PATHOLOGY REGIONAL HOSPITAL MULLINGAR
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Grúpa Ospidéal
Oirthear na hÉireann

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Free Testosterone (males) and Free Androgen Index estimations

Reflex testing for Sex Hormone Binding Globulin (SHBG) e.g. when Total Testosterone (TT) is low in males or raised in females, can help improve evaluation of androgen status. Accordingly, as per our earlier memo (Jan 2020) any requests for SHBG are only processed (reflex tested) depending on the results of initial Testosterone analysis. Following any SHBG analysis (by our referral laboratory), an estimation of bioavailable testosterone (androgen) can subsequently be used to estimate the **Free Androgen Index** (Females, Ref. Range: 0-4%) or **Free Testosterone** (Males, Ref. range 0.16-0.52 nmol/L). Depending on factors that might affect the SHBG level, discordance between the total testosterone and FAI of cFT may be seen. Please contact the Consultant Clinical Biochemist (Dr Graham Lee, glee@mater.ie) for any further advice and interpretation.

Free Androgen Index (FAI, %) in females may be calculated as follows:

FAI (%) =Total Testosterone (nmol/L)/SHBG (nmol/L) x 100 **(Ref. Range: 0-4%**)

Free Testosterone in males may be calculated:

Using this online calculator available at the following website:
http://www.issam.ch/freetesto.htm   (**Ref. Range: 0.16-0.52 nmol/L**)

IMPORTANT:
Ensure the correct units for T [nmol/L], SHBG [nmol/L] and Albumin [g/L] are selected.

Note quoted Ref. Ranges are current since February 14th 2022. Please avoid using printed copies of this instruction especially as any updates of Ref. Ranges will be notified separately with updates to web version only.

Please see example below

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EXAMPLE for Free Testosterone calculation in MALES:

http://www.issam.ch/freetesto.htm

Free & Bioavailable Testosterone calculator

These calculated parameters more accurately reflect the level of bioactive testosterone than does the sole measurement of total serum testosterone. Testosterone and dihydrotestosterone (DHT) circulate in plasma unbound (free approximately 2 - 3%) ,bound to specific plasma proteins (sex hormone-binding globulin SHBG) and weakly bound to nonspecific proteins such as albumin. The SHBG-bound fraction is biologically inactive because of the high binding affinity of SHBG for testosterone. Free testosterone measures the free fraction, bioavailable testosterone includes free plus weakly bound to albumin.

Albumin	43	g/L ▾	Calculate	Explanation and examples
SHBG	10	nmol/L ▾		
Testosterone	6	nmol/L ▾		

Free Testosterone — 0.189 nmol/L = 3.14 %
Bioavailable Testosterone — 4.42 nmol/L = 73.7 %

Disclaimer: Results from this calculator should NOT be solely relied upon in making (or refraining from making) any decision in any case/ circumstances without the prior consultation of experts or professional persons. No responsability whatsoever is assumed for its correctness or suitability for any given purpose.

WARNING! The calculated free and bioavailable testosterone are reliable in most clinical situations, but should not be relied upon in situations with potential massive interference by steroids binding to SHBG; e.g. in women during pregnancy, in men during treatment inducing high levels of DHT (e.g. transdermal DHT, oral testosterone) or mesterolon

This calculator was developed at the Hormonology department, University Hospital of Ghent, Belgium. If you have suggestions to improve this calculator, or for further questions or help contact us Dr. Tom Fiers or Prof. Dr. J.M. Kaufman

Example (MALES):
Albumin = 43 **g/L** (use 43 as default, if no current albumin)
SHBG = 10 **nmol/L** (RR: 13-71 nmol/L)
Total Testosterone = 6 **nmol/L** (RR: 7.0-37.0 nmol/L)

Free Testosterone = 0.189 nmol/L (RR: 0.16-0.52 nmol/L)