

Sex Hormone Binding Globulin (SHBG)

Sex hormone binding globulin (SHBG) is a protein that binds to sex hormones (i.e., testosterone and estrogen) in the blood and helps transport the hormones into tissues to do their job. In this way, SHBG plays an important balancing role for sex hormones in the body.¹

When hormones bind to SHBG, they are essentially inactivated. High concentrations of SHBG in the body can lead to increased bound testosterone, as SHBG binds more easily to testosterone than to estrogen.² This can cause symptoms associated with testosterone deficiency, including fatigue, decreased libido, weight gain, mood changes, decreased muscle mass, and decreased bone mineral density, to name a few.³

On the other hand, when SHBG levels in the body are low, there may not be enough binding power to keep sex hormones within range. This can lead to increased free testosterone and estrogen in the body, which can lead to symptoms like alopecia (hair loss) and acne.⁴

There are many things, including health conditions, that can affect the level of SHBG in the body.³ Your practitioner may have specific recommendations to help normalize SHBG levels, based on your individual circumstances. The lists below highlight examples of things that may affect SHBG. Talk to your functional medicine practitioner before beginning or changing any treatments.

Associated with Increased SHBG

Health Conditions:

- Aging^{2,3,5}
- Anorexia⁶
- Cirrhosis³
- Hepatitis^{3,5}
- Hyperthyroidism^{1,3}
- HIV^{3,5}
- Pregnancy^{5,7}
- SHBG gene polymorphisms^{3,5}

Medications and Supplements:

- Anticonvulsants^{3,5}
- Exogenous estrogens^{3,5,7}
- Vitamin D^{8,9}

Diet, Nutrition, and Lifestyle Factors:

- Exercise^{10,11}
- High caffeine/coffee intake^{12,13}
- Smoking^{15,16}
- Weight loss^{14,17}

Associated with Decreased SHBG

Health Conditions:

- Acromegaly^{3,5}
- Cushing's syndrome¹⁸
- Diabetes mellitus (Type 2)^{1,3,5}
- Hypothyroidism^{1,3,5}
- Metabolic syndrome/insulin resistance^{1,5}
- Nephrotic syndrome^{3,5}
- Obesity^{1,3,5}
- SHBG gene polymorphisms^{3,5}

Hormones:

- Androgens⁵
- IGF-1 and growth hormone¹⁹
- Insulin¹⁹
- Progesterin³
- Prolactin¹⁹

Medications:

- Glucocorticoids^{3,5}

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