

## Division of Laboratory Medicine

### Biochemistry

## Sex hormone binding globulin (SHBG)

SHBG is a plasma protein made by the liver that transports testosterone and estradiol. While bound these hormones are inactive. Variation in SHBG can therefore result in discrepancies between the total measured testosterone and clinical signs in some cases. SHBG concentration is used to calculate the free androgen index (FAI= 100 x Total testosterone/ SHBG).

In men SHBG and testosterone levels may be used in the investigation of infertility, a decreased sex drive, and erectile dysfunction, especially when total testosterone results are inconsistent with clinical signs. In women SHBG may be helpful in the investigation of amenorrhea, infertility, acne and hirsutism.

The concentration of SHBG is influenced by age, sex, liver disease, thyroid status, obesity and by anticonvulsant drugs like phenytoin and phenobarbitone. It is increased in response to oestrogens and decreased by androgen exposure.

### General information

**Collection container:** Adults – serum (with gel separator, 4.9mL brown top Sarstedt tube)

Paediatrics – lithium heparin plasma (1.2mL orange top Sarstedt tube)

**Type and volume of sample:** The tubes should be thoroughly mixed before transport to the lab. 1mL whole blood is required as a minimum volume.

**Specimen transport/special precautions:** Samples should not be taken from patients receiving therapy with high biotin doses (i.e. > 5 mg/day) until at least 8 hours following the last biotin administration.

### Laboratory information

**Method principle:** SHBG is analysed on the automated instruments by sandwich immunoassay with electrochemiluminescence detection. The assay is standardised against the 1st International Standard for SHBG from the National Institute for Biological Standards and Control (NIBSC) code 95/560.

#### Biological reference range or cut off:

	Females (nmol/L)	Males (nmol/L)
Age		
4 days to 1 month	14 - 120	

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1 month to 1 year	36 - 229	
1 to 8 years	42 - 189	
8 to 11 years	26 - 162	
11 to 13 years	15 - 108	
13 to 15 years	11 - 98	
15 to 17	10 - 84	10 - 50
17 years	11 - 155	
18 to 49	32-128	18 - 54
≥50y	27 - 128	21 - 77

**Turnaround times:** 2 weeks

### Clinical information

**Factors known to significantly affect the results:** Decreases SHBG: androgens, obesity, insulin resistance, metabolic syndrome, type 2 diabetes mellitus, gestational diabetes mellitus, polycystic ovary syndrome, non-alcoholic fatty liver disease, acromegaly, cushing's syndrome, congenital adrenal hyperplasia, hyperprolactinemia, tumor necrosis factor alpha, interleukin-1 beta and hypothyroidism.

Increase SHBG: estrogens, pregnancy (estrogens), weight loss, alcoholic cirrhosis, hepatitis-B and hepatitis-C infection, hemochromatosis, hyperthyroidism, growth hormone deficiency, acute intermittent porphyria, first generation anticonvulsants.

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