

Anemia is defined as a reduction in one or more of the major red blood cell measurements: hemoglobin concentration, hematocrit, or red blood cell count. Hemoglobin is an iron-rich protein that gives the red color to blood. It carries oxygen from the lungs to the rest of the body. Anemia has three main causes: blood loss, lack of red blood cell production, and high rates of red blood cell destruction. While some types of anemia are short-term and mild, others can last for a lifetime. Left untreated, anemia may be life-threatening. The National Kidney Foundation defines anemia as a hemoglobin concentration of less < 13.5 g/dL in men and < 12.0 g/dL in women.

Hematopoiesis is the production of all of the cellular components of blood including red blood cells (erythrocytes), white blood cells (leukocytes) and platelets. White blood cells have the shortest life span, from a few hours to a few days. Red blood cells can last up to 120 days. The hematopoietic system which includes the bone marrow, liver, and spleen is responsible for continuously renewing the blood cells. About one percent of the body's blood cells must be replaced every day. Decreased hematopoietic function due to bone marrow deficiency or aging can cause reduced red blood cell production.

There are many anemia types. Some people are born with certain types of anemia (inherited), or develop due to chronic disease, or due to nutritional deficiencies, especially iron-deficiency.

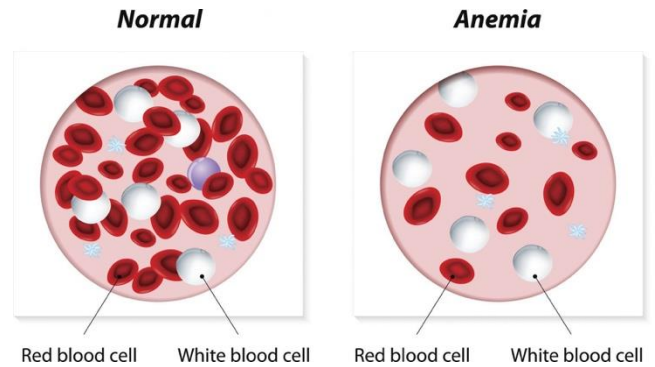
Anemia can cause physical and mental dysfunction due to a lack of oxygen supply to the body with symptoms of malaise, fatigue, weakness, dyspnea, impaired cognition, headache, dizziness, slow wound healing, skin rashes, cold hands and feet, and other symptoms such as impaired sexual function. It can also cause cold hands and feet, pale skin, irregular heartbeats, and chest pain.

New research has found a relationship between anemia and impaired thinking. In the elderly, mild anemia may be an independent risk factor for cognitive decline and executive function impairment such as problem solving, planning, and assessing dangers. Executive function impairment may happen early in the process with patients becoming unable to carry on with instrumental day-to-day living activities, such as shopping, cooking, taking medications, paying bills, walking, etc., then memory loss occurs.

Infections & Anemia

Mycobacterial infections frequently lead to the development of anemia. The mechanisms of anemia development during mycobacterial infections are not fully understood. Whether mycobacteria-induced anemia is due to iron restriction in response to infection or to a block in RBC formation is still a matter of debate. The development of anemia correlates with an increased risk of death in mycobacterium tuberculosis patients.

Viruses have also been linked to anemia. Epstein-Barr virus, cytomegalovirus, varicella-zoster virus, human herpes virus 6 (HHV-6), B19 parvovirus, human immunodeficiency virus, hepatitis A and C viruses and the putative viral agent associated with non-A-G post-hepatitis aplastic anemia have been reported in association with anemia. The ability of the bone marrow to generate copious amounts of blood cells required on a daily basis depends on a highly orchestrated process of proliferation and differentiation of hematopoietic stem and progenitor cells. This process can be rapidly adapted under stress conditions from viruses to meet the specific cellular needs of the immune response to the physiological changes. The virus itself and the ensuing immune response can have a tremendous impact on the hematopoietic process. Inflammatory cells produced by the immune system can cause hematopoietic cell death.



Iron-Deficiency Anemia

Iron-deficiency anemia is a type of anemia caused by an insufficient amount of iron. Without adequate iron, the body can't produce enough hemoglobin to support red blood cells to carry oxygen. As a result, the patient may experience tiredness and shortness of breath. The cause of iron-deficiency anemia includes loss of blood, malnutrition without enough iron intake, low vitamin B12, as well as infections.

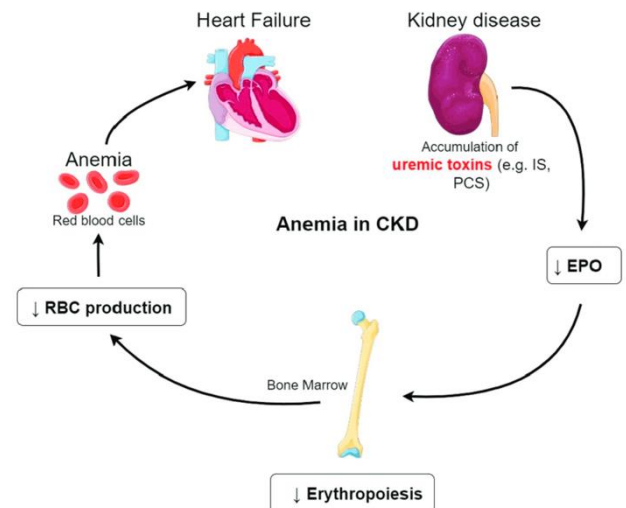
Iron is an essential element in maintaining oxygen carrying function by the red blood cells. Iron is also a critical nutrient for growth and survival for nearly all infectious microorganisms including bacteria, viruses, and fungus. Successful bacterial pathogens have therefore evolved to compete successfully for iron in a highly iron-stressed environment of the host's tissues and body fluids. On the other side, in reaction to an infection, the body has developed a protective mechanism to decrease iron levels and deprive microbes of iron to help the body get rid of the infection. The iron absorption in the digestive tract is under the control of a protein, hepcidin, produced by the liver. Heparin is a key regulator of the entry of iron into circulation in mammals. During infection or inflammation, the liver will release abnormally high amounts of hepcidin which suppresses gut iron absorption and triggers the macrophages and liver cells to trap the iron inside the cell, leading to a reduced serum iron level. When the infection and inflammation is over, the liver should decrease the secretion of hepcidin and iron absorption should return to normal. However, in some patients, their liver keeps secreting high levels of hepcidin resulting in long lasting decreased iron absorption which causes chronic iron deficiency anemia. For patients with chronic infections or inflammation, iron deficiency anemia is a common complication.

CKD & Anemia

The prevalence of CKD-associated anemia is approximately 50%. The major causes of anemia in CKD patients are decreased erythropoietin (EPO) syntheses. EPO is a glycoprotein secreted by the kidneys interstitial fibroblasts and is essential for the growth and differentiation of red blood cells in the bone marrow. In CKD, tubular atrophy and tubulointerstitial fibrosis compromises renal erythropoietin synthetic capacity and results in anemia.

In CKD patients complicated with diabetes, anemia can contribute to retinopathy, neuropathy, or diabetic foot ulcer. Anemia can directly cause further progression of kidney disease. Renal ischemia due to reduced oxygen worsens renal medullary hypoxia, leading to renal interstitial injury and fibrosis. Anemia also causes increased renal sympathetic nerve activity, resulting in increased glomerular pressure and proteinuria which in turn accelerates the progression of kidney disease.

Under anemic conditions, the heart contracts harder to meet the body's oxygen demand. Over time it causes left ventricular hypertrophy (LVH) and heart failure. Heart failure causes further renal function deterioration and leads to a vicious cycle termed the "cardiorenal anemia syndrome" which significantly increases morbidity and mortality of CKD patients.



Wellness Recommendation

The wellness recommendation for all causes of anemia includes Anemic Formula. The Anemic Formula nurtures the blood and helps to enhance red blood cell and other blood cell production from the bone marrow. San Qi, an herbal ingredient in Anemic Formula, is a medicinal herb used to treat blood disorders since ancient times and exhibits anti-anemia effects. It has a "blood tonifying" function. In research settings, it has been shown to enhance hematopoiesis though promoting the division and growth of various blood cells, the proliferation and release of bone marrow cells, increasing the number of peripheral blood cells and hematopoietic factors in bone marrow. Patients can experience symptom improvement in 1 week. Red blood cell counts can be improved with 2-6 weeks of treatment.

For patients with CKD-related anemia, it is recommended to use Anemic Formula together with the kidney treatment including LC Balancer, Xcel, Formula C, and KS Formula. Patients can experience improvement in anemia related

symptoms in 2 weeks. A sustained increase of red blood cell count can be achieved with 4-6 weeks of treatment. Please refer to the Chronic Kidney Disease Protocol for further information.

For patients with anemia caused by a mycobacterial infection, it is important to clear the organ associated with the infection. It is recommended to use the organ-specific mycobacterial formula (see chart below) along with Blood Tonic and Anemic Formula. Blood Tonic nurtures the blood and removes blood stagnation. It helps improve RBC quality and circulation. Dang Gui, an herbal ingredient in Blood Tonic, has been shown to have excellent effects on anemia through promotion of hematopoietic stem cell proliferation. It regulates coenzyme A biosynthesis and HIF-1a (mediator in maintaining oxygen balance) pathways which increases levels of erythrocyte function. Bai Shao, another herbal ingredient in Blood Tonic, is a common blood-enriching herb in TCM. It's been shown to improve microcirculation and remove blood stasis. 6 weeks to 3 months of the protocol is recommended.

For patients with iron deficiencies due to infection, Bronze, LC Balancer, Brown, Levera and the associated germ-clearing formulas are also recommended. Bronze nurtures the Blood and enhances immune function. It is especially helpful for iron deficiency and the related anemia due to poor immune function. Bronze helps improve iron absorption and at the same time supply the required iron to resolve the iron deficiency and restore the immune function to fight infections. Levera helps clear liver Heat to reduce the hepcidin secretion. If patients still have a chronic infection, Woad/Woad-R is recommended for viral clearance. Trinicin is recommended for bacteria clearance and Plasmin is recommended for fungus clearance. Please refer to the product catalogue for additional formulas required. Patients can experience increased energy and vitality in 1 week. 3-4 weeks of treatment is required for significant improvement and sustained results. Please refer to the Viral Infections Protocol for further information.

Location of Mycobacterial Infection	Product(s) Recommended
Respiratory	ClearLung Jade Java NewBase
Heart	Kardinin
Kidney	Nefnin
Urinary/Genital tract	Mycocin
Liver	Bilegen
Stomach	Stomacin
Intestine	Colomycin Colonacin Java
Peritoneal cavity	Peritonin
Brain	Brainin
Thyroid/face, neck	Thyrocin
Lymph Node	LymphClear
Spine and Nerve	Aurum
Muscle	Lotus Pine
Bone	Ostenin
Joint	WHITEE Patch/LCB Java
Bone Marrow	Leukicin A
Tendon	Fibromin A FASTT Patch
Skin	Dermaticin
Connective tissue	Plum

Location of Viral Infection	Product(s) Recommended
Liver/Blood	Pleurum
Kidneys / Urinary Tract	Pleurum-K
Lymphatic system	Indigo
GI Tract	Musk
Heart	Amber
Respiratory in acute phase	CL
Respiratory	Perilla, Jade
Blood Vessels	Sophia
Brain	Almond, Gold
Skin	Saponin, Jade-R

Selected Case Study

Case 1: Successful Treatment High Blood Pressure and Anemia Caused by Kidney Failure

Terry King-Bey, DNM, ND, Cleveland, OH

A patient was diagnosed with diabetes and kidney failure with symptoms of high blood pressure, low energy, poor sleep and bubbles in urine. This patient's quality of life was severely diminished and was put on dialysis 3 times a week to support the kidney as well as anemia shots for low iron levels. The patient began an herbal treatment with products from Wei Laboratories consisting of LC Balancer, Anemic Formula, and Xcel Capsules while keeping his medications and routine dialysis. After 2 weeks of treatment hemoglobin levels improved dramatically and doctors determined the patient no longer needed iron supplement injections. Blood pressure levels improved to that comparable to a 17-year-old. Urine quality improved and there was a significant reduction of bubbles in the urine. This indicated less protein in the urine, a sign of improved kidney structure and function. The doctor was very impressed with these results. The patient reported much better energy levels and sleep quality. Night time urination also was no longer an issue. The patient is still undergoing treatment and is showing excellent progress.