Sex hormone-binding globulin (SHBG) or sex steroid-binding globulin (SSBG) is a glycoprotein that binds to the two sex hormones: androgen and estrogen. Other steroid hormones such as progesterone, cortisol, and other corticosteroids are bound by transcortin. SHBG is found in all vertebrates apart from birds.

SHBG is produced mostly by the liver and is released into the bloodstream. Other sites that produce SHBG include the brain, uterus, testes, and placenta. Testes-produced SHBG is called androgen-binding protein.

SHBG is a protein of mol wt 90 kDa (402 aa) containing two subunits. SHBG transports the sex steroids testosterone, DHT and estradiol in the blood. Serum levels are increased during pregnancy, in women taking estrogens, and in men over the age of 50. Levels are reduced after menopause and in response to treatment with androgens or corticosteroids. Diagnostic uses include polycystic ovarian syndrome, and certain drugs. Lactation suppresses SHBG, whereas anorexia nervosa, and certain drugs (e.g., antidopaminergic drugs) increase SHBG. SHBG levels are decreased by androgens, progesterone, and estrogens.

SHBG has both enhancing and inhibiting hormonal influences. It decreases with high levels of insulin, growth hormone, insulin-like growth factor 1 (IGF-1), androgens, prolactin, and transcortin. High estrogen, and thyrxine cause it to increase.

Functions as an androgen transport protein, but may also be involved in receptor mediated processes. Each dimer binds one molecule of steroid. Specific for 5-alpha-dihydrotestosterone, testosterone, and 17-beta-estradiol. Regulates the plasma metabolic clearance rate of steroid hormones by controlling their plasma concentration.

SHBG levels are decreased by androgens, administration of anabolic steroids, polycystic ovary syndrome, hyperthyroidism, obesity, Cushing’s syndrome, and acromegaly. Low SHBG levels increase the probability of Type 2 Diabetes. SHBG levels increase with estrogenic states (oral contraceptives), pregnancy, hyperthyroidism, cirirosis, anorexia nervosa, and certain drugs. Long-term calorie restriction of more than 50 percent increases SHBG, while lowering free and total testosterone and estradiol. DHEA-S, which lacks affinity for SHBG, is not affected by calorie restriction. Polycystic Ovarian Syndrome is associated with insulin resistance and excess insulin lowers SHBG, which increases free testosterone levels.

**Source of Antigen and Antibodies**

<table>
<thead>
<tr>
<th>Antigen</th>
<th>Purified human SHBG protein</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antibody host/type</td>
<td>Mouse, monoclonal IgG1 (Cat # SHBG11-M) &amp; SHBG12-M (IgG2a)</td>
</tr>
<tr>
<td>2-ab</td>
<td>Goat Anti-mouse IgG-HRP conjugate Cat # 40320 (AP, biotin, FITC conjugates also available)</td>
</tr>
<tr>
<td>-ve control</td>
<td>Cat # 20008-1, Mouse (non-immune) Serum IgG, purified for ELISA, Western, IHC as -ve control</td>
</tr>
</tbody>
</table>

Human SHBG was purified from pooled human serum using proprietary techniques. Purified SHBG ~45 Kda and >90% pure by SDS-APGE. For Western blot -ve control (Cat # SHBG11-C) is supplied in SDS-PAGE sample buffer (reduced). Load 10 ul/lane of SHBG11-C for good visibility with antibody Cat # SHBG11-M. Store at –20°C in suitable size aliquots. SDS may crystallize in cold conditions. It should redissolve by warming before taking it from the stock. It should be heated once prior to loading on gels. If the product has been stored for several weeks, then it may be preferable to add 5 ul of fresh 2x sample buffer per 10 ul of the SHBG11-C solution prior to heating and loading on gels. This preparation is not biologically active. It is not suitable for ELISA or other applications where native protein is required. Do not freeze, thaw, or heat repeatedly.

**Form & Storage of Antibodies/Peptide Control**

- **Affinity pure IgG**
  - 100 ug/100ul
  - Solution
  - lyophilized powder

  Supplied in Buffer: PBS
  Reconstitute powder in Water

- **Storage**
  - Short-term: unopened, undiluted liquid vials at -20°C and powder at 4oC or -20C.
  - Long-term: at ~20C or below in suitable aliquots after reconstitution. Do not freeze and thaw and store working, diluted solutions.

- **Stability**: 6-12 months at ~20°C or below.

- **Shipping**: 4oC for solutions and room temp for powder

**Recommended Usage**

- Western Blotting (1:1K-5K using Chemiluminescence technique).
- ELISA (1:10K-1:100K; using 50-100 ng of control peptide well).

**General References**


**Human SHBG proteins and antibodies**

**Related material available from ADI**

Human SHBG ELISA kit

SHBG11-12-M-C 1611285V

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