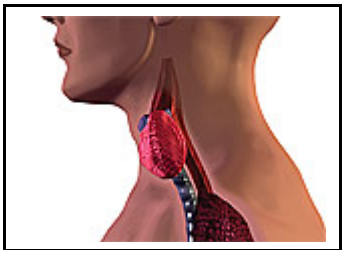
REPORT

Physician's Guide: Using Blood Test Findings To Safely Induce Weight Loss

By William Faloon



Weight Loss Might Not be Possible if Thyroid Hormone Levels Are Insufficient

The thyroid gland secretes hormones involved in cellular energy expenditure. When a person restricts their calorie intake (i.e. goes on a diet), there is often a decrease in metabolically active thyroid hormone that causes the body's fat-burning processes to slow down.

One reason people put on weight as they grow older is because aging impairs their ability to efficiently utilize carbohydrates and fats. One cause of impaired carbohydrate and lipid metabolism is sub-clinical thyroid deficiency. Some physicians believe that most people over 40 have a sub-clinical thyroid deficiency that contributes to their unwanted weight gain.[109,110]

To give you an idea of how profoundly the thyroid gland dictates body weight, consider that when the thyroid produces too much thyroid hormone, the most common clinical symptom is significant weight

loss. The name for the disease caused by an overactive thyroid gland is hyperthyroidism, and in 76–83% of cases, a patient's first complaint to their physician is about how much weight they have been losing.

In the 1960s and 1970s, the connection between hypothyroidism and weight gain caused some people to assume they could speed up their metabolism and lose weight by using supplemental thyroid hormones. This led to an abuse of thyroid hormone as people created an artificial state of excess thyroid hormone (a condition medically known as hyperthyroidism). Hyperthyroidism can cause weight loss as well as irregular heartbeats, sweating, and tremors. Although people taking supplemental thyroid hormones in these studies may have lost weight, they were losing lean muscle mass in addition to undesirable body fat.[111]

Today our understanding of the relationship between thyroid hormone and weight loss is more complete. It works like this: when calorie intake is drastically lowered, the activity of an enzyme called *5'-monodeiodinase* is reduced; 5'-monodeiodinase is necessary to convert the thyroid hormone T4 into T3. When *5'-monodeiodinase* level are reduced, the levels of T3 drop.[112-115] T3 is the stronger form of thyroid hormone.

Decreased T3 levels can be directly replaced. Some older clinical studies testing this theory were promising. However, later studies showed that direct T3 supplementation by dieters was connected with muscle wasting.[116,117] During fasting, administration of large doses of T3 caused even more severe muscle wasting.[118]

More recent studies suggest that using very low doses of replacement thyroid hormone during dieting, once the body has switched over from carbohydrate burning to fat burning, may not be associated with muscle breakdown.[119-121]

How to Prescribe Thyroid Hormones

While there are studies showing that thyroid supplementation promotes weight loss in some people, it should only be used when there is evidence of a thyroid hormone *imbalance,* either in the form of decreased secretion from the thyroid gland or decreased conversion of T4 to the metabolically active T3 in the peripheral tissues. It is important to remember that many people's metabolic rate decreases in response to dieting, as their body attempts to slow the metabolic rate to conserve body mass.

That means a person with normal thyroid status before dieting may become thyroid-*deficient* because of the reduced intake of calories. This may occur when drugs like **metformin** or natural products are used to suppress appetite. For optimal fat-loss effects, a person may be prescribed small doses of Cytomel® (a prescription form of T3) if their T3 levels are not in the upper one-third range of normal, or if consuming fewer calories results in a reduction of T3 levels.

There are several blood tests used to assess thyroid function. If any of these tests indicate a thyroid deficiency, consider prescribing the appropriate dose of the drug Cytomel® (T3) or Armour® desiccated thyroid to bring your patient's level into the normal range.

If a blood test shows an increase in *thyroid-stimulating hormone* (TSH), this means that the pituitary gland is over-secreting a hormone to stimulate thyroid function because of an apparent thyroid deficiency. The normal range for TSH can be as wide as 0.2–5.5 mIU/mL. However, if TSH levels are above **2.0,** this indicates the patient may be hypothyroid and could benefit from Cytomel® or Armour® drug therapy. Remember, the higher the TSH blood level, the more likely the patient is to be

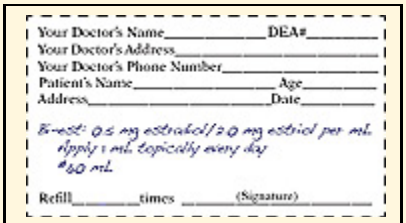
thyroid-deficient.

T4 (or free *thyroxine*) tests the biologically available hormone being secreted by the thyroid gland. If T4 is deficient, most doctors prescribe Synthroid®, which is a synthetic T4 hormone. We recommend Cytomel® (T3) or Armour® desiccated thyroid, however, instead of Synthroid® (T4) because T3 is the metabolically active form of thyroid that aids in thermogenesis (body fat burning).[122] When evaluating T4 blood test results, optimal levels for males seeking to lose weight should be in a range of 8.5–10.5 mcg/dL. Females under age 60 seeking to lose weight should be in the range of 9–11 mcg/dL. Women older than 60 years should be in the range of 8.5–10.7 mcg/dL. If there is too much T4, this is a sign of hyperthyroidism that should receive immediate medical treatment.

Measuring the amount of T3 is one way of ascertaining how much metabolically active thyroid hormone is available to the tissues. The normal free T3 range is 2.3–4.2 pg/mL, but for losing weight, you might want a range of 3.4–4.2 pg/mL. If the patient's blood levels are below this, then Cytomel® drug therapy should be considered. Some patients are started with 12.5 mcg of Cytomel® twice a day. The dose can be increased if blood T3 levels do not return to a normal range or if symptoms of thyroid deficiency persist. If T3 levels are above normal, this can indicate an overdose of drugs like Synthroid® or Cytomel, or hyperthyroidism.

It should be emphasized that thyroid hormone by itself does not induce fat loss. Human clinical studies show that when thyroid hormone is given in the absence of thyroid insufficiency, muscle tissue is depleted.[111,116,118] The purpose of testing a patient's thyroid hormone status is to ensure they are in the *optimal* range (upper one-third of the normal reference range for T3).

HOW TO PRESCRIBE BIOIDENTICAL ESTROGEN DRUGS TO AGING FEMALES


Your Doctor's Name_____DEA#_____
Your Doctor's Address_____
Your Doctor's Phone Number_____
Patient's Name_____Age_____
Address_____Date_____
Bi-est: 0.5 mg estradiol/2.0 mg estriol per mL
Apply 1 mL topically every day
#60 mL
Refill_____times _____(Signature)_____

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Most practitioners use the level of **estradiol** in women's blood, along with an assessment of the patient's symptoms to prescribe the initial dose of bioidentical estrogen. The **estradiol** blood level must be considered in context to the other hormones such as **progesterone.** Looking at the **estradiol** blood level alone as a target is somewhat effective but not entirely comprehensive. Here is an example of how estradiol reading is commonly used as an approximation. In menopause, a woman typically has an estradiol blood level of **0-19** pg/mL. If with compounded **bi-est** (estriol and estradiol) cream, the blood estradiol level goes up to **100** pg/mL, for example, then you know that the **bi-est** is being absorbed and has increased your patient's estradiol level. You may then assume that the other estrogens also went up, and if the patient reports her menopausal symptoms have resolved, she is losing abdominal fat mass, and is happy, most practitioners would stop there and continue the patient on the dosage she has been using and do periodic follow-up.

If, however, the patient is still having symptoms, you can increase the bi-est dose or order additional tests such as the **total estrogen** blood test and/or estrone or a **urinary estrogen** test to get a better handle on the other estrogens and proceed from there. A typical starting dose for bi-est topical cream prescription might read as:

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The dose can be increased when severe symptoms of estrogen deficiency are present. Any women with an intact uterus must also be prescribed natural progesterone (not synthetic progestin drugs like Provera®) in a dose that achieves a youthful balance. Natural progesterone produces many benefits when properly balanced with estrogen. A typical twice-daily dose is one-quarter teaspoon of a 2.5% OTC natural progesterone cream applied to a different part of the body twice each day. Progesterone can help the skin appear younger, and many women apply it on certain days to their facial skin. It can also be applied to the breasts and inner thighs.

Suggested dosing is as follows:

- Premenstrual and perimenopausal women: 1/4 tsp. twice daily starting on day 12 of the menstrual cycle continuing up to day 28.
- Menopausal women: 1/4 tsp. twice daily for 21 days followed by 7 days off.

The dose can be adjusted up or down depending on the symptoms and response.

A typical dose for prescription natural progesterone cream is:

A blood level target to strive for in aging women might be:

Estradiol	**90-250 pg/mL**
Progesterone	**2.0-6.0 ng/mL**
Free testosterone	**1.0-2.2 pg/mL**

Remember that too much **free testosterone** in an aging woman induces abdominal weight gain, as does a*deficiency* of **estradiol.** Progesterone may be weight neutral, though some complementary practitioners claim it helps facilitate weight loss. Some doctors seek to increase progesterone levels up to **15** ng/mL.

The objective is to achieve a more youthful sex hormone balance not only to induce abdominal fat loss, but also to improve the patient's overall state of health and well-being. The use of estrogen drugs is contraindicated in women with existing estrogen-receptor positive cancer.

Suppressing Obesity-Inducing Inflammatory Factors

In recent years, *C-reactive protein* (CRP) has emerged as a reliable marker of many age-related diseases that have a hidden inflammatory component, such as heart disease and cancer. However, scientists are now realizing that CRP may also play a more direct role in disease by contributing to the growing obesity epidemic.

In a recent breakthrough, scientists from the University of Pittsburgh have discovered that CRP interacts directly with a key hormone in the body called **leptin,** which signals satiety as well as promotes the breakdown of fat.[123] By binding to leptin, the researchers conclude that CRP blocks its ability to pass through the blood-brain barrier to reach the hypothalamus and turn off chronic hunger

signals, effectively interfering with leptin's ability to regulate body weight. These exciting results reveal the importance of controlling CRP levels as part of a successful weight-management strategy. Indeed, studies using the dietary supplement ***Irvingia gabonensis*** have shown a dramatic reduction in weight accompanied by a marked decline in CRP levels.[124-126] Medications such as **orlistat, metformin,** and the carbohydrate enzyme-inhibiting agents can also reduce CRP.[127,128] There are several **nutritional approaches** that offer a safe and effective means of reducing CRP levels:

- A combination of **vitamins C** and **E** can help to fight inflammation. A recent placebo-controlled study in 19 overweight subjects found that this antioxidant combination reduced CRP levels by **32%** compared with an increase of **50%** in the placebo group.[129]
- The Mediterranean diet is an effective approach to reducing inflammation. Consuming a diet rich in **omega-3 fatty acids** has been shown to reduce CRP levels.130 For example, the Greek ATTICA Study of over 3,000 men and women yielded a 20% reduction of CRP in participants who most closely adhered to a traditional Mediterranean diet.[131]
- Increasing soluble **fiber** intake has been used successfully for reducing inflammation, achieving up to 28% reduction in CRP levels in overweight individuals.132 Beta-glucans are an excellent form of soluble dietary fiber that help lower CRP levels.[133]
- **Niacin** at a dose of 1,000 mg (which should be used with medical supervision) has been shown to reduce CRP levels by 15%.[134]
- **Vitamin D** is also gaining recognition as a crucial modulator of inflammation. A University of London study demonstrated a dramatic reduction in CRP levels of 23% following vitamin D supplementation.[135]
- Researchers have found that **vitamin K** status and intake also affect levels of CRP. In an analysis of the Framingham Offspring Study of 1,381 subjects with a mean body mass index of 28.1 (classified as overweight), higher levels of vitamin K status and intake (measured both by vitamin K plasma concentration and intake of the vitamin) were associated with lower levels of CRP.[136]
- **Curcumin,** the active ingredient in the curry spice, turmeric, has been used for centuries as a topical anti-inflammatory agent in India. Experimental studies confirm its anti-inflammatory ability, showing that it reverses the threat that elevated CRP levels pose to human endothelial cells.[137,138]
- Flavonoid **antioxidants** found in tea extracts, red wine, and cocoa can also reduce inflammation. In experimental studies, **resveratrol** and **quercetin,** found in red wine, have been shown to suppress the expression of CRP in a dose-dependent manner.[139] Dark chocolate, which contains another class of flavonoids called cocoa polyphenols, reduces inflammation too. In a study of 4,849 subjects, researchers found that CRP levels were up to 17% lower in those who consumed up to 20 grams of dark chocolate every three days compared with non-consumers,[140] signaling the benefits of **cocoa polyphenols** for reducing CRP levels. In addition, a human study of purified **theaflavin** extracts (found in black tea) produced a dramatic reduction in disease-causing mediators of inflammation, including CRP.[141]

Restoring Insulin Sensitivity and Further Reducing Postprandial Triglycerides

Metformin is an *oral hypoglycemic* drug that helps lower blood sugar levels in people with type 2 diabetes. It is a member of a class of antidiabetic agents originally derived from a plant called French lilac *(Galega officinalis),* which has been known for centuries to improve symptoms of diabetes.[142,143] But, as with so many other substances (both supplements and prescription drugs),

metformin has some unexpected and beneficial side effects when it comes to weight loss.

Recognizing that metformin-treated diabetics often lose weight, and believing that the drug might reduce patients' food intake, researchers at the St. Louis University Medical Center explored possible mechanisms for this effect in 1998.[144] Twelve obese women with type 2 diabetes who were on no medication were randomly assigned to receive oral metformin (850 or 1,700 mg) or placebo at 8:00 a.m. for three days. After a six-hour fast on the third day, subjects were given a "meal test" at 2:00 p.m., at which they were offered sandwich canapés. Just before, the meal subjects rated their hunger on a standard scale, and researchers then recorded the number of sandwiches the subjects ate in three consecutive 10-minute periods. Subjects who had taken metformin at either dose had significantly decreased calorie intake compared with placebo recipients, with the higher dose producing the most marked effect. Metformin-treated subjects also rated their hunger as lower, with the 1,700 mg/day dose producing the greatest decrease.

The researchers then went on to study 48 similar obese diabetic women who had not lost weight using diet alone. These subjects were given a 1,200-calorie diet and then were started on metformin (850 mg) or placebo twice daily for 24 weeks. The metformin-treated patients lost weight continuously throughout the treatment period, with a mean maximum weight loss that was **17.6 pounds greater** than the placebo group. Not surprisingly, the metformin recipients also had lower fasting blood glucose levels as well as lower levels of the hemoglobin A1C molecule that is a marker of chronic blood sugar levels. The authors of this study concluded that ***"metformin decreases calorie intake in a dose-dependent manner and leads to a reduction in bodyweight in non-insulin dependent diabetic patients with obesity."***[144]

TYING ALL THIS TOGETHER

A lot of ground has been covered in this article, but we will tie it all together succinctly here. Overweight and obese patients are likely to suffer from postprandial disorders that preclude sustainable fat loss. Young healthy humans can often ingest high-calorie meals without accumulating surplus body fat. Their young bodies respond with an immediate surge of insulin that precisely converts ingested calories to energy with minimal fat storage. They have abundant

functioning insulin receptors capable of optimally regulating how they metabolize their food. Hormones that regulate fat storage are primed to keep their young bodies slender. Normal aging severely disrupts these healthy metabolic patterns, necessitating aggressive medical interventions to reverse. **Blood test** results help enlighten you and the overweight patient to the degree of metabolic disturbance that may manifest on a blood test report showing fasting triglycerides far above **60-80** mg/dL and fasting glucose hovering around **100** mg/dL. What has become accepted as "normal" blood test findings (within the "reference range") are really an indicator of how widespread metabolic disorders have become in modern societies. An overweight or obese patient with fasting glucose around **100** mg/dL almost always has dangerously high fasting insulin levels. While this surplus insulin may temporarily keep glucose at barely acceptable levels, insulin resistance disrupts normal metabolic processes and contributes to excess storage of body fat. For long-term weight loss to occur, it is critical to enhance insulin sensitivity and purge the excess levels of fats (mainly triglycerides) and glucose that chronically saturate the patient's bloodstream.

We therefore recommend the following interventions for the first 60-90 days (or longer in certain patients):

1. **Orlistat** in the dose of **120** mg should be taken three times a day before each meal to inhibit the lipase enzyme. This will result in a rapid reduction of triglycerides and chronic inflammatory markers with a partial reversal of insulin resistance syndrome.
2. After two days, the drug **acarbose** in the dose of **50** mg taken three times a day before meals should be introduced to inhibit the alpha-glucosidase enzyme. Those who prefer taking a natural dietary supplement in lieu of acarbose can try **125 mg** of **InSea2™** (a combination of brown seaweed polyphenols and bladderwrack) before carbohydrate-containing meals to suppress alpha-glucosidase. Suppressing alpha-glucosidase significantly improves metabolic parameters involved in unwanted weight gain. This dose of InSea2™ is included in the new Enhanced Irvingia formula.
3. After another two days, the patient should initiate alpha-amylase inhibition using a standardized **white kidney bean extract** *(Phaseolus vulgaris)* in the dose of **445** mg before carbohydrate-containing meals. Suppressing *alpha-amylase* significantly improves metabolic parameters involved in unwanted weight gain. This dose of ***Phaseolus vulgaris*** is also included in the new **Enhanced Irvingia** formula.
4. All patients should supplement their meals with at least five grams of **soluble fiber** powder such as beta-glucans from oat or barley, psyllium, guar gum, and/or pectin to further reduce the rapid absorption of sugars into the bloodstream (and the subsequent insulin spike). Patients who don't want to mix powders can derive some benefit by taking four capsules (2,000 mg) of a highly purified glucomannan called PGX® with each meal. These fibers also help reduce blood lipid levels.
5. Patients presenting with any indications of metabolic syndrome, pre-diabetes, or frank type 2 diabetes should be considered for **metformin** therapy. Initial dose should be 250 mg with the two largest meals of the day. The dose may be increased to 850 mg taken with each meal (up to 2,550 mg/day). Metformin functions via multiple mechanisms to improve a patient's metabolic profile while helping to suppress appetite.
6. **Men** with free **testosterone** levels below optimal ranges of 20-25 pg/mL of blood should be prescribed a**compounded testosterone cream** with the objective of increasing their free testosterone to optimal levels (20-25 pg/mL of blood). Low testosterone predisposes men to abdominal obesity. Men with existing prostate cancer should not be prescribed testosterone. Estradiol levels in men should be maintained in the range of 20-30 pg/mL of blood.
7. **Women** with **estradiol** levels below 90 pg/mL of blood should be prescribed a

compounded **bioidentical estriol/estradiol cream** to increase their estradiol blood reading to over 90 pg/mL of blood. Women deficient in estrogen are predisposed to abdominal fat accumulation. Women with existing estrogen receptor positive cancers should not be prescribed estrogen drugs. All women with an intact uterus should be prescribed natural progesterone and most women will benefit by restoring progesterone blood levels to the youthful range. Women with excess free testosterone should be prescribed metformin and flutamide as discussed on pages 54 and 55 of this article.

8. **Thyroid** status can be assessed with blood tests and patients' free T3 level should be kept in the upper one-third range of normal, but should never be increased to above the upper range of normal. Ensuring compliance is critical if your patients are to achieve meaningful weight loss. We urge that you refer your patients to The Nine Pillars of Successful Weight Loss (And the article located at www.lef.org/pillar). The information provides patients with guidance on dietary, nutrient, and lifestyle changes they should implement to enhance the fat-reducing benefits of the various medications discussed in this article.

Metformin's health benefits now appear to extend beyond simple weight loss—other studies are showing that it can beneficially affect a variety of other parameters that are disturbed by obesity. A group of Turkish researchers, for example, writing in *Internal Medicine* in 2008, demonstrated that, in addition to weight loss, metformin-treated obese subjects had highly significant decreases in hypertension, disruptions of lipid profiles, and fasting blood sugar levels compared with placebo-treated subjects. These researchers ended their report with the statement that ***"metformin treatment should be initiated in patients with excess weight in their fifties."***[145] While that may be a bit over-enthusiastic, it does highlight the excitement that is being generated by this drug.

A Mexican research group has made similar findings with greater precision. They treated 60 obese patients with the metabolic syndrome (a constellation of findings related to obesity and its consequences), giving them metformin 850 mg/day or placebo, along with dietary counseling for all patients. They followed the patients for one year, tracking vital indicators of obesity-related cardiovascular health such as BMI, waist circumference, blood pressure, lipid profiles, blood sugar, and markers of the oxidant stress and inflammation that are cardinal features of the metabolic syndrome. Both groups lost weight and had improved blood pressures during the study, but patients taking metformin also had reductions in total cholesterol, markers of oxidation and CRP, a critical marker of inflammation related to vascular health. Perhaps most impressively, treated patients also had significant reductions in their *intima-media thickness* (IMT), which is a direct measure of blood vessel health reflecting the vessels' actual reaction to metabolic risk factors. Not surprisingly these researchers concluded that *"metformin has a considerable beneficial effect on nitroxidation, endothelial function and IMT in patients with metabolic syndrome."*[146]

Metformin has been used by healthy anti-aging enthusiasts since the early 1990s. Its ability to reduce glucose and insulin levels have led some to postulate that metformin may mimic some of the beneficial effects of *caloric restriction.*There are relatively few contraindications for prescribing metformin. Our only concern vis-à-vis this comprehensive weight-loss protocol we are proposing are hyper-responders to the *alpha-glucosidase* and *alpha-amylase inhibitors* who also overly respond to *metformin.* There is

a theoretical risk of inducing a state of *hypoglycemia* when all three agents are combined. In the real world setting, however, most overweight and obese patients will already suffer from some degree of glucose impairment and should benefit greatly from all three of these treatment modalities. A safe starting dose of metformin would be 250 mg twice a day before a meal. If glucose levels are not overly suppressed, the metformin dose can be increased to as high as 850 mg two or even three times a day before meals.

An undesirable side effect of metformin for men is that it can reduce *testosterone* levels.[147] As you read earlier in this article, low testosterone predisposes aging men to abdominal obesity. This may be why metformin has not always produced significant weight loss in clinical studies. Men who are prescribed testosterone replacement therapy can readily overcome this side effect if **blood tests** reveal that the prescribed dose of testosterone is not increasing free testosterone blood levels to the optimal **20-25** pg/mL range. All the prescribing doctor has to do is slightly increase the testosterone dose to overcome the testosterone-reducing effect of the metformin.