

PRODUCTS

Testing For C-reactive Protein May Save Your Life

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Have you had your **CRP** levels tested? You should—because this simple **blood test** might just save your life.

C-reactive protein, or CRP, has long been used as a marker of **inflammation** in the body.¹ High CRP levels are found in practically every known inflammatory state. Even if you have no symptoms of disease, elevated CRP levels may signal an increased risk for practically all degenerative disorders, including cardiovascular disease, cancer, diabetes, and more.²⁻⁶

Now, it turns out that CRP is more than just a marker of inflammation—it is also a *cause* of inflammation.⁷ Knowing your CRP status puts you in an enviable position. If it is elevated, you can take proactive steps to lower it, thereby slashing your risk of a long list of disorders related to chronic inflammation.

What Is CRP?

C-reactive protein (CRP) is manufactured throughout the body, especially by immune cells, the liver, and by adipocytes (fat cells).⁸ During the early phase of an inflammatory stimulus (such as infection or tissue injury) CRP levels rise dramatically.

CRP is an incredibly sensitive and robust “marker” of general inflammation.¹⁰ It’s used to track the progress of chronic inflammatory conditions such as rheumatoid arthritis, vasculitis, or inflammatory bowel diseases like Crohn’s disease.¹¹⁻¹³ In those cases, increased symptoms accompanied by a rise in CRP signals a “flare” of the disease, and indicates the need to provide anti-inflammatory therapy.

More recently, however, CRP has been recognized as an active *cause* of inflammation in addition to simply being a *marker* of inflammation.⁷ This important discovery opened the door for additional ways to fight chronic inflammation.

When CRP binds to specific molecules in the body, it participates in rapidly raising the production of inflammatory signaling molecules called *cytokines* and other inflammatory mediators.¹⁴ This is a healthy function of acute inflammation because it helps speed up the race to the scene of any damage, and quickly destroys invading organisms.¹⁵

However, when CRP rises unchecked, it can contribute to destructive **chronic inflammation**.

It is easy to see why Big Pharma is now hotly pursuing CRP-inhibiting drugs.¹⁶ Fortunately, there are a number of methods that lower CRP by changing the underlying conditions that cause it to rise.

WHAT YOU NEED TO KNOW

CRP Predicts Heart Disease and Cancer Risk

- C-reactive protein, or CRP, is a sensitive marker of inflammation. It rises quickly after an inflammatory attack, but should return to normal levels. When CRP remains high, it is an indication of chronic inflammation.
- Elevated CRP signals increased risk for many chronic inflammation-related disorders, including cardiovascular disease, cancer, diabetes, obesity, and more.
- But CRP is much more than simply a marker of inflammation; it actively participates in the inflammatory process.
- Lowering CRP levels, then, is a vital part of a healthy lifestyle and a host of safe, affordable nutritional supplements may offer immediate help.
- Get your CRP tested, and get started today on supplements that can work for you.



What CRP Can Reveal About Your Health

The use of CRP has been a standard diagnostic practice for many years in determining the status of known inflammatory disorders,¹⁷ such as rheumatoid arthritis and Crohn's disease, and in discriminating between inflammatory and functional bowel disorders.^{12,13,18}

But as we keep learning more about diseases that have been linked with inflammation, CRP is turning out to be a useful research tool for both diagnosis and **risk assessment**. This is especially the case with two major killers of Americans: cardiovascular disease and cancer.

WHAT ARE OPTIMAL CRP LEVELS?

Heavier people usually have higher CRP levels, as **abdominal fat** provides fertile ground for over-production of deadly pro-inflammatory cytokines that cause CRP to increase. Obese individuals are often in a chronic pro-inflammatory state that sharply increases their risk of all degenerative diseases.

A simple way of suppressing CRP for many people is to shed abdominal fat pounds.

Optimal **CRP** levels for everyone to strive for are under **0.55 mg/L** in **men** and under **1.0 mg/L** in **women**.



Cardiovascular Disease



CRP levels are closely correlated with the risk of cardiovascular disease; the higher the CRP, the greater the risk.^{19,20} Even otherwise healthy people with modestly raised CRP levels have a significantly higher risk of future cardiovascular events.²⁰

In one important study, patients with the highest CRP levels were at a **45%** increased risk for **coronary heart disease** compared with those having the lowest levels.²¹ Another study found that people with elevated CRP levels were **60%** more likely to develop **ischemic heart disease** and **30%** more likely to have a **cerebrovascular event**, compared to those with normal levels.²² In addition, CRP levels have now been shown to be capable of predicting serious complications in hospitalized patients with coronary artery disease.²³

Preliminary evidence suggests that CRP levels may even help distinguish between your risk for a fatal vs. a non-fatal heart attack, but that is far from established.²⁴

Such risk increases seem to hold true for other conditions, such as diabetes, that also contribute to cardiovascular disease.^{25,26} Indeed, in one study, women with the highest CRP levels had a **16-fold** risk for developing **diabetes** compared with those at the lowest levels.²⁵ In another study, the risk was about **2.8-fold** for both sexes.^{25,26}

CRP is also associated with other cardiovascular-related conditions such as high blood pressure.

In people with high blood pressure, CRP levels are correlated with stiffness of arteries and atherosclerosis, as well as damage to organs such as the heart and kidney.²⁷

In people with normal baseline blood pressure, CRP levels have repeatedly been shown to predict the later development of hypertension.²⁷

And people with heart rhythm disturbances, such as atrial fibrillation, have significantly higher CRP levels than do normal controls.²⁸

CRP levels are such strong indicators of cardiovascular risk that circulating levels of CRP are now being used to predict the likelihood of cardiovascular events and to assist in choosing therapy.²⁷

In addition to being a marker of risk, there is growing evidence that CRP *contributes* directly to cardiovascular and diabetes risk.^{26,27} Studies have shown the presence of CRP directly inside of most arterial plaques—and all heart lesions—after a heart attack.²⁰ Indeed, in a damaged brain or heart after a stroke or heart attack, there is a correlation between CRP and the size of the affected area; this is strong support for a contributing role of CRP in these diseases.¹⁶

TABLE: SELECTED NUTRIENTS KNOWN TO LOWER CRP

Nutrient	Key Effects*
Creatine	Prevented exercise-induced rises in CRP in athletes ⁴⁹
Curcumin	Lowered CRP more than control in patients with toxin-induced skinirritation ⁵⁰ Lowered CRP by a huge 6.4 mg/L in a meta-analysis of 6 studies of patients with elevated CRP ⁵¹
Fenugreek	Reversed elevated CRP levels in rats with experimental arthritis ⁵²
Ginger	Reduced hs-CRP in diabetic adults ⁴⁷
Green Tea Polyphenols	Lowered CRP in a rat model of systemic inflammation ⁵³
Isoflavones	Reduced CRP by 1.1 mg/L in postmenopausal women when combined with exercise ⁵⁴
L-carnitine	Lowered CRP in end-stage renal disease patients on dialysis ⁵⁵
Magnesium	Higher serum magnesium correlated with lower CRP in overweight middle-aged women ⁵⁶
Probiotics	Lowered hs-CRP in diabetes patients ⁵⁷
Omega-3 fatty acids	Low omega-3 in blood correlated with higher CRP in patients with peripheral artery disease ⁵⁸ Lowered hs-CRP and depression scores in depressed shift workers ⁵⁹ Lowered CRP and CRP/albumin ratio (beneficial) in colorectal cancer patients ⁶⁰
Quercetin	Lowered CRP when given with vitamin C ⁶¹
Red yeast rice	Lowered hs-CRP by nearly 24% in people with moderately highcholesterol ⁴⁶
Vitamin C	Reduced plasma CRP 24% in active or passive smokers ⁴⁸ Lowered hs-CRP in hemodialysis patients ⁶²
Vitamin D	Higher vitamin D levels correlated with lower CRP in humans with rheumatoid arthritis, an inflammatory condition ⁶³ Reduced serum CRP in pregnant women by 1.4 mg/L while controls rose by 1.5 mg/L (400 IU daily dose) ⁶⁴
Vitamin E(alpha-tocopherol)	Lowered CRP in humans and animals ⁶⁵
Zinc	Lowered hs-CRP from more than 10 to 7.7 mg/L in diabetics with kidney disease ⁶⁶ Lowered hs-CRP in young obese women ⁶⁷
Combinations	Mixture of resveratrol, pterostilbene, quercetin, delta-tocotrienol, and nicotinic acid reduced CRP 29% in healthy seniors ⁶⁸

*All differences statistically significant

Cancer

With the discovery that **cancer** is strongly related to overall **inflammation** status, there's been growing interest in CRP as a predictor of prognosis in a variety of cancer types.^{29,30} And, with strong evidence that CRP is an active (and destructive) participant in promoting inflammation, there's equally strong interest in discovering ways to actively lower a person's CRP levels to reduce their cancer risk—or to promote their recovery if they already have cancer.

Optimal **CRP** levels for everyone to strive for are under **0.55 mg/L** in **men** and under **1.0 mg/L** in **women**. Interestingly, CRP is now associated with a number of cancers as a powerful tool for determining prognosis and survival.²⁹⁻³⁶ When CRP is measured at the time of diagnosis, high levels consistently predict poor survival, whereas normal (especially the lower-end of normal) levels predict good outcomes.³⁰⁻³⁶

For example:

In men with penile cancer, a CRP level greater than **20 mg/L** at diagnosis is significantly associated with the probability of developing lymph node metastases, a sign of poor outcome.³¹

In patients with advanced stomach cancer, those with a CRP level greater than **17 mg/L** had an **11%** greater chance of dying within 3 months after diagnosis, compared to those with lower levels.³² A later study found that CRP greater than **10 mg/L** was associated with a **77%** increase in poor overall survival, with a **196%** greater chance of having a higher disease stage, and an **81%** increase in the likelihood of tumor recurrence.³³

CRP is strongly associated with survival in patients with colon and/or rectum cancers. Those with elevated levels of CRP were more likely to have lymph node (local) and distant metastases, invasion of blood vessels and nerves, and a higher stage diagnosis.³⁴ For patients with CRP greater than **5 mg/L**, only **13.3%** survived after 5 years, while **57%** of patients with lower CRP were still alive 5 years later.³⁴ Indeed, one study indicated that CRP was the only marker that was an independent predictor of disease-free survival.³⁰ CRP concentrations were higher in a group of colorectal cancer patients, at **2.4 mg/L**, compared with **1.9 mg/L** in healthy controls, and those with the highest CRP were **2.6** times as likely as those with the lowest levels to develop such cancers.³⁵

In pancreatic cancer, high plasma CRP levels at diagnosis indicated a **121%** increased risk of dying from the disease.²⁹

In breast cancer, a CRP level of greater than **10 mg/L**, compared with a level of less than **1 mg/L**, predicted³⁶:

- A **96%** greater risk of dying from any cause,
- A **91%** greater risk of dying from breast cancer specifically, and
- A **69%** greater risk of having additional breast cancer-related events.

MEASURING CRP IN THE LABORATORY

A laboratory test measurement called “high sensitivity CRP (or “hs-CRP”) is now often used to measure inflammation, especially in cardiovascular disease. This newer test uses the same scale as previous standard CRP measurements, but because of its higher sensitivity, it is better at discriminating even very small increases in CRP measurements at the lowest levels. While Life Extension currently recommends an optimal hs-CRP of less than **1.0 mg/L** for women and less than **.55 mg/L** for men, standard laboratory testing uses the following risk stratification for hs-CRP:



- The “lowest risk” range is less than **1.0 mg/L**.
- “Average risk” is **1.0 to 3.0 mg/L**.
- The “highest risk” category is greater than **3.0 mg/L**.⁶⁹

How To Lower Your CRP

With high levels of CRP being so closely tied to cardiovascular disease and cancer, the question you’re probably wondering right now is, “*How do I lower my CRP levels?*”

For starters, your lifestyle has a direct impact on CRP levels. Certain dietary habits, such as a high intake of trans-fatty acids, can increase CRP levels, leading to a reason why *trans fats* increase cardiovascular risk to a greater degree than one would expect based on its adverse effects on blood fat levels.³⁷

A 2013 study found that ideal health behaviors (such as diet, exercise, etc.) could lower CRP.³⁸ In that study, people having four to six “ideal behaviors” had up to a **32%** reduction in their CRP levels. Exercise alone has been shown to be a means of lowering high CRP. In fact, the higher the baseline CRP, the greater the impact of a reasonable exercise regimen on CRP.³⁹

Eating foods cooked at high temperature can increase inflammation.⁴⁰⁻⁴²

Avoiding high temperature-cooked food can reduce production of pro-inflammatory cytokines and CRP, thus helping to extinguish the inflammatory fire raging in the bodies of most aging people today.⁴⁰⁻⁴³

Wouldn’t it be incredible if Americans could throw away side effect-laden pain killing drugs just by changing the way their food is prepared?

Some drugs, such as statins, have been shown to lower CRP levels in patients with elevated blood lipids.^{19,44} In fact, one study using *rosuvastatin* (Crestor[®]) showed that healthy people without raised blood cholesterol but with CRP levels greater than **2.0 mg/L** reduced hs-CRP levels by **37%** and reduced the frequency of major cardiovascular events (though the study didn’t address the long-term consequences of statin therapy).⁴⁵ There are, however, other ways to lower CRP without a prescription.

Over a dozen dietary supplements have been shown to bring down CRP levels in laboratory or human models. Red yeast rice, for example, lowered CRP by nearly **24%** in people with moderately high cholesterol;⁴⁶ ginger reduced CRP in diabetic adults;⁴⁷ and vitamin C reduced plasma CRP **24%** in smokers.⁴⁸

The table above describes 17 nutrients that have been shown to favorably influence CRP levels.

In order to determine your CRP level, all it requires is a low-cost **blood test**.

By lowering your CRP, you'll be protecting yourself against chronic inflammation **before** it progresses to a life-threatening disease.

CLINICAL USES OF CRP IN DIAGNOSIS

C-reactive protein has been in use as a screening measure for inflammation almost since its original discovery.⁷⁰

Levels of CRP begin to rise in the body usually 6 to 12 hours after an inflammatory stimulus and peak around 48 to 96 hours after the event.^{71,72} Changes in repeated measurements of CRP are often used as a way to track a patient's inflammatory course, helping to identify improvement (falling CRP) or relapse (rising CRP).⁷³



While CRP is never diagnostic of a specific condition, if interpreted in terms of clinical context, it does help to determine if inflammation is the source of worrisome signs and symptoms, and whether symptoms are being caused by infections or by other causes.^{70,74} In infants and toddlers with high fevers, for example, a CRP below **5 mg/dL** was shown to rule out a serious bacterial infection.⁷⁵

In a similar fashion, CRP is frequently used diagnostically to rule out a potentially dangerous diagnosis in adults. For example, adult patients with chest pain were found to be safe to go home from the hospital if they had CRP levels within the normal range.⁷⁶

Elevated CRP levels are also useful as early markers of the seriousness of inflammation in a very wide range of disorders, from urinary tract infections and appendicitis to heart attacks.^{15,70,76} And CRP has been shown to help in discriminating Crohn's disease from non-inflammatory bowel disorders, including intestinal lymphoma.⁷⁷

Another widespread use of CRP is as a means of following a patient's progress after a major diagnosis has already been made. In such patients, the CRP level correlates with the severity of the ongoing disease, and therefore rising levels can be used as an early warning that the disease is rapidly worsening, and that aggressive treatment is necessary.⁷⁸

Summary

We've known for years that C-reactive protein (CRP) is an important marker of dangerous inflammation in the body, but we've recently discovered that it also actively participates in the inflammatory process.^{1,7}

High CRP levels are found in practically every known inflammatory state. Even if you have no symptoms of disease, elevated CRP signals increased risk for cardiovascular disease, cancer, diabetes, obesity, and more.²

Additionally, there's strong evidence that people with lower CRP levels have fewer inflammation-related diseases.

This knowledge has opened the door to a new way of treating chronic inflammation: by lowering your CRP level back to a safe, normal range. There are drugs such as statins that lower CRP levels, but high-dose statin drugs have proven side effects.⁴⁵ Fortunately, over a dozen nutrients have been found to have a safe, immediate impact on this dangerous cause of chronic inflammation.

Don't delay—get your CRP checked, and get started on a lifestyle, supplement, hormone or drug regimen that works for you.

OBESITY AND CRP

Two conditions that contribute to a rise in CRP levels are obesity and diabetes—an effect that may be the reason behind the rise in inflammation seen in those conditions.^{79,80}

Obese individuals experience a double threat from CRP. First, while much of the circulating CRP is made in the liver, human fat tissue also produces substantial amounts of CRP.^{8,79} Second, obese individuals experience a rapid rise in cytokines, particularly the one known as interleukin-6 (IL-6),⁸¹ which may induce CRP production in the liver—potentially causing CRP levels to climb even higher and promoting additional inflammation.⁸²

In this way, CRP may be at least part of the missing link between obesity, diabetes, and cardiovascular disease, in which inflammation plays such a major part.^{79,80,82}

