

FATIGUE

What's the Problem, and How Do You Diagnose It?

Fatigue—feeling tired or weak or not having normal energy for life activities—is all too common in HIV disease. Diagnosis is simple: ask yourself whether you have the same level of energy that you've always had in the past. If the answer is no, that's fatigue. However, because fatigue may be a slowly developing problem in many, don't just ask yourself how you felt yesterday, but rather in years past, including before your HIV diagnosis. Think about how energetic you feel throughout the day now compared to years past. Also consider how sustained your energy is. Do you wake up feeling rested or, even after a full night's sleep, is it a struggle to get out of bed? Can you operate at full steam while you perform the day's activities? Can you get through a whole, full day without sagging? Does your energy level decrease much more than it used to in the late afternoon or evening? Are you still able to work a full day and then go out for an evening's activities, if you so desire. If answering these questions makes you realize that your energy level isn't what it used to be, then it would be important to consider all the possible ways to improve it. What may be more difficult than identifying that you have an energy problem will be to discover all the things that may be underlying your fatigue so that answers for returning your energy to normal can be found.

What are the Causes?

There are many possible causes of fatigue in HIV disease, and in many cases, there may be several operating at once. To have the best hope of returning your energy to a truly healthy, normal, life-sustaining level, it will be important to look at all the possible contributing causes.

□ **The first and most urgent possibility to consider is infection.** You should always report fatigue to your physician so that you can be checked for any possible infections, whether they're the everyday variety that anyone might develop or, if your CD4s are on the low end, opportunistic conditions. There can be cases where fatigue is the only symptom of an infection, so reporting it to your physician will be crucial so that moving forward to diagnose the problem can begin, preferably before the infection worsens enough to cause other symptoms.

Two infectious possibilities that are often not considered are chronic yeast overgrowth and parasites. If your fatigue is accompanied by any of the other common signs of Candida overgrowth (including vaginal yeast problems in women, a white coating on the tongue, digestive gas and inability to properly digest food, anal itching, sinus problems and constant runny nose, skin rashes, body aches and pains, and/or headaches), then it would be important to consider this possibility and talk to your physician about the possible need for treatment. Parasites tend to be under diagnosed and it's easier to come in contact with them than you may think. All that's required for a parasite to reach you is for a kitchen worker to not appropriately wash up after a bathroom visit and then handle the salad that you later eat. Many people seem to think that parasites are no concern unless they've been in a third world country, but it's simply not true. If you have gas or bloating or diarrhea along with your fatigue, discuss this possibility with your physician.

Sometimes it's HIV infection itself that's causing low energy, particularly in those with high viral loads. For those not yet on antiretroviral therapy, fatigue would be another factor to consider in making decisions about beginning HAART.

The catch-22 of beginning drug therapy to solve fatigue is that many drugs can cause or contribute to it. It's a particularly common result of taking drugs that cause anemia. And anemia from any cause will often cause serious fatigue. [See *Anemia* for a full discussion of all possible causes, including a list of the drugs that are common anemia inducers.]

In some cases, anemia is not the problem that drugs are causing. Just taking all those meds seems to wear some people out. This sort of fatigue seems to be an individual response—a particular drug may cause energy problems in you but not in your friends. So asking your fellow med-takers whether your low energy could be caused by the HAART combo you're on may not give you good answers. They may be doing just fine on those same drugs and assure you that surely they aren't the problem, but in your individual case, they might be.

It's also important to know that this sort of med-caused energy loss will sometimes disappear after a period of time on those drugs so if at all possible, consider waiting for a period of six to eight weeks on the drugs to see if the fatigue passes. If it does not, it will be very important to discuss with your physician whether other drugs might be available to you which would be less likely to cause energy loss. When it is possible to discontinue a fatigue-causing drug, the problem will usually disappear fairly quickly when the med is stopped *unless* the drug leaves behind a problem like anemia that still needs to be addressed. [Again, see that discussion under *Anemia*.]

□ **Another very important possible cause of fatigue is malnutrition**, and it's more common than many people believe. Food is your body's source of energy and when you don't take in the whole foods that will truly feed your body what it needs to sustain itself, the end result is often fatigue. This may be the problem if either the food you're eating is nutrient-poor (you're living on junk food and your body wouldn't recognize a healthy food if you swallowed it) or because you're

simply not eating enough. Because loss of appetite is not uncommon in HIV disease, many people simply do not take in enough calories to supply their body with its source of energy. There are many causes of appetite loss in HIV, and the result may be an inadequate intake of food for normal, healthy energy. [If you think that appetite loss may be present, see a full discussion of possible treatments under *Appetite Loss*.]

□ **HIV+ people are known to have multiple micronutrient deficiencies from early disease stages on, and many of those deficiencies can contribute to fatigue.** These deficiencies may be more common in those who are not eating enough for overall good nutrition, but there are many reasons for nutrient deficiencies in addition to lack of proper food intake, so many people may develop such problems, even when they feel that their food intake is good.

□ **B-12 deficiency is a particularly common cause of serious energy loss.** Alas, researchers have shown that B-12 deficiency does not always cause the red blood cell changes that physicians look for as a sign of deficiency. In addition, because the standard blood test reflects only what's in the bloodstream and not what is in the body's cells, a reading that appears normal may not truly reflect the body's status. Even with these problems related to accurate testing (which almost certainly result in significant under-diagnosis of B-12 deficiency), many studies have shown that a large percentage of HIV+ people are B-12 deficient, even sometimes in relatively early disease stages. For many people, a simple trial of B-12 therapy may be the best way to see if it can help with fatigue.

□ **Inadequate levels of certain fatty acids may also contribute to fatigue.** Fatty acids are very important in the body's energy cycle, and in some HIV+ people the fatty acids needed to produce full energy may not always be present, either due to lack of sufficient intake or because of excess requirements for them due to immune system demands.

□ **Because so many different micronutrients are required for proper energy, there are other possible deficiencies, some of which are common in HIV+ people, that might be contributing to energy loss.** Included are vitamin E, L-carnitine, chromium, magnesium, and Coenzyme Q₁₀. Supplementation with these can also contribute to increases in energy.

□ **Sometimes the cause of the fatigue is inadequate levels of protein in the diet.** If the fatigue is severe three quarters to one gram of protein per pound of body weight may be needed. Please see the diet section of *NYBC's Self Care Guide* for more information on protein intake.

□ **Incidences of low blood sugar can also contribute to fatigue.** Even if what you eat is good, waiting too long between meals can increase the possibility that blood sugar may drop too low at certain points, especially in those who have tendencies toward chronic hypoglycemia. With more and more HIV+ people developing blood sugar problems and, in some cases, diabetes, hypoglycemia may be more common now. We tend to talk much more about high blood sugar, but too low blood sugar is also a serious problem, and always zaps energy. Initially, when the blood sugar drops too low, the brain is not getting the energy it needs, and the result is a feeling of serious fatigue, along with irritability and emotional swings due to the release of adrenal hormones. Many people suffering from hypoglycemia experience a roller coaster effect as their blood sugar bounces from low to high to low again, with multiple episodes throughout the day. This can contribute significantly to feelings of overall fatigue.

Each time the blood sugar drops too low, there can be a serious loss of energy. Then, because the low blood sugar causes a craving for food, many people resort to quick-fix snacks that contain substantial sugar. This rush of glucose will temporarily raise the blood sugar but in many cases, the level goes too high and the pancreas often responds to the sudden increase by over-producing insulin. This, in turn, lowers the blood sugar too much and results in another bout of hypoglycemia symptoms. During each of these episodes, insulin escorts tryptophan into the brain which then leads to the creation of serotonin, the sleep chemical. This inevitably results in additional feelings of fatigue.

□ **Hormone problems are another important possible source of energy loss.** Lisa Capaldini, M.D., has pointed to **adrenal insufficiencies** as being one cause of fatigue in people living with HIV. She believes that the problem may be deficiencies of either glucocorticoids (like prednisone) or androgens/anabolic steroids (like testosterone). Dr. Capaldini points out that if you get suddenly tired by just standing up or walking a few steps, you may have orthostatic hypotension, the kind of low blood pressure often caused by adrenal insufficiency. This is treatable with low, normalizing doses of adrenal hormones.

Another common fatigue-causing problem in HIV is abnormally **low levels of testosterone**. When your fatigue is accompanied by lean tissue loss or loss of libido (sex drive) and/or depression, a testosterone deficiency is often the cause. If testing shows that your testosterone level is abnormally low, regular use of it via a transdermal (through-the-skin) patch or gel will often lead to substantial increases in energy, as well as the nice side bonus of normalized sex drive and improved ability to normally grow muscle tissue when working out. **DHEA levels may also be low and could contribute to fatigue.**

Studies have also shown **abnormal thyroid function** in some HIV+ people. Thyroid hormone deficiency is a known cause of fatigue and can cause other symptoms such as abnormally low body temperature and cold extremities (hands and feet that are always cold). If you have this combination of symptoms, careful tests should be run to ascertain

where replacement hormone therapy may be appropriate. Even test results at the low end of normal are often indicative of clinically important deficiency. [For more specific info on hormone supplementation, see NYBC's *Self-Care Guide*.]

□ **Liver problems can also contribute substantially to fatigue.** If you are coinfecting with hepatitis viruses or have other problems that have caused liver stress, often indicated by elevated liver function tests, this may be contributing to a low energy level. [For suggestions on this, see *Liver Dysfunction*.]

□ **Depression and stress can both cause serious fatigue.** If these seem to be present in your life, resolving fatigue may require addressing these appropriately. [For more specific info, see NYBC's *Self-Care Guide*.]

□ **Fatigue may also be secondary to sleep problems.** Difficulty with sleeping is common in our society at large, and factors specific to HIV disease may increase the likelihood that HIV+ people are not getting sufficient rest. When that's the case, fatigue is the inevitable result. It will be terrible important to do everything possible to eliminate sleep problems, and begin getting the full night's rest that is needed for good energy. [For more information, see *Depression, Anxiety, Insomnia, and Other Mental Problems* in this guide, as well as the information on sleep in the *NYBC Self-Care Guide*.]

□ **Your activity level can also affect your energy level.** If, for whatever reason, you have gotten in the habit of doing very little exercise and, in general, have little activity in your day, you can get to feeling sluggish and tired. This creates a vicious circle because when you feel so lethargic you won't be inclined to increase your activity level. Sometimes you just have to force yourself to start with a small increase in activities and exercise. The increased circulation and other benefits that come from this exercise may then give you the boost you need to do more. [For a full discussion of exercise and its benefits in HIV disease, see the *NYBC Self-Care Guide*.]

□ **And last but not least, do remember that your lifestyle choices may be greatly affecting your energy level.** If you are working too many hours, exercising and sleeping too little, living with a too-high stress level, not bothering with proper nutrition, artificially pushing the body with caffeine or nicotine or other drugs, or simply pushing yourself beyond any reasonable limit, it's hardly surprising that you have too little energy. Of these, one of the most common in our coffee-addicted society is the situation in which caffeine intake first causes overstimulation, followed by a subsequent crash. The crash will, of course, often lead the caffeine-addicted person to gulp more coffee, and so on and so on. A reasonable intake of a cup or two of coffee daily is not usually problematic, but for those who always seem to have a cup in hand, this could be contributing to fatigue.

The other "addiction" that is too common in our society is workaholicism. Far too many people spend far too many hours driving themselves in the workplace, and far too few getting the rest and recreation they need for health. In their rushed lives, it is also not uncommon for nutrition to be forgotten while they live on the fastest of the available fast food. Choices like these wouldn't be healthy for someone who is *not* living with this disease. For people living with HIV who make such choices, the fatigue that comes may not have anything to do with the virus. They may just be worn out. Don't let this be you. (For suggestions on ways to live more healthfully with HIV, see the *NYBC Self-Care Guide*.)

What are the Treatments?

The first must for effective treatment of fatigue is identification of all the possible contributing causes, to the greatest extent possible, followed by elimination of as many of these as you can. This would certainly include treating any infections found so, first and foremost, call your doc and discuss the possibility of undiagnosed infections.

Improving your diet (where that's a problem) and supplementing with the nutrients discussed below should be a priority. Of all the nutrients discussed here, supplementation with B-12 may be the very most important. The fact discussed above that B-12 and folic acid may be deficient despite normal-appearing lab results means that these deficiencies' possible contribution to fatigue may be missed. This has led many physicians to simply do a test run of supplementation with both nutrients to see if fatigue and weakness improve. Deficiencies of other B vitamins may also contribute to fatigue so accompanying B-12 supplementation with a B complex is the best approach.

In those not currently on antiretroviral drugs, the persistent presence of fatigue would be a factor to be considered in deciding to start HAART therapy since HIV might be contributing. Where possible, choosing drugs less likely to cause anemia would be preferable. For those currently on HAART, substitutions should be considered for anemia-causing drugs, or any others that are suspected of contributing to fatigue, where possible.

However, there is an important caveat to this. Although it would seem ideal to look for possible substitutions for any medication that appears likely to be contributing to this problem, there may not always be available substitutes. This may be a particular problem for people who are very treatment experienced with HAART meds. They may have become resistant to many previously used drugs, and might well be on the only combo currently available to them. If the combo is otherwise working well and providing the anti-HIV benefits needed, it may be necessary to stay with those meds, while attempting to address the fatigue in other ways. If the drug(s) cause anemia, addressing it with the red blood cell growth-promoting drug Procrit may be the best solution for returning energy to normal. In other cases, there might be no choice but to stick with a cancer chemotherapy or other drug(s) needed for treatment of particular conditions since what has been prescribed may be the best possible treatment. Again, the right approach may be to stick with those meds, but treat anemia

with Procrit and address all the other possible causes of fatigue.

An aggressive approach to fatigue would include:

- Treating any infection found;**
- Treating all possible causes of anemia, if it is present, and substituting for anemia-causing drugs if possible; where anemia can't be eliminated, treating the red blood cell problem with erythropoietin (Procrit);**
- Possibly treating HIV infection for those not currently doing so, if otherwise appropriate;**
- Supplementing with B-12 and folic acid, along with a B complex or a multivitamin that contains the whole range of B vitamins;**
- Supplementing with coenzyme Q-10;**
- Supplementing with fatty acids and the other micronutrients, discussed below, that may be deficient;**
- Improving the diet as much as possible, both to increase nutrient intake and to prevent hypoglycemia;**
- Addressing sleep problems;**
- Beginning and maintaining an effective exercise program;**
- Testing hormone levels and replacing hormones, where needed;**
- Doing liver supportive therapies for those with liver problems;**
- Doing whatever is necessary to address stress and depression;**
- Making the most energy supportive lifestyle choices: work less, exercise and sleep more, try to have more fun and less stress, try to limit sugar to the occasional treat and consume reasonable amounts of caffeine, and try to eliminate nicotine or other drugs that artificially boost the body and then let it crash.**

Key Treatments

Diagnosing and treating infections. With any fatigue, always call your physician immediately so that any possible infections can be diagnosed and treated. If you are not currently on HAART and your doc believes that HIV itself may be causing fatigue, discuss the pros and cons of beginning antiretrovirals.

Drug switches. If fatigue begins soon after beginning a med, it's always possible that it's the main cause of fatigue. As discussed above, keep in mind that this sort of med-caused energy loss will sometimes disappear after a period of time on those drugs so if at all possible, consider waiting for a period of six to eight weeks on the drugs to see if the fatigue passes. If it does not, discuss with your doc whether other drugs might be available to you which would be less likely to cause energy loss. When it is possible to discontinue a fatigue-causing drug, the problem will usually disappear fairly quickly when the med is stopped *unless* the drug leaves behind a problem like anemia that still needs to be addressed. [Again, see that discussion under *Anemia*.] Just remember that maintaining viral control may sometimes require continuing a drug that causes this problem, especially if you have already used many of the available drugs and, thus, have few remaining treatment options. In this case, consider all the other possibilities for addressing fatigue and, where anemia is present, the use of erythropoietin (Procrit) to help eliminate fatigue while you remain on the problematic drug(s).

Improving the diet. Again, your intake of food is the basic source of all your body's energy. If an honest look at your diet shows weaknesses, working to improve your nutrition intake may really help eliminate fatigue. For details, see *NYBC's Self-Care Guide*. If you feel that a lack of appetite is contributing to inadequate intake, see *Appetite Loss*.

Nutrient boosting. Supplementation with the micronutrients that play a role in the body's production of energy, especially when they are the nutrients that have been shown to be frequently deficient in HIV disease, may be one of the most important things you can do to eliminate fatigue and restore truly life-supporting energy to your life.

B-12 and folic acid. Countless people have reported significant and even dramatic increases in energy when they have supplemented with B-12 and folic acid. Of all the therapies for HIV-associated fatigue, this combo seems to be the one that most often gets the most significant results. These nutrients should always be given together since taking folic acid alone could prevent the blood cell changes that might otherwise indicate B-12 deficiency. Doses of B-12 (1,000 mcg given daily via pills, or one to several times weekly through prescription Nascobal nasal gel or injections) and folic acid (800 mcg daily via pills) may be useful in restoring energy and overall feelings of well being, even when tests do not indicate obvious deficiencies. The injections or nasal gel forms of B-12 bypass absorption problems that may be present in many HIV+ people due to problems with the parietal cells that produce the intrinsic factor needed for absorption of B-12 consumed orally (in either foods or pills).

Since B-12 deficiency has been shown in many studies to be widespread in HIV disease—and researchers have noted that test results frequently do *not* accurately reflect deficiencies—supplementation with B-12 and folic acid would seem to be appropriate in anyone with fatigue, especially when eliminating other possible causes does not return energy to normal. Because other B vitamins are often deficient in HIV disease and those deficiencies can contribute to energy loss, it is always best to take the full B complex (as found in a potent multiple or in a separate B complex supplement) along with the B-12 and folic acid.

Essential fatty acids. Essential fatty acids appear to be deficient in many HIV+ people because of maldigestion

and malabsorption of fats, as well as metabolic changes in the body. Since EFA deficiencies are a well-known cause of fatigue, supplementation with essential fatty acids may be very useful for restoring energy. Two small trials have shown significant reductions in fatigue in those given fatty acid nutraceuticals.

There are two kinds of fatty acids that may be particularly important. Eicosapentaenoic acid (EPA) is an omega-3 fatty acid that is found in the body oils of certain cold-water fishes. Specifically, it is found in the fish on the feeding chain that begins with the arctic and antarctic plankton that actually produce the EPA. Your body can normally obtain EPA by using the enzyme delta-6-desaturase (D6D) to convert the alpha linolenic acid in omega-3 vegetable oils (such as flaxseed/linseed oil or canola/rapeseed oil) into EPA, but there may be problems with that in HIV+ people (see below).

Gamma-linolenic acid (GLA) is an omega-6 fat found in evening primrose oil, borage oil, oil, and black currant seed oil. Italian researchers have shown deficiencies of omega-6 fatty acids to be common in HIV+ people even in early disease stages. Theoretically, the linoleic acid found in omega-6 seed oils can be converted in the body to GLA, again with the help of the enzyme D6D, but there are a number of common blocking factors. One of the most important of these is that viral infections interfere with D6D production in the body. The lack of this enzyme, of course, can block the conversion of the common oils into GLA or EPA.

Direct supplementation with GLA and EPA bypasses the many factors that can block their production in the body. EPA is marketed under many brand names but it is important to use only brands that are guaranteed to be cholesterol-free. Toxins such as DDT, PCB, mercury, and others are stored in the cholesterol of the fish so by removing the cholesterol, the pollutants are also removed. One safe brand that is widely available because many different companies market it is Max-EPA. Of the four sources of GLA listed above, black currant seed oil is probably the least useful because in addition to its GLA content, black currant seed oil also contains large amounts of alpha linolenic acid which inhibits the use of GLA in the body. Of the others commonly available in capsules, the borage oil is much less expensive.

Overall, the most useful products for improving energy appear to be flaxseed oil (2 to 4 capsules with each meal), which is rich in both omega-3 and omega-6 fatty acids; GLA-rich borage oil (one capsule, 240 mg, twice daily); omega-3-rich fish oil (like Max-EPA, 1 to 2 capsules with meals, twice daily; and the combination product made by BioSyn called Omega-Syn (2 to 3 capsules daily) which contains both GLA (gamma-linolenic acid) and EPA (eicosapentaenoic acid) in a specified ratio.

An eleven-month, double blind, placebo-controlled study with 18 HIV+ people in moderate disease stages showed a definite, statistically significant reduction in fatigue in those who were given OmegaSyn. Researchers theorize that the reduction of fatigue in those taking OmegaSyn may indicate that the fatigue was caused by an essential fatty acid deficiency that in turn caused reduced cardiovascular efficiency due to the limited transfer of oxygen to the muscle cells. The researchers believe that supplementation with OmegaSyn may correct this deficiency and reduce the fatigue associated with it. This beneficial effect on the heart may also be important in light of the current concerns about the possibility of cardiac disease development in HIV+ people, especially those on HAART. [For more information on this, see *Cardiac Concerns*.] Supplementation with essential fatty acids may be important to help prevent this. For all these reasons, taking essential fatty acid nutraceuticals with meals may be highly advisable long-term.

Consuming foods rich in essential fatty acids, especially those which appear to be protective against heart disease, is also useful. Fatty fish (such as salmon, mackerel, sardines, tuna, cod and halibut) are a good source of omega-3 fatty acids, and multiple studies in the non-HIV population have shown their benefits for maintaining a healthy cardiovascular system, and thus the energy that only comes with a healthy heart..

Vitamin E, L-carnitine, chromium, magnesium, and Coenzyme Q₁₀. Various studies have shown that each of these nutrients may be deficient in HIV+ people. Since each is important for various aspects of the body's creation of energy, those deficiencies may cause fatigue. Thus, appropriate supplementation with these can contribute to increases in energy. Appropriate doses might be vitamin E (800 IU daily), L-carnitine (3,000 to 6,000 mg daily) or acetyl-L-carnitine (500 mg, three times daily), chromium (200 mcg in a GTF formula, with each meal), magnesium (500 to 600 mg daily), and coenzyme Q-10 (100 to 500 mg daily, or more if affordable). (For additional information on these nutrients, see *NYBC's Basic Nutrient Protocols* and *Counteracting Inflammation* in this guide's *Introduction*.)

Botanicals for Fatigue:

Ashwagandha (*Withania somnifera*): The primary herbal tonic of the Ayurvedic system of medicine in India. It has been widely studied for its tonic effects and ability to reduce the damaging effects of stress. It has primarily been used to enhance physical performance and secondarily for its anti-inflammatory effects. In at least one study, use of ashwagandha increased lean muscle mass and weight gain. Other studies have reported on its ability to enhance phagocytosis and increase macrophages and white blood cells.

Dosage: Equivalent to 3-6 g daily.

Caution: May potentiate the effects of barbiturates.

Astragalus Root (*Astragalus membranaceus*): One of the primary energy and immune enhancing tonics of Chinese medicine. Regarding its energy enhancing activity it is reported to induce the accumulation of cyclic AMP. It has broad-spectrum immune modulating activity (see Immune Supportive Therapies). In Chinese medicine it is also used for abnormal sweating. It is best combined with other tonics such as codonopsis and atractylodes.

Dosage: Equivalent to 6 g daily as decoction or solid extract.

Atractylodes Root (*Atractylodes* spp.): Atractylodes is a major ingredient in most Chinese tonic formulas. It has been reported to increase endurance and body weight. It also elicits specific immune enhancing activity (see Immune Supportive Therapies). In Chinese medicine it is also used for abnormal sweating. It is best combined with other tonics such as codonopsis and astragalus.

Dosage: Equivalent to 3-12 g daily as decoction or solid extract.

Codonopsis (*Codonopsis* spp.): A primary endurance enhancing tonic of Chinese medicine that is often used as a substitute for ginseng. It is best used with other tonics such as astragalus and atractylodes and is used for poor appetite, anemia, weak limbs, and shortness of breath.

Dosage: 9-15 g as a decoction.

Cordyceps (*Cordyceps chinensis*): A “mushroom” like substance that, naturally, grows high in the Himalayan mountains. In recent years it has been cultivated under controlled conditions. Cordyceps is one of the most highly regarded energy enhancing and endurance promoting substances in Chinese medicine. It has been shown to enhance cardiac performance and speed up recovery times after exertion. It has additionally been reported to enhance general immune resistance through increased T-helper cells, increased natural killer cell activity, enhanced production of interferon, and prolongation of the survival times of lymphocytes and macrophage activity. It has also been shown to improve liver function in those with hepatitis B.

Dosage: Equivalent to 3 g daily.

Ginseng Root (*Panax ginseng*): Panax ginseng and Siberian ginseng are both noted for their ability to offset fatigue and improve stamina. Both come in capsules, powders, tinctures, and syrup forms. Dosing will depend on the form chosen. Ginseng is the primary energy enhancing botanical in Chinese medicine and has a number of beneficial effects with regards to the treatment of fatigue. It has been shown to enhance performance, increase tolerance to stress, and strengthen cardiac function. It can also help increase lean muscle mass, an anabolic activity through the synthesis of RNA and protein in muscles. One study reported on its ability to increase the exercise capacity of skeletal muscles through a greater utilization of fatty acids, thus sparing carbohydrate stores. Ginseng has also been shown to increase the activity of natural killer cells. In traditional Chinese medicine, ginseng is used to enhance digestion and assimilation, for heart palpitations, forgetfulness, and insomnia, and to treat loss of appetite and diarrhea. Naturopathic physicians recommend drinking it in tea form early in the day as a natural way to improve energy. NOTE: Practitioners of Traditional Chinese Medicine believe that ginseng should not be used during any active infection. During chronic infection (like HIV) its use is acceptable.

Dosage: The equivalent of 3-9 g as decoction nor solid extract.

Note: There is a wide variety of grades of ginseng available on the market ranging from those that are very effective to those that are completely ineffective. Care must be taken to seek out high quality ginseng products.

Rhodiola (*Rhodiola* spp.): Rhodiola, also known as “Arctic root”, was widely used as a tonic in Russia and Siberia. It has been shown to enhance general well-being, physical performance, mental fatigue, learning ability, muscular coordination, and cognitive functions. Reported mechanisms of action include: increased release of nor-epinephrine, serotonin, and dopamine.

Schisandra Fruit (*Schisandra chinensis*): One of the most highly regarded tonics of Chinese medicine. It has been used since antiquity for the treatment of fatigue, sexual dysfunctions, such as spermatorrhea, premature ejaculation, and impotence. Modern research regarding its tonic effects has focused on its adaptogenic activity in humans and animals. In athletes, it increases performance and recovery after exertion. An enhancement of nitric oxide production has been reported as one of the mechanisms of action associated with these effects. Antidepressant and liver-protecting effects have also been reported.

Cautions: May modulate cytochrome P-450 enzyme systems, and therefore, may alter the effectiveness of conventional medications affected by this system. Consult a qualified health care professional when using schisandra in conjunction with conventional medications.

Siberian ginseng (“ELEUTHERO”) Root (*Eleutherococcus senticosus*): Panax ginseng and Siberian ginseng are both noted for their ability to offset fatigue and improve stamina. Both come in capsules, powders, tinctures, and syrup forms. Dosing will depend on the form chosen. Ginseng is the primary energy enhancing botanical in Chinese medicine and the most widely studied adaptogenic tonic in the botanical kingdom. Adaptogens are substances that help to enhance the body’s adaptive responses to physical and psychological stresses. It has been shown to enhance physical and mental performance, reduce the negative effects of stress, reduce stress-induced high blood pressure, and increase general resistance against disease. It also has specific immune modulating functions of enhancing the activity of both natural killer and T-cells.

Caution: Do not use if you have high blood pressure. Note: Recently, the name Eleuthero has been applied to this botanical.

Botanicals for Fatigue:

Ashwagandha 4.5% 450mg x 90	6/d (2B, 2L 2D)
Astragalus 400mg x 100	6-12/d (2-4B, 2-4L, 2-4D)
Atractylodes Extract x 100 grams	1-4 teaspoons daily in water
Cordyceps 600mg x 90	6/d (2B, 2L, 2D)
Olive Leaf x 1lb	2-3 cups day
Siberian Ginseng 425mg x 100	3-8/d (1-2B,1-3L, 1-3D)
Rosavin/Rhodiola 3% 100mg x 60	3/d (1B, 1L, 1D)
Schisandra x 180	6/d (2B, 2L, 2D)

Other Nutraceuticals

Magnesium Malate: A combination of magnesium and malic acid that allows absorption of both compounds and improves muscle cramps, weakness and fatigue. Malic acid also chelates (grabs) aluminum.

Dosage: 1 - 3 tablets daily with meals.

NYBC Nutraceuticals for Fatigue:

Acetylcarnitine 500mg x 100	3/d (1B, 1L, 1D)
B-12 1,000mcg x 250	1/day
Borage Oil 240mg GLA x 120	2/d (1L,1D)
Chromium GTF 200mcg x 250	3/d (1B, 1L, 1D)
CoEnzyme Q 10 100mg x 60	1-5/day
Vitamin E 400IU x 250	1-2/d (0-1L, 1D)
Super EPA 360mg x 120	3-6/d (1-2B,1-2L, 1-2D)
Essential Balance 3/6/9 1,000mg x 200	6-12/d (2-4B, 2-4L, 2-4D)
Magnesium Malate 100 mg x 180	1 - 3 tablets daily with meals.

Erythropoietin (Procrit). When fatigue is *caused by anemia*, erythropoietin may be a very important treatment. Erythropoietin (EPO) is a protein that is normally produced by the kidneys to promote the production of red blood cells in the bone marrow. The synthetic versions of this substance are administered via subcutaneous injection and are quite effective in boosting red blood cell counts, and eliminating the fatigue caused by anemia. Procrit has been shown to work well to reverse anemia caused by drugs, even when the person is continuing to take them. This may allow someone to continue taking needed drugs without a level of fatigue that might otherwise be debilitating.

In those diagnosed with even mild to moderate anemia, Ronald Mitsuyasu, MD, of UCLA’s Center for Clinical AIDS Research and Education, advises giving Procrit one to three times per week as a way of maintaining hemoglobin and hematocrit at normal levels, and thus eliminating fatigue and other anemia symptoms. The drug can make a huge difference in quality of life, and has few side effects, although some people experience a temporary rash. Other side effects that more rarely occur are fatigue, headaches, high blood pressure, cough, fever and/or asthenia (the "blahs"). For those with uncontrolled high blood pressure, it is advised that the blood pressure be controlled before beginning Procrit.

For those with inadequate kidney function, it is very important to monitor blood pressure during treatment. The drug's effectiveness can sometimes be blocked by opportunistic infections that involve the bone marrow, such as disseminated MAC. Because of its high cost, some insurers are reluctant to approve its use, but it is generally reimbursed by either private insurers or Medicaid. For those without coverage for the drugs' costs, the manufacturers provide limited patient assistance programs.

NOTE: Both B-12 and folic acid should be given along with Procrit because they are the *rate-limiting* step in red blood cell production. In other words, Procrit is stimulating the bone marrow to produce red blood cells but it does not provide the raw materials from which those cells are actually created. Those raw materials are the B-12 and the folic acid so if you don't have enough of them, you won't be able to build the cells. Since they are so commonly deficient in HIV disease, simply providing them along with any use of Procrit seems wise. For those shown to be iron deficient, supplementation with iron may also be needed to eliminate anemia. (For further information, see *Anemia*.)

Preventing hypoglycemia and sugar or caffeine-caused energy crashes. Avoiding empty calories (white flour and white sugar and all the foods made with them, as discussed in *NYBC's Self-Care Guide*) is critical for preventing hypoglycemia reactions. This will also help prevent the "sugar high" rush that empty-calorie, high-sugar foods can cause, a rush that is almost always followed by a crash down to low energy. Avoiding excessive caffeine may also help in similar ways since too-high levels of caffeine can create a false feeling of energy, followed by a crash when the caffeine is eliminated from the body.

The best regimen to stabilize blood sugar and avoid these ups and downs usually consists of regularly scheduled meals and snacks with an emphasis on a whole-foods diet that is high in complex carbohydrates and fiber. Complex carbohydrates are broken down slowly and help your body to maintain a steady blood sugar level, which results in steadier energy levels. Eating carbohydrates along with some protein and fat will also help by slowing digestion (since fats and protein take longer to digest) and, thus, slowing the flow of glucose into the body. If you are seriously hypoglycemic, smaller meals with frequent snacks may help (in other words, you're basically eating six small meals per day).

In addition, supplementation with chromium may be helpful. Chromium is a mineral that makes up part of the glucose tolerance factor (GTF) molecule. GTF is very important for blood sugar control since it is required for the body's proper use of carbohydrates. Deficiencies of GTF might contribute to the development of hypoglycemia. Products are available that contain the GTF molecule itself, including the chromium, and these may be preferable to taking chromium separately.

Hormone therapy. Testing hormone levels (especially testosterone, thyroid hormones, and adrenal gland hormones) is very important for anyone with fatigue. If abnormal levels of any of these are found, appropriate supplementation may work wonders for restoring energy. [For more information, see *NYBC's Self-Care Guide*.]

Exercise. Just do it. Regular exercise can very significantly improve energy levels. If you're too exhausted initially to do more than lift a soup can, then start there and gradually work your way up to a fitness-creating daily workout. Improved energy is bound to follow. [For more info, see *NYBC's Self-Care Guide*.]

Countering depression and stress. Since both depression and high levels of stress can be major causes of fatigue, working to eliminate these (and learning how to better handle what cannot be eliminated) will be very important for improving energy. [For more info, see *Depression, Anxiety, Insomnia, and Other Mental Problems* in this guide; also see *NYBC's Self-Care Guide*.]

Sleep promotion. Getting healthful amounts of sleep every night is an absolute requirement for eliminating fatigue. If you're not getting a restful 8 to 9 hours every night, then this is an important problem to address if you want to be restored to full energy. [For more info, see *Depression, Anxiety, Insomnia, and Other Mental Problems* in this guide; also see *NYBC's Self-Care Guide*.]

Liver support. For those whose liver function tests indicate liver problems, doing everything possible to support the liver will be very important since fatigue is a frequent result of liver distress. [For more info, see *Liver Dysfunction*.]