levels can be a sign of:An autoimmune disease or that you're at a higher risk of developing an autoimmune disorder.Recurring bacterial infections.Hemolytic anemia (AIHA).Hepatitis.Hereditary angioedema (swelling under the skin).Kidney disease.Cirrhosis.Malnutrition.What do high levels of C4 mean?High C4 protein levels may mean you're recovering from an infection or illness. If you're getting treatment for an autoimmune disease, high C4 typically means treatment is working.High C4 levels may also be a sign of the following health conditions:Ulcerative colitis.Sarcoidosis (inflammatory disease)Certain types of cancer.When should I know the C4 complement blood test results?You can expect to get your test results within a few days. Your healthcare provider will contact you to discuss your results.When should I call my healthcare provider?Call your healthcare provider if you have questions about the results of your C4 complement blood test. When functioning properly, your immune system acts as your body's frontline defense against infections, injuries, and other potential threats. A key player in this defense is the complement system, a network of proteins that assists immune cells in identifying and neutralizing harmful invaders. Among these proteins, C3 complement and C4 complement are particularly important for detecting and eliminating pathogens.Testing your complement levels, especially C3 and C4, can provide valuable insights into the health of your immune system. These tests are frequently used to diagnose and monitor autoimmune conditions such as lupus or rheumatoid arthritis, as well as certain kidney disorders.This article will delve into the significance of complement levels, how they are measured, and why they are essential for maintaining your overall health. Whether you're preparing for a C3 and C4 blood test or simply seeking to understand immune system testing, this guide offers clear and accessible information tailored to your needs.What Are Complement Levels (C3, C4)?The complement system is a vital component of your immune system, consisting of more than 30 proteins that work together to protect your body from infections and inflammation. Among these, C3 and C4 are two key proteins that act as "first responders," helping immune cells detect and eliminate harmful bacteria, viruses, and damaged cells.A complement system test measures the levels of C3 and C4 in your blood through a straightforward blood test, often referred to as a C3 and C4 lab test. These results help determine whether your immune system is functioning as it should or if there are signs of an underlying condition, such as an autoimmune disorder or chronic illness.Low complement levels, particularly low C3 and C4, may indicate an overactive or underactive immune system. For example, complement deficiency, a condition characterized by abnormally low levels of complement proteins, can make you more susceptible to infections. On the other hand, elevated complement activity might signal inflammation or tissue damage.Doctors often use complement level testing to monitor diseases like lupus, where low C3 and C4 levels are common. These tests are also instrumental in diagnosing kidney conditions such as glomerulonephritis, where complement proteins contribute to inflammation and kidney tissue damage.Understanding your complement levels provides a clearer picture of your immune system's health, enabling your doctor to create a personalized treatment plan tailored to your specific needs.Why Are Complement Levels (C3, C4) Important?Measuring complement levels is crucial because it offers valuable information about your immune system's activity. C3 and C4 proteins serve as important markers that help doctors diagnose and monitor a variety of health conditions, particularly those involving the immune system.A C3 and C4 blood test is commonly used to diagnose and manage autoimmune diseases. For instance, in systemic lupus erythematosus (SLE), a chronic autoimmune disorder, low C3 and C4 levels are often observed during disease flare-ups. Monitoring these levels allows doctors to assess the severity of the disease and adjust treatment plans as needed.Complement levels are also essential in diagnosing and managing kidney diseases. Conditions such as membranoproliferative glomerulonephritis or lupus nephritis often involve abnormal complement activity. Detecting these abnormalities early can help prevent further kidney damage and guide effective treatment strategies.Another important role of complement testing is in identifying complement deficiency, a condition that increases susceptibility to infections. Detecting low C3 and C4 levels enables doctors to implement preventive measures to reduce the risk of recurrent infections.Beyond diagnosis, complement levels are also used to monitor the effectiveness of treatments. For example, if you are undergoing therapy for an autoimmune disorder, tracking C3 and C4 levels can help determine whether your medications are working or if adjustments are needed.In summary, understanding your complement levels is a critical step in managing your health. These tests provide essential insights that help doctors diagnose conditions, monitor disease progression, and tailor treatments to meet your unique needs.What Does a Complement Levels (C3, C4) Test Diagnose?The complement system, which includes proteins like C3 and C4, plays a vital role in fighting infections and clearing damaged cells. Measuring complement levels helps diagnose and monitor a range of diseases. Before exploring specific conditions, it's helpful to understand two key terms in medical testing: positive predictive value (PPV) and negative predictive value (NPV). PPV refers to the likelihood that a positive test result accurately identifies a disease, while NPV indicates how likely a negative result is to rule out a disease. These values depend on the condition being tested and the population studied. Let's examine the conditions that a C3 and C4 complement test can help diagnose or monitor.Systemic Lupus Erythematosus (SLE)Systemic lupus erythematosus (SLE) is a chronic autoimmune disease in which the immune system attacks the body's tissues, causing inflammation and damage to the skin, joints, kidneys, and other organs. Low complement levels, particularly decreased C3 and C4, are common during active lupus because the complement system is consumed during immune responses. A C3 and C4 blood test is often used to monitor disease activity and flare-ups. For example, studies indicate that low C3 levels have a PPV of 75% and an NPV of 90% for predicting lupus nephritis, a severe kidney complication of SLE. Regular testing helps guide treatment decisions and evaluate the effectiveness of therapies.Rheumatoid Arthritis (RA)Rheumatoid arthritis (RA) is an autoimmune disorder characterized by chronic joint inflammation, which can lead to pain, swelling, and potential joint damage. While complement levels are not routinely used to diagnose RA, they can provide additional insights in complex cases. Low complement levels, particularly C4, may suggest immune system overactivity or the presence of overlapping autoimmune conditions. Although the PPV and NPV for complement levels in RA are less well-defined, these tests can still offer valuable information about disease mechanisms and help tailor treatment plans for patients with coexisting autoimmune diseases.GlomerulonephritisGlomerulonephritis refers to a group of kidney diseases that cause inflammation in the glomeruli, the tiny filtering units of the kidneys. Low C3 levels are a hallmark of certain types of glomerulonephritis, such as post-infectious glomerulonephritis and membranoproliferative glomerulonephritis. Measuring complement protein levels helps distinguish between different kidney conditions. For instance, in post-infectious glomerulonephritis, C3 levels are typically low while C4 levels remain normal. The PPV of low C3 for diagnosing this condition is approximately 85%, making it a reliable marker for clinicians.VasculitisVasculitis encompasses a group of disorders characterized by inflammation of the blood vessels, which can lead to organ damage. Certain types, such as cryoglobulinemic vasculitis, are associated with low complement levels due to immune complex formation and complement consumption. Testing C3 and C4 levels helps identify these subtypes and monitor disease progression. While predictive values vary depending on the type of vasculitis, complement testing remains an important diagnostic tool for immune-mediated vascular inflammation.Sjögren's SyndromeSjögren's syndrome is an autoimmune disease that primarily affects the glands responsible for producing saliva and tears, resulting in symptoms like dry mouth and dry eyes. In some cases, it can cause systemic symptoms, including joint pain and organ involvement. Low complement levels, particularly C4, may be observed in severe or systemic forms of Sjögren's syndrome. Complement testing helps identify patients at higher risk of complications, such as vasculitis or kidney involvement. Although the PPV and NPV for complement levels in Sjögren's syndrome are not well-established, these tests provide valuable insights into disease severity and progression.How is a Complement Levels (C3, C4) Test Performed?The Complement Levels (C3, C4) test is a straightforward blood test that measures specific proteins in your blood. These proteins, known as C3 and C4, are integral components of the complement system, which plays a crucial role in your immune response. Understanding the steps involved in the test can help ease any concerns you may have about the procedure.Before the TestPreparing for the complement system test is simple, but there are a few key steps to keep in mind:Fasting: In most cases, fasting is not required. However, your healthcare provider may give you specific instructions depending on your overall health or if other tests are being conducted at the same time.Medication Disclosure: Be sure to inform your provider about any medications, supplements, or herbal remedies you are taking. Certain drugs, such as corticosteroids or immunosuppressants, can influence complement protein levels and may need to be considered when interpreting your results.Hydration: Staying well-hydrated can make the blood draw process smoother. Drinking plenty of water before your appointment can help ensure your veins are easier to access.During the TestThe procedure itself is quick and typically takes just a few minutes. Here's what you can expect:Step 1: A healthcare professional will clean the skin on the inside of your elbow or the back of your hand with an antiseptic to minimize the risk of infection.Step 2: A tourniquet will be placed around your upper arm to make your veins more visible and easier to access.Step 3: A small needle will be inserted into a vein to collect a blood sample. You may feel a brief pinch or stinging during this step.Step 4: Once the sample is collected, the needle will be removed, and a small bandage will be applied to the puncture site.After the TestAfter the procedure, you can return to your normal activities right away. Some people may experience mild bruising or tenderness at the site where the blood was drawn, but this usually resolves within a day or two. If you feel lightheaded or faint, let the healthcare provider know immediately so they can assist you before you leave.Overall, the Complement Levels (C3, C4) test is a quick, low-risk procedure that provides valuable insights into the health of your immune system.Understanding Complement Levels (C3, C4) ResultsOnce your Complement Levels (C3, C4) test is complete, your healthcare provider will review the results with you. These results can offer important information about your immune system and may help diagnose or monitor conditions such as autoimmune diseases, infections, or kidney disorders.Normal Complement LevelsNormal ranges for C3 and C4 levels can vary slightly depending on the laboratory, but general reference values are:C3 Complement: 90-180 mg/dLC4 Complement: 10-40 mg/dLResults within these ranges typically indicate that your complement system is functioning properly.Low Complement LevelsLow levels of complement proteins may indicate an underlying condition affecting your immune system. Common causes include:Autoimmune Diseases: Conditions such as lupus or rheumatoid arthritis can lower complement levels due to increased consumption of these proteins during immune responses.Kidney Disorders: Diseases like glomerulonephritis may reduce complement levels, particularly C3.Infections: Certain bacterial or viral infections can temporarily decrease complement levels.If your levels are low, your healthcare provider may recommend additional tests to determine the cause and develop an appropriate treatment plan.High Complement LevelsElevated levels of C3 or C4 are less common but may occur in cases of inflammation or specific infections. Your healthcare provider will interpret these results in the context of your symptoms and medical history to provide a clearer picture of your health.Discussing Results with Your ProviderIt's important to discuss your test results with your healthcare provider to fully understand what they mean for your health. Consider asking questions such as:What do my complement levels reveal about my overall health?Are additional tests or follow-up appointments necessary?What lifestyle changes or treatments could help improve my condition?Your provider will guide you through the next steps to ensure you receive the care and support you need.Limitations and RisksWhile the Complement Levels (C3, C4) test is a valuable diagnostic tool, it does have some limitations and risks. Being aware of these can help you feel more informed and confident about the procedure.Limitations of the TestThis test provides useful insights into your complement system but is not a standalone diagnostic tool. It must be interpreted alongside other clinical findings and diagnostic tests, such as antibody panels or imaging studies. Additionally, complement levels can fluctuate due to temporary factors like infections, so monitoring trends over time may be necessary.Normal results do not rule out all immune system disorders, as some conditions may not significantly affect C3 or C4 levels.Risks of the ProcedureThe risks associated with the blood draw are minimal but may include:Bruising: Mild bruising at the puncture site is common and typically resolves quickly.Infection: Although rare, there is a small risk of infection at the needle insertion site. Proper sterilization techniques significantly reduce this risk.Fainting or Dizziness: Some individuals may feel lightheaded during or after the blood draw. If you have a history of fainting during medical procedures, let your provider know in advance.Managing and Preventing ComplicationsIf you experience unusual symptoms after the test, such as prolonged pain, swelling, or signs of infection, contact your healthcare provider immediately. While complications are rare, they can be effectively addressed with prompt medical attention.Understanding the Importance of Complement Levels TestingThe Complement Levels (C3, C4) test is a simple yet invaluable diagnostic tool for evaluating the health of your immune system. By measuring these essential proteins, healthcare providers can diagnose and monitor a range of conditions, including autoimmune diseases such as lupus, kidney disorders, and infections. This blood test plays a critical role in identifying complement deficiencies and uncovering the underlying causes of various health concerns.Benefits of the Complement System TestThe C3 and C4 complement tests are crucial for detecting irregularities in complement protein levels. These tests allow healthcare providers to assess the complement cascade, a vital component of the immune response. Whether you're experiencing symptoms associated with low complement levels or undergoing testing for autoimmune conditions, the Complement levels test provides valuable insights into the functionality of your immune system.Limitations and Risks of the C3 and C4 Blood TestWhile the Complement levels test offers significant diagnostic benefits, it does have certain limitations. For instance, it cannot pinpoint the exact cause of low complement levels but serves as an important starting point for further investigation. The risks associated with the test are minimal and typically limited to minor discomfort or bruising at the site where blood is drawn. Despite these small drawbacks, the test remains a cornerstone in diagnosing immune-related disorders and monitoring conditions such as lupus and kidney disease.Partnering with Experts for Your Healthcare JourneyAs an online care and primary care practice, we are committed to helping you understand your test results and guiding you through the next steps in your healthcare journey. If you have concerns about your immune system or need assistance interpreting your Complement levels, our team is here to provide expert, compassionate support.How We Can HelpProvide clear, detailed explanations of your Complement C3 and C4 test results.Discuss potential causes of low complement levels, including autoimmune diseases and other conditions.Offer guidance on managing symptoms associated with low complement levels and improving immune health.Help you understand the normal range for Complement levels and what deviations might indicate.Take Control of Your Immune HealthWhether you're undergoing a Complement levels test to investigate immune disorders or seeking answers to questions like "What does low C3 and C4 mean in a blood test?" our team is here to support you every step of the way. Understanding your complement protein levels is a vital part of diagnosing and managing conditions that affect your immune system. Let us help you navigate this process with confidence, clarity, and care. Complement C4 is a protein that is important for your immune function. It helps clear infections and protects against autoimmunity. Low levels may point to autoimmune disease, including lupus. High levels are rare, poorly understood, and may signal inflammation. Read on to find out more about the C4 test. What is Complement C4? Overview C4 is one of over 30 small proteins of the complement system, which is an important part of the immune system [1]. Scientists think that the complement system improves the function of antibodies and phagocytes — cells that ingest harmful particles, bacteria, and dead or dying cells. In other words, it "complements" antibodies and phagocytes, helping them clear microbes and damaged cells more effectively [1]. Complement C4, in particular, marks targets that need to be cleared, such as microbes, immune complexes, and dying cells. It also activates other complement proteins and promotes immune tolerance [2]. C4 is produced by some white blood cells (macrophages) and the liver [3]. It circulates in the blood as inactive and becomes activated by specific immune signals [1, 4]. Test & Normal Range Lab results are commonly shown as a set of values known as a "reference range", which is sometimes referred to as a "normal range". A reference range includes the upper and lower limits of a lab test based on a group of otherwise healthy people. Your healthcare provider will compare your lab test results with reference values to see if any of your results fall outside the range of expected values. By doing so, you and your healthcare provider can gain clues to help identify possible conditions or diseases. Doctors will usually order a complement C4 blood test if they suspect that you have lupus or another autoimmune disease. C4 levels will be decreased in these non-hereditary autoimmune disorders. For example, people with lupus often have low C4 (and other complement) levels [5]. Other rare conditions that may also lower C4 levels include hereditary angioedema and congenital C4 deficiency. Normal complement C4 levels in the blood are between 16 and 47 mg/dL (milligrams per deciliter), or 0.16 to 0.47 g/L (grams per liter). Levels may vary slightly between laboratories. Your healthcare provider will recommend follow-up testing or treatment based on your results. Some lab-to-lab variability occurs due to differences in equipment, techniques, and chemicals used. Don't panic if your result is slightly out of range — as long as it's in the normal range based on the laboratory that did the testing, your value is normal. However, it's important to remember that a normal test doesn't mean a particular medical condition is absent. Your doctor will interpret your results in conjunction with your medical history and other test results. Have in mind that a single test isn't enough to make a diagnosis. Your doctor will interpret this test, taking into account your medical history and other tests. A result that is slightly low/high may not be of medical significance, as this test often varies from day to day and from person to person. Autoimmunity C4 is implicated in suppressing autoimmunity. Researchers suspect that one of the ways it does this is by promoting the production of Treg cells [6, 7]. When C4 is absent, cell debris is not cleared effectively. This increases the number of self-reactive (autoimmune) white blood cells, although bacterial infections will still be cleared normally [3]. Scientists hypothesize that C4 protects mice from developing lupus. Mice deficient in C4 spontaneously develop a lupus-like autoimmune disease. We can't apply these findings directly to humans, though [6, 8]. Low Complement C4 Levels Factors shown here are commonly associated with low complement C4 levels. Low levels are often found in autoimmune conditions or when there are issues that interfere with C4 production (e.g. liver disease) [3]. Work with your doctor or other health care professional for an accurate diagnosis. Associated Factors 1) Autoimmune Disease Low complement C4 levels are most commonly found in lupus (systemic lupus erythematosus), an autoimmune disease where the immune system attacks the body's own tissues [9, 10]. Patients with lupus can have persistently low C4 levels (< 10 mg/dL). Alternatively, they can have fluctuating levels, with low levels corresponding to disease flare-ups [11]. Low C4 levels are also found in: Sjögren's syndrome [12] Celiac disease [13] Juvenile dermatomyositis [14] Juvenile idiopathic arthritis [15] Autoimmune hepatitis [16] IgA nephropathy (IgAN) [17] Cold agglutinin disease [18, 19] Hereditary angioedema [20] However, in another autoimmune disease, rheumatoid arthritis, C4 levels can be either low, normal, or high. Blood levels may also differ from joint levels [21]. 2) Complement Deficiency Complement deficiency is a genetic disorder that causes low complement levels. Undetectable levels usually point to congenital (inborn) C4 deficiency [22]. While complete C4 deficiency is very rare (there are less than 100 recorded cases to date), partial C4 deficiency is pretty common. It's estimated to occur in up to 30 - 40 % of populations of European descent [22, 23, 24]. 3) Liver Disease In an observational study, 66 patients with hepatitis C had low complement C4 levels compared to 50 healthy people [25]. Chronic liver disease patients may also have lower complement C4 levels. In an observational study of over 120 people, liver disease patients (primary biliary cirrhosis, chronic active hepatitis, and cirrhosis) had significantly lower complement C4 levels [26]. Larger studies are needed to determine if measuring C4 levels is relevant in people with liver disease. 4) Beta Thalassemia Low C4 levels were found in 60 patients with beta-thalassemia in one study [27]. It's possible that multiple blood transfusions, which represent the only treatment for this disease, lead to continuous contact with various infection factors, causing overactive levels of the complement factors. Changes in the immune system due to iron overload may also be a contributing factor, but this is still just a hypothesis [27]. More research is needed. 5) Malaria Limited research suggests that complement C4 levels may fall during acute malaria, but more studies are needed to confirm the link [28, 29]. 6) High-Fat Diets A high-fat diet decreased blood C4 levels in a study of 46 healthy people. This decrease was linked to an increase in insulin resistance [30]. Although the mechanism here is unknown, one possible explanation is that overeating and excess fat reduce the liver's ability to produce complement proteins. This has yet to be properly verified in large human studies [30]. Potential Health Effects Risk of Infections C4 helps clear microbes. Some evidence suggests that when C4 levels are low, the immune system can't fight invading bacteria and viruses efficiently. That is why low complement C4 levels are thought to increase the risk of infections. However, there's still an alternate pathway that can clear bacteria from the body [31, 32, 33, 34, 35, 36]. People with C4 gene deficiencies are more likely to suffer from gum and sinus inflammation (chronic periodontitis and chronic or recurrent rhinosinusitis) [37, 24]. Autoimmune Disease Risk C4 is involved in immune tolerance. When there is a lack of C4, the immune system may start reacting against the body's own cells. Researchers think that low C4 levels increase the risk of developing an autoimmune disease, such as lupus and juvenile idiopathic arthritis [35]. More than 75% of people who are completely deficient in C4 proteins develop lupus or lupus-like disease [2]. Partial C4 deficiencies are also hypothesized to predispose people to different autoimmune disease, including: Lupus [38, 10, 2] Type 1 diabetes [39] Celiac disease [13] Autoimmune hepatitis [16] Vitiligo [40] Juvenile idiopathic arthritis [15] Vogt-Koyanagi-Harada (VKH) syndrome [41] A causal relationship has yet to be determined, though. Have in mind that many other factors can also contribute to autoimmune disease risk. High Complement C4 Levels Factors shown here are commonly associated with high complement C4 levels. Work with your doctor or other health care professional for an accurate diagnosis. Additionally, the potential causes and health effects of high complement C4 levels are still poorly understood. We know more about high complement C4 levels. Associated Factors 1) Inflammatory Conditions Research suggests that complement C4 may rise with some types of low-grade inflammation [42, 43]. C4 levels sometimes increase with other inflammatory proteins, such as CRP and homocysteine [44, 45]. Inflammatory conditions that have been associated with increased C4 levels include: Obesity [46] - C4 levels appear to increase with BMI (body mass index) [47] Crohn's disease and ulcerative colitis (IBD) [48, 49] Skin conditions, such as psoriasis, dermatitis, and hives (urticaria) [50, 51] Psoriatic arthritis [52] Rheumatoid arthritis [53, 54, 55] Rheumatic fever, an inflammatory disease that may result from untreated strep throat [56] Inflammation and kidney failure in IgA nephropathy [57] Some types of cancers [58, 59] However, some of the mentioned studies had mixed findings. Plus, complement C4 levels can vary throughout the body and levels in a certain tissue (e.g. joints) may not correspond to blood levels. More research is needed to understand the relevance of complement C4 levels in these diseases. 2) Pregnancy Complement C4 levels normally rise during pregnancy [60]. 3) Drugs Drugs such as cimetidine (Tagamet) may increase complement C4 levels, but more research is needed [61]. Potential Health Effects Metabolic Syndrome Metabolic syndrome is a condition characterized by three or more of the following symptoms: high blood pressure, high blood sugar, abnormal cholesterol, abnormal triglyceride levels, and increased stomach fat. In an observational study of over 3,000 people, higher complement C4 levels were associated with a higher risk of metabolic syndrome after a four-year follow-up. These findings need to be replicated in multi-center studies [42]. Heart Disease In an observational study of 5,850 initially healthy men, higher complement C4 was associated with an increased risk of stroke or heart attack over the following 18 months. C4 was correlated with other heart risk factors, such as cholesterol, blood pressure, and BMI [43]. Since this study dealt with associations, we don't know whether complement C4 levels were the cause, consequence, or a random association with heart disease risk. More research is needed. Factors that May Affect Complement C4 Levels Precautions & Limitations Remember that complex autoimmune disorders always involve multiple possible factors — including biochemistry, environment, health status, and genetics - that may vary from one person to another. Work with your doctor to treat any underlying conditions causing your abnormal complement C4 levels. You may try the strategies listed above if you and your doctor determine that they could be appropriate. Read through the approaches we bring up and discuss them with your doctor before trying them out. This is particularly important if you plan to take any dietary supplements. Most of the lifestyle, dietary, and supplement factors listed in this article rely on animal and cellular data. These findings can't be applied to humans. Clinical research is needed before the safety and effectiveness of any approach listed in this post is determined. Additionally, supplements have not been approved by the FDA for medical use. Supplements generally lack solid clinical research. Regulations set manufacturing standards for them but don't guarantee that they're safe or effective. Thus, we're providing a summary of the existing research, which should guide further investigational efforts. However, the studies listed should not be interpreted as supportive of any health benefit. Proposed to Increase Complement C4 Refrain from overeating and reduce your intake of fatty foods. Eating a high-fat diet may reduce complement C4 levels. Plus, diets high in unhealthy fats may have other detrimental health effects [30]. Supplements such as mangosteen help boost C4 levels in animals [62]. It might be a good idea to avoid: Cannabis, which tends to inhibit the immune system, including C4 (shown in 60 users and 30 controls) [63] Exposure to heavy metals such as lead [64] Exposure to allergens such as cotton dust and cereal grain [65, 66, 67] Proposed to Decrease Complement C4 Levels Some life choices that help reduce chronic inflammation may be helpful, such as: The following supplements are being researched for lowering inflammation and complement C4 levels: Flaxseed [68] Andrographis paniculata [69] Resveratrol [70] Human data are lacking. Cannabis is also being investigated for reducing inflammation and complement C4. But remember that the use of cannabis is illegal under federal law in the US. Its use remains controversial because of a risk of addiction and side effects [63]. Avoiding exposure to toxins such as styrene may also be a good idea [71]. Complement C4 & Genetics C4 seems to be highly variable. There are two genes that encode this protein: C4A and C4B [72]. Both genes have varying copy numbers, ranging between 2 and 8. In a study of over 500 healthy Americans of European descent, about 60% of people had 4 copies of C4 genes, 27% had less, and 12% had more than 4 copies [23, 2, 73]. In addition, both C4A and C4B differ in size; they can be short or long (longer variants are due to a retrovirus). In Whites, about 76% of the C4 genes belong to the long form and 24% to the short form [23]. The copy number and the size of C4 genes might determine the blood C4 protein concentrations. Blood levels increase in a linear fashion with the total C4 gene copy number. Further, those with one or more short C4 genes have higher blood C4 levels than those with long C4 genes only [23]. Partial deficiency of C4A or C4B has been described in up to 30 - 40% of populations of European descent [23, 24]. C4 Genes and Lifespan Several studies have linked low C4B copy number with a shorter life span, but this association is still highly controversial [74, 75, 76]. Some scientists try to explain it by saying that since lower C4 levels tend to increase the risk of infections, they might shorten lifespan. No solid data back them up. The existing studies included only a couple dozen to a couple of hundred subjects. Furthermore, other studies failed to support this link [23]. Another study found that people without long C4 variants were less likely to be long-lived [23]. More research is needed. C4 Genes and Disease The following associations are mostly based on small-scale or lower-quality studies. More research is needed to determine their relevance. Low C4 and C4A copy numbers are related to an earlier onset and a more severe course of lupus [77]. A low number of C4B copies has been associated with a higher risk of infections [78]. Also, a low C4B copy number has been linked to heart disease (heart attack, stroke) [79, 80, 81]. On the other hand, multiple copies of the C4B gene were associated with IBD worsening, through escalated complement reactivity towards the microbiota. This has yet to be confirmed in future studies [82].