

SHBG
Sex Hormone
Binding Globulin



SHBG

- Our bodies transport fat-soluble steroid hormones in the aqueous blood primarily by linking them to plasma proteins.
- SHBG primarily binds estrogens and androgens
- CBG primarily binds progesterone and corticosteroids
- Both SHBG & CBG have high affinity and high specificity
- Albumin has low affinity and low specificity for steroids, but a high degree of prevalence.
- Birth Control pills, because they add additional hormones to young women who are at the peak of their own hormone production, raise the SHBG
 - And often as a result, lower free testosterone and libido
 - Often it declines when OCP's are withdrawn...
...an on occasion, the elevated SHBG stays elevated!!!

SHBG

- One consequence of excessive dosages of estrogens or androgens is that the body will protect itself by increasing SHBG!
- Lookout folks! When (/if) overdose is discovered and reduced, SHBG levels may decline... and they may not!
- Some of the more challenging cases I have ever had resulted from an SHBG that would not come down without Rx
- Rx can include Danazol in low dosages (5 – 15 mg q.d.)
 - Monitor success with Serum SHBG levels

SHBG: Moral of the Story

- Include SHBG in your initial screening blood work
- Don't prescribe excessive levels of Bi-Est or Testosterone, and even progesterone and thyroid
- Certainly do not exceed 2.6 mgeeq of Bi-Est without testing
- Test everyone... even women who are on low dosages

Test results of the 20 out 51 women who dosed above optimal range: > 2.6 mgeeq



Test results of the 3 out 51 women who dosed below optimal range: < 0.8 mgeeq



- Good luck if SHBG elevates!

SHBG: reference

Transport of sex hormones

Testosterone and estradiol circulate in the bloodstream, loosely bound mostly to serum albumin (~54%) and corticosteroid-binding globulin (CBG) (AKA transcortin), and to a lesser extent bound tightly to SHBG (~44%). Only a very small fraction of about 1-2% is unbound, or "free," and thus biologically active and able to enter a cell and activate its receptor. SHBG inhibits the function of these hormones. Thus, bioavailability of sex hormones is influenced by the level of SHBG. The relative binding affinity of various sex steroids for SHBG is dihydrotestosterone (DHT) > testosterone > androstenediol > estradiol > estrone.[6] DHEA is weakly bound to SHBG as well, but DHEA-S is not.[6] Androstenedione is not bound to SHBG either, and is instead bound solely to albumin.[7]

Wikipedia

Principles and Practice of Endocrinology and Metabolism.
Lippincott Williams & Wilkins. 24 April 2001. ISBN
978-0-7817-1750-2. Retrieved 4 August 2012.

Sex Hormone Binding Globulin SHBG

If hormone dosages are too high,
SHBG will rise

... and confound

Unless you suspect it

Excessive
Estrogen Rx, Testosterone Rx, and even
Progesterone Rx and Thyroid Rx
will raise SHBG

Sex Hormone Binding Globulin SHBG

Always test for it

In your difficult-to-solve cases,
remember it