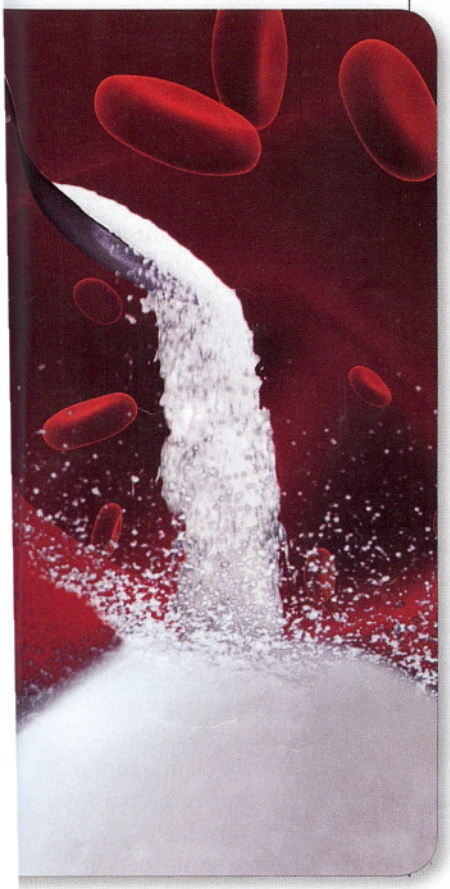
Glucose: The Silent Killer

BY WILLIAM FALOON



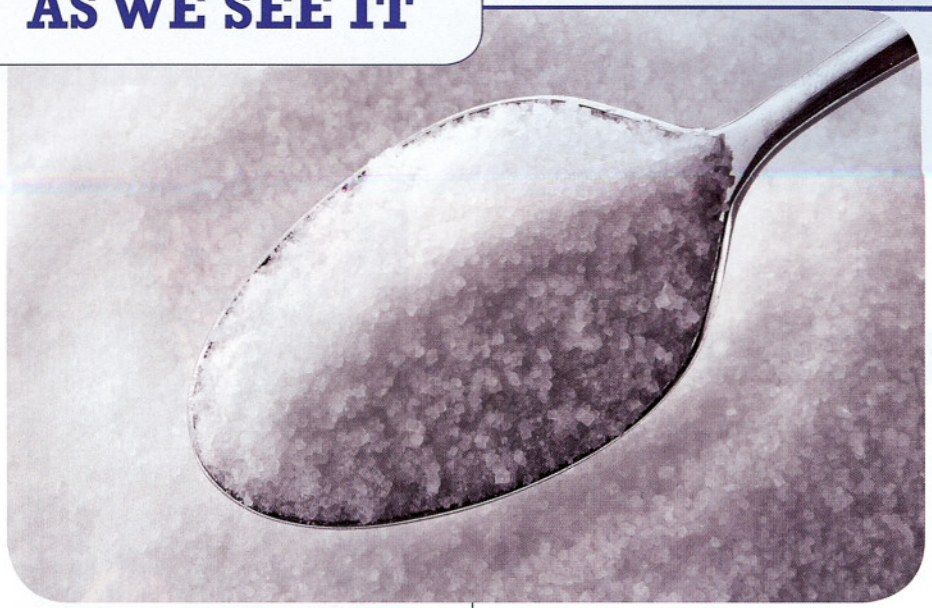
The deadly effects of even ***slightly*** elevated ***glucose*** are fatally misunderstood.

One reason for this calamity is physicians who continue to rely on ***obsolete*** blood glucose ranges. These doctors fail to recognize that any *excess* glucose creates lethal metabolic pathologies that are underlying factors behind multiple age-related diseases.

People today thus suffer and die from diabetic-like complications without knowing their blood sugar (glucose) levels are too high!

Life Extension® long ago argued that most aging people have elevated **blood glucose**. Our controversial position has been vindicated as mainstream medicine consistently lowers the upper-level threshold of acceptable (safe) fasting blood glucose.

As new evidence accumulates, it has become abundantly clear that maturing individuals need to take **aggressive** actions to ensure their fasting and after-meal glucose levels are kept in safe ranges.



Glucose Is Like Gasoline

Our body's primary source of energy is glucose. All of our cells use it, and when there is not enough glucose available, our body shuts down in a similar way that a car engine stops when the gasoline tank is empty.

When glucose is properly utilized, our cells produce energy efficiently. As cellular sensitivity to **insulin** diminishes, excess glucose accumulates in our bloodstream. Like spilled gasoline, excess blood glucose creates a highly combustible environment from which oxidative and inflammatory fires chronically erupt.

Excess glucose not used for energy production converts to **triglycerides** that are either stored as unwanted **body fat** or accumulate in the blood where they contribute to the formation of **atherosclerotic plaque**.[1-6]

If you were filling your automobile with gasoline and the tank reached full, you would not keep pumping in more gas. Yet most people keep fueling their bodies with excess energy (glucose) with little regard to the deadly consequences.

As an aging human, you face a daily onslaught of excess **glucose** that poses a greater risk to your safety than overflowing gasoline. Surplus glucose relentlessly reacts with your body's proteins, causing damaging ***glycation*** reactions while fueling the fires of **chronic inflammation** and inciting the production of destructive **free radicals**.[7-20]

The Evolving Definition of Type 2 Diabetes

Medical dictionaries define diabetes as a condition whereby the body is not able to regulate blood glucose levels, resulting in too much glucose being present in the blood. The debate is over what level of blood glucose is considered "too high."

Nearly four decades ago, we emphatically stated that fasting blood glucose should be below **100** (mg/dL). Yet from 1979 to 1997, the medical establishment dictated that one of the criteria for a diagnosis of diabetes was fasting glucose readings of **140 mg/dL** or higher on two separate occasions.

In 1997, the medical establishment revised the fasting glucose threshold for a diagnosis of diabetes to **126 mg/dL**. In addition, the medical establishment (American Diabetes Association), characterized the so-called *impaired fasting glucose* threshold level at **110 mg/dL**, which was subsequently lowered in 2003 to what Life Extension originally stated, i.e. that no one should have fasting glucose **100 mg/dL** or higher.

The problem is that we now know that the optimal fasting glucose ranges are **70-85 mg/dL** based upon the totality of the scientific evidence.[33]

Those with glucose above **85 mg/dL** are at increased risk of heart attack.[34] This was shown in a study of nearly 2,000 men where fasting blood glucose levels were

Where Does Blood Glucose Come From?

Glucose accumulates in the blood primarily from carbohydrate foods we eat.

Less understood is the role of saturated fats that impair *insulin sensitivity*. When cells lose their sensitivity to insulin, glucose levels increase because it is not able to be utilized by energy producing cells. When people take compounds that block fat absorption and carbohydrate breakdown, fasting glucose levels plummet, along with triglycerides and cholesterol.[21,22]

Digested carbohydrate foods are the primary source of blood glucose. We can control blood glucose by reducing calorie intake,[23-25] blocking calorie absorption,[22,26-32] and/or enhancing the ability of our cells to efficiently utilize glucose for energy production.

measured over a 22-year period. The startling results showed that men with **fasting glucose** over **85** (mg/dL) had a **40%** increased risk of death from cardiovascular disease.

The researchers who conducted this study stated *"**fasting blood glucose values in the upper normal range appears to be an important independent predictor of cardiovascular death in nondiabetic apparently healthy middle-aged men**."*[34]

So pull out your latest blood test result and see where you stand. At a minimum, you want to see your fasting glucose below **86** mg/dL.

Why Any "Excess" Glucose is Dangerous

Sugar damages cells via multiple mechanisms and is a causative factor in common diseases of aging.[35-52]

In a group of humans who reduced their food intake to calorie restriction levels, fasting glucose declined to an average of **74** mg/dL.[23] This corresponds to animal studies in which caloric restriction induced significant reductions in blood glucose in conjunction with extension of life span.[53-55]

It is well established that cutting calorie intake reduces one's risk of age-related diseases and slows markers of aging.[56-62] One reason for this may be the reduction in blood glucose (and insulin) levels that occurs in response to ingesting fewer calories.

In a study of 33,230 men, high glucose was independently associated with a **38%** increase in deaths from digestive tract cancers.[63] Other studies show that diabetics have even greater increased cancer risks.[64-70]

Diabetics suffer such horrific incidences of vascular disorders that some experts believe that coronary artery occlusion and diabetes should be classified as the same disease. In other words, if you are diabetic, you are almost certainly going to suffer coronary atherosclerosis.

In a recent study involving 1,800 people, coronary disease rates were the same over a 10-year period in pre-diabetics compared to those with full-blown diabetes. The authors of the study commented that impaired fasting glucose significantly increased risk in comparison with the normal glucose group and concluded:

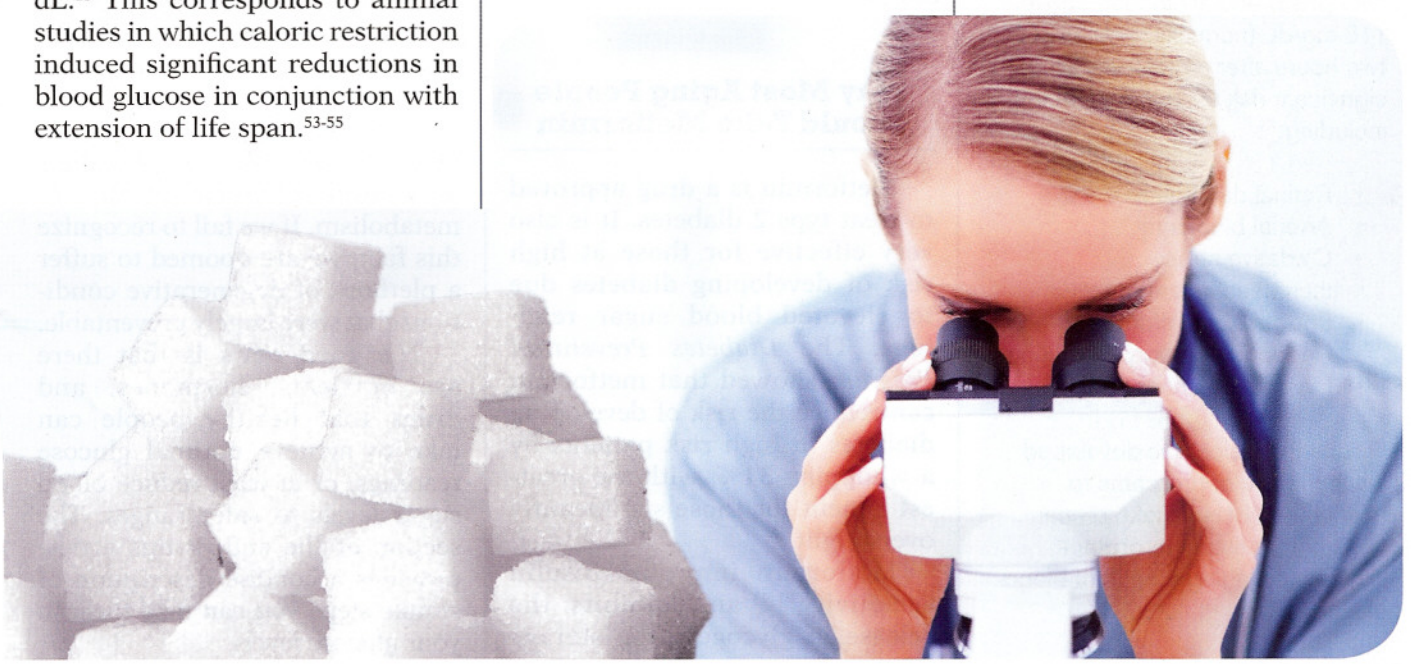
*"**Early control of blood glucose is essential to prevention and control of coronary heart disease**."*[71]

As people age, their fasting glucose levels usually increase as their health declines.

Standard laboratory reference ranges allow an upper-limit of fasting glucose of **99** mg/dL. Yet the most effective anti-aging therapy—caloric restriction—lowers fasting glucose levels to the **70-85 mg/dL** range.

Recent studies indicate that keeping fasting glucose levels in the range of **70-85 mg/dL** and not allowing after-meal glucose levels to spike higher than **40 mg/dL** over your fasting value, favorably influences our **longevity genes**.[72]

The take-home lesson is that one can slash their risks of age-related diseases and possibly slow their rate of aging by tightly controlling blood glucose levels.



Dangers of After-Meal Glucose Spikes

When after-meal glucose levels surge above **140** mg/dL, risks of virtually all degenerative diseases increase.

Remember that you should strive for **fasting glucose** levels of no greater than **85 mg/dL** (optimal range: **70-85 mg/dL**). In response to eating, your blood glucose reading should increase no more than **40 mg/dL** above your fasting value. This means if your fasting glucose is **80**, your after-meal glucose should be no higher than **120 mg/dL**.

The dangers of high glucose are so strongly evident that the *International Diabetes Federation* has warned that non-diabetics with postprandial glucose above **140** mg/dL (normally measured two hours after a meal) are at significant risk for many diseases including:[73]

- Retinal damage to the eye
- Arterial blockage
- Oxidative stress
- Increased inflammation
- Endothelial dysfunction
- Reduced coronary blood flow
- Increased cancer risk

Life Extension has developed a wide range of programs to enable members to take precautions before meals to protect against damaging surges of blood glucose.

Shield Your Body From Excess Glucose

An enormous volume of published data shows that by taking the proper compounds before meals, the surge of glucose into the bloodstream and the subsequent insulin spike can be mitigated.[74-84]

Nutrients that neutralize carbohydrate-degrading *enzymes* (like white kidney bean and brown seaweed extracts) are helpful.[77,85] The addition of special fibers (like propolmannan) can slow the rate of carbohydrate absorption from the small intestine, thus further blunting the after-meal (postprandial) flow of glucose into the blood.[86-89]

Life Extension introduced a multi-ingredient powdered formula in **2010** that was designed to be taken before heavy meals to control the rate of fat and carbohydrate absorption.

I cannot emphasize the critical importance for those with glucose levels above **85 mg/dL** to take these kinds of compounds before meals that help shield one's bloodstream against dangerous glucose-insulin spikes.

Why Most Aging People Should Take Metformin

Metformin is a drug approved to treat type 2 diabetes. It is also very effective for those at high risk of developing diabetes due to elevated blood sugar readings. The *Diabetes Prevention Program* showed that metformin can reduce the risk of developing diabetes in high risk patients by a whopping **31%**, with the greatest benefit for those significantly overweight.[90]

Metformin improves insulin sensitivity,[91-93] and inhibits the release of glycogen (the storage form for glucose) from the liver,[94-98] thus lowering fasting glucose blood levels.

Life Extension funded research showing that metformin may have calorie restriction mimetic properties in laboratory mice. The drug's unique ability to reduce glucose-insulin blood levels and its super low-cost make it something you'll want to ask your doctor about.

Are Most of Us Pre-diabetic?

In reviewing thousands of blood test results and published scientific studies, I have come to the conclusion that more than 75% of people over the age of 40-50 are suffering from some degree of prediabetic-related disorder inflicted by elevated blood sugar.

These problems may silently smolder as kidney impairment,[99,100] aberrant cell proliferation,[101-109] and endothelial dysfunction[110-117]—or explode outwardly as a sudden-death heart attack.[118-122] Young healthy people can usually maintain optimal glucose ranges, whereas glucose levels creep up as we age. The data showing that modestly elevated "normal" glucose increases disease risk cannot be ignored.[119,123-127]

Normal aging predisposes most of us to metabolic complications as a result of impaired glucose metabolism. If we fail to recognize this fact, we are doomed to suffer a plethora of degenerative conditions that were largely preventable.

The good news is that there are nutrients, hormones, and drugs that healthy people can take to achieve optimal glucose readings, or at least reduce blood sugar levels to safer ranges. The section at the end of this article provides a concise description of simple steps you can take to slash your glucose levels.

What Are Fasting Glucose Levels Of Life Extension Members?

Each year, tens of thousands of **Life Extension** members utilize our low-cost blood testing service. This enables individuals to monitor their disease risk factors–and provides us with a treasure trove of data to ascertain health of our overall membership.

Immediately before introducing the **Calorie Control Weight Management Formula** in September 2010, we evaluated the last **47,232** blood test results in our files. The reason we chose this cutoff date was that we knew many of our members would start using **Calorie Control Weight Management Formula** in September to help reduce their glucose levels (and shed fat pounds).

The findings from this pooled analysis revealed mean fasting glucose levels in **males** were **97** (mg/dL), whereas mean female levels were **92**. Both of these numbers were above *optimal* fasting glucose of **70-85**.

In fact, only **22.8%** of Life Extension members had fasting glucose in the optimal range of **70-85** mg/dL.

With so many members now taking a scoop of **Calorie Control Weight Management Formula** powder before the two heaviest meals of the day, and following other steps to lower excess glucose, we expect our next pooled analysis to show a considerable reduction in mean fasting glucose levels amongst Life Extension members.

AS WE SEE IT

Don't Be a Victim of Physician Ignorance

We at *Life Extension* hear from members who say their doctor is not concerned that their fasting glucose level is a little over **100 mg/dL**. The reason physicians don't panic about this kind of high reading is that they are so used to seeing it in older individuals.

As you have just learned, however, glucose readings over **85 mg/dL** place aging humans at sharply elevated risks for cardiovascular disease. You don't have to become a victim of physician apathy and ignorance. There are a myriad of steps you can take to drive down your glucose to safer ranges. The section beginning on the next page provides a menu of options to select from to gain glycemic control over your body.

As more Americans wake up to the ***inadequacies*** of mainstream medicine, they are joining the **Life Extension Foundation**. One benefit of membership is being able to order your own **blood tests** at ultra-low prices. For instance, we offer a comprehensive blood chemistry test that measures glucose, triglycerides, LDL, HDL, total cholesterol, liver-kidney function, blood cell counts and more for only **$35**. You can order this test by calling **1-800-208-3444** (24 hours a day) and have your blood drawn in your area at your convenience.

Research Funded by Life Extension in 2010

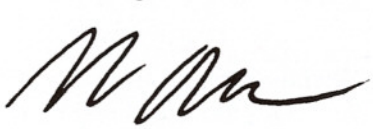
The Life Extension Foundation expanded its research funding in 2010, with special emphasis on grants to scientists working on cutting-edge **cancer** therapies. We selectively fund research that offers the best opportunity to discover a cure during the early clinical trial phase. In other words, when cancer patients enter our clinical trials, we take extraordinary efforts to give them the best chance of attaining a complete response or eradication of the disease.

Pharmaceutical companies, on the other hand, conduct placebo-controlled studies on cancer patients to gather data with little regard to the human lives they know will be lost because of the barbaric way their studies are designed. Cancer research funded by Life Extension is not being done by pharmaceutical giants because it seldom involves a compound that can be patented. As members are aware, therapies that don't have the potential to produce gigantic profits are neglected and even suppressed by the pharmaceutical industry.

Life Extension supports a relentless campaign to reform corrupt governmental policies that deprive Americans of life-saving therapies. By exposing the lethal impact of medical ignorance, such as showing that doctors accept dangerously high **glucose** levels as being normal, we spare countless humans the ravages of debilitating and lethal diseases. Just once a year, we discount the price of every product we offer. During our annual **Super Sale,** members stock up on our most advanced formulations and enjoy considerable savings.

I want to thank members for purchasing most of their supplements from the **Life Extension Buyers Club**. We use these sales to fund critical **research projects** aimed at eliminating disease and death, while battling **oppressive** government attempts to establish dictatorial control over your health and longevity.

For longer life,



William Faloon

Proven Methods to **Reduce** Fasting and Postprandial **Glucose Levels**

Scientific studies indicate that any amount of fasting glucose over **85** mg/dL incrementally adds to heart attack risk.[34]

If you can choose an ideal **fasting glucose** reading, it would probably be around **74** mg/dL.[23] We know, however, that some people are challenged to keep their glucose under **100** mg/dL. What this means is that it is critically important for aging individuals to follow an *aggressive* program to suppress excess glucose as much as possible.

The good news is that many approaches that reduce **glucose** *also* lower fasting insulin,[31,128-130] LDL,[86,128,131-134] triglycerides,[21,22,28,128,130] and C-reactive protein,[135] thereby slashing one's risk of vascular disease,[21,31,76,136] cancer,[137-141] dementia[142-146] and a host of other degenerative disorders.

In this section, we succinctly describe drugs, hormones, nutrients and lifestyle changes that facilitate healthy glucose levels.

NUTRIENT OPTIONS

Since **Life Extension** members know it is best to take dietary supplements with meals, it should not be difficult for them to make it a routine practice to shield their bloodstream from excessive calorie absorption by taking the proper nutrients before most meals.

An efficient way of obtaining nutrients that can impede the impact of carbohydrate and fat foods when taken before meals is a powdered drink mix that provides the nutrients in the box below:

NUTRIENTS THAT REDUCE THE IMPACT OF EXCESS CALORIE INTAKE

Propolmannan — **2,000 mg**

Mechanism(s): Slows gastric emptying to delay rapid carbohydrate absorption. It also provides a viscous barrier that binds bile acids that normally facilitate fat absorption.[80,81,147]

Phaseolus vulgaris — **445 mg**

Mechanism(s): Inhibits the *amylase* digestive enzyme used to break down carbohydrate foods for eventual absorption into the blood as glucose.[22,148,149]

Irvingia gabonensis — **150 mg**

Mechanism(s): Inhibits *amylase* and functions via three additional mechanisms to internally regulate glucose and triglyceride metabolism.[30,131,150]

Green Tea Phytosome — **150 mg**

Mechanism(s): Inhibits the *lipase* digestive enzyme used to break down fatty foods and boosts internal utilization of glucose by boosting resting metabolic rate.[27,151]

We suggest taking a powdered drink mix containing these ingredients before the two heaviest meals of the day.

FOR SUGAR ADDICTS

For those whose glucose levels remain unacceptably high despite taking the powdered drink mix, there are encapsulated nutrients that work to specifically block the *sucrase* and *glucosidase* digestive enzymes. Sucrase breaks down sucrose and *glucosidase* converts all carbohydrates into glucose. Blocking these enzymes reduces the amount of glucose absorbed from dietary sources. One capsule containing **L-arabinose** and a special **brown seaweed extract** should be taken before eating sucrose (table sugar) containing foods.[33,79,152,153]

ENHANCING INSULIN SENSITIVITY

Aging causes a loss of *insulin sensitivity*, which means that **glucose** that would normally be utilized by energy-producing cells instead either remains in the blood or converts to storage as **triglyceride** (in blood and fat cells) or **glycogen** in the liver.

A new **cinnamon extract** has been developed to enhance the ability of **insulin** to drive blood **glucose** into muscle cells. This novel **cinnamon** compound that enhances *insulin sensitivity* is combined with **brown seaweed extract** (to inhibit the glucosidase enzyme) to provide additive control over glucose levels.[29,77,153-157]

DRUG OPTIONS

An anti-diabetic drug that *Life Extension* suggests normal aging people consider taking to lower glucose is **metformin**. It is available in low-cost generic form.

Metformin has a long history of safe human use, plus intriguing data to suggest that it may possess anti-aging properties.[158,159] We think that those with excess blood glucose (above **80-85** mg/dL) should ask their doctor about it even if they are not diagnosed as diabetic.

Some of the side benefits of metformin include weight loss[160-162] and triglyceride reduction,[163-165] which are in themselves proven heart attack risk reducers.

Metformin functions to reduce absorption of ingested carbohydrates,[98,166,167] suppress appetite,[168,169] enhance insulin sensitivity,[91-93] and most uniquely, metformin inhibits the release of stored liver glucose (glycogen) back into the blood.[95-98,170]

One of the problems that frustrates so many people who follow a low-calorie diet, yet have persistently elevated glucose levels is that the liver improperly dumps too much glucose into the blood. This of course is a vital life function in a starvation state, but for aging individuals, excess hepatic release of glycogen (called gluconeogenesis) causes them to suffer chronically high glucose and insulin levels. Metformin inhibits gluconeogenesis.[170,171]

Another low-cost drug that lowers glucose levels is **acarbose,** which reduces the absorption of ingested carbohydrates by inhibiting the *glucosidase* and other sugar absorbing enzymes in the small intestine. A typical dose is **50-100** mg of acarbose taken before each meal. Some people experience intestinal side effects, but otherwise, acarbose is highly efficacious in reducing blood glucose levels and reducing several cardiac risk markers in the blood.[21,31,76]

There are of course other FDA-approved drugs that will lower your glucose levels. Many of these drugs, however, function by mechanisms that carry side effect risks.

Life Extension stands on solid scientific ground in recommending that those with impaired glucose tolerance follow an aggressive program that involves eating healthier and smaller meals, exercising, and taking nutrients before meals that deflect the impact of excess calorie intake. Drugs like **metformin** may be considered for its multiple benefits that extend beyond mere glucose control. **Acarbose** should be utilized if glucose levels remain stubbornly high.

Metformin Dosing and Precautions

The dose of metformin varies considerably. The starting dose may be as low as **250-500** mg once a day with a meal. If hypoglycemia (low blood sugar) does not manifest, the dose of metformin may be increased to **500-850** mg taken before the two or three meals, all under the supervision of your physician, of course. One side effect of metformin is that it can cause homocysteine levels to elevate.[172] This is less likely to happen to Life Extension members who already take nutrients that suppress homocysteine. Those with impaired kidney function or congestive heart failure may not be able to take metformin.

HORMONE OPTIONS

Normal aging is accompanied by a sharp decline in **hormones** that are involved in maintaining insulin sensitivity and hepatic glucose control. Restoring **DHEA** (dehydroepiandrosterone) levels to youthful ranges in men and women may help enhance insulin sensitivity and glucose metabolism in the liver.[173-177]

Progressive doctors are realizing that in men, a **testosterone** deficiency can induce a serious reduction of *insulin sensitivity.* For men, restoring youthful levels of testosterone has been shown to be particularly beneficial in facilitating glucose control.[178] Blood tests can assess your hormonal status

Hormone Precautions

Men with pre-existing prostate cancer should avoid testosterone until their cancer is cured. Women with certain types of hormone-related cancers are advised to avoid DHEA until their cancer is cured. Men who replace testosterone are advised to test their blood within 60 days to make sure that their estrogen (estradiol) levels and PSA are not increasing. Some men convert (aromatize) testosterone into estradiol. If this happens, there are drugs (like Arimidex®) or nutrients that inhibit the aromatase enzyme to keep estradiol in the safe range of between 20-30 pg/mL. These blood tests, taken 60 days after testosterone therapy is initiated, can also detect liver or blood count abnormalities that in rare cases can be exacerbated by testosterone.

so a man can replenish testosterone (and DHEA) to more youthful ranges. Optimal ***free testosterone*** blood levels in men are between **20-25** pg/mL.[179]

Life Extension has published articles showing that diabetic men can derive enormous benefits by restoring testosterone to youthful ranges, as opposed to overloading the body with excess insulin as mainstream doctors continue to do.[180-182]

DIETARY OPTIONS

One can achieve remarkable control over glucose levels by altering their diet and exercising more. Below are three dietary options to consider:

1. Consume a **low-calorie diet** (often less than 1,400-1,800 calories a day). Most people cannot adhere to this kind of low-calorie diet.[56]
2. Consume a **Mediterranean diet,** with lots of fresh fruits and vegetables, fish and beans as protein sources, and omega-3 and monounsaturated fats (olive oil), while avoiding saturated fats, refined carbohydrates, cholesterol-laden foods, excess omega-6 fats, and most animal products. An increasing percentage of health-conscious Americans are adopting this kind of diet.[183-185]
3. Avoid sugary fruit juices (almost all fruit juices contain too many sugars) and beverages spiked with fructose,[186-190] sucrose,[191-196] and/or high-fructose corn syrup.[197-201] Consume a low-glycemic index and low-glycemic load diet.[202,203]

Summary

From a practical approach, achieving optimal glucose readings on your next blood test will probably involve a combination of the various approaches described in this section. Each individual will respond differently.

For some, a modest reduction in calorie intake and an increase in physical activity will sufficiently lower fasting and after-meal glucose levels. Most aging individuals, however, will need to take the powdered drink mix described on page 12 before the two heaviest meals of the day to impede the impact of ingested calories. Others should ask their doctor about the prescription drug suggestions such as metformin.

When one questions the importance of doing all this, please know that the incidence of pre-diabetes, metabolic syndrome and type 2 diabetes is increasing at alarming rates. In fact, diseases related to glucose impairment are skyrocketing everywhere in the world that adopts unhealthy Western eating habits.

A medical catastrophe is predicted for the United States as the vast majority of the population is now overweight and suffers frighteningly high levels of glucose, insulin and triglycerides.

The single most important component of one's longevity program may be the steps taken before meals to neutralize the toxic effects of excess calories most of us invariably ingest.

Life Extension urges all members to enact a personal program designed to suppress **fasting glucose** levels to ranges of **80-85 mg/dL** (or lower). Fortunately, there are a wide range of options that enable aging humans to accomplish this profoundly effective anti-aging feat. ●

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