

Laboratory Operational Update for Endocrinologists

20th January 2017

Labtests has changed its method for total testosterone and SHBG to a new modified version on our Siemens platform (Advia Centaur).

The new testosterone method is more specific, showing less cross-reactivity with other steroids. It also shows better precision, especially at low values. Results are now closer to Mass Spectrometry, the gold standard method for measuring testosterone, and aligned with CDC Hormone Standardisation Program Testosterone reference method. Please see Figure 1 for correlation data comparing the new formulation (TST II) with a Tandem Mass Spectrometry assay.

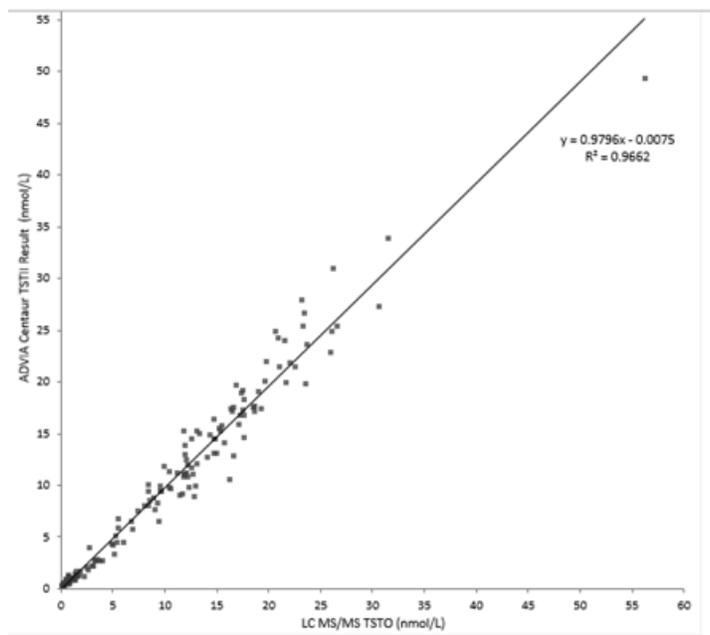


Figure 1: Linear correlation between the new assay (y axis) and a Tandem Mass assay (x axis)

TST II assay provides results that are overall very similar but slightly lower than the old formulation for both men and women.

Seventy five samples were sent to Labplus for comparison of the TST II assay with Labplus Roche testosterone immunoassay. Concentrations spanned the female to lower male range.

- Figure 2 demonstrates the correlation between the two sets of results for results ≤ 10 nmol/L,
- Figure 3 demonstrates the correlation for female samples only, and
- Figure 4 for male samples only.
- Figure 5 demonstrates that the overall average difference between TST II assay and Roche assay at Labplus (LPL) is approximately 0.1 nmol/L, with the new Siemens TSTII assay slightly lower.

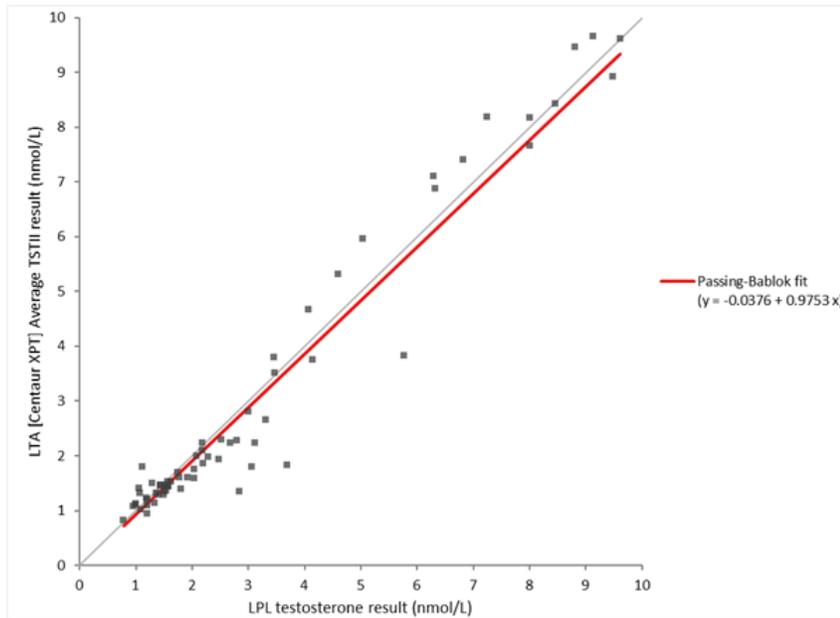


Figure 2: Passing & Bablok for all results < 10 nmol/L comparing TST II (y axis) with LPL (Roche) assay (x axis). 95% CI for intercept is -0.1834 to 0.1557; 95% CI for slope is 0.8465 to 1.052

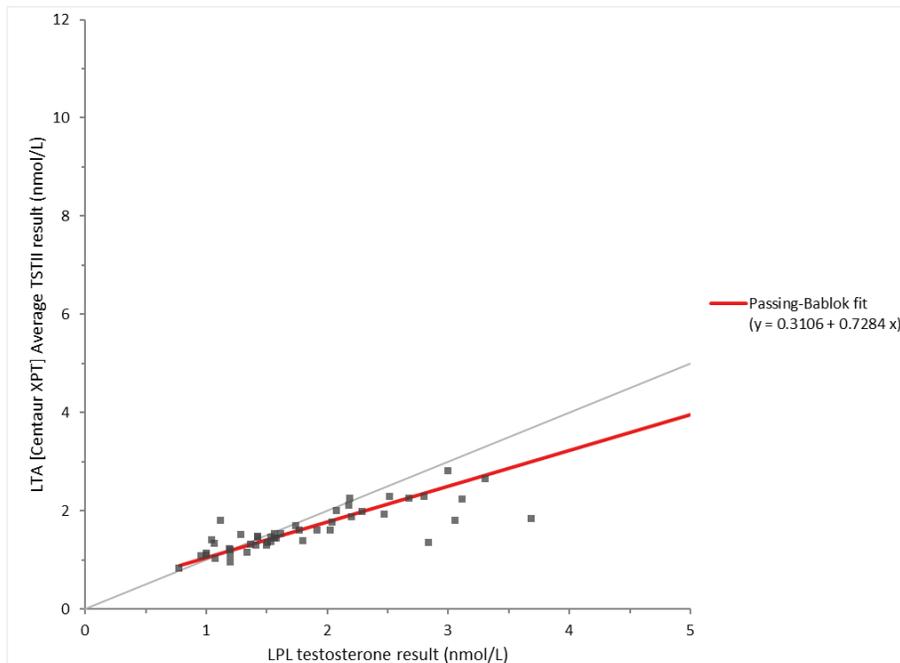


Figure 3: Passing & Bablok for females *only* comparing TST II (y axis) with LPL (Roche) assay (x axis). 95% CI for intercept is 0.06 to 0.5; 95% CI for slope is 0.6 to 0.9.

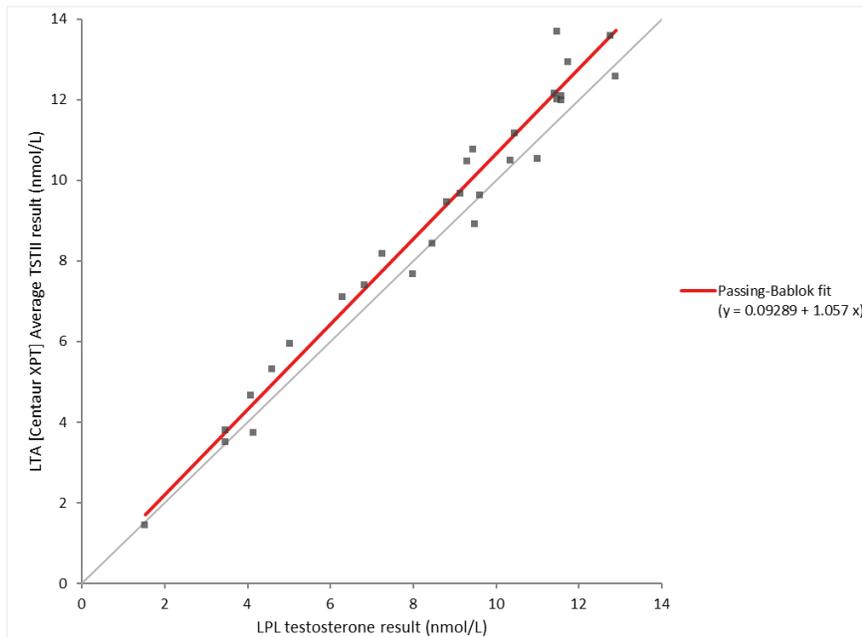


Figure 4: Passing & Bablok for males *only* comparing TST II (y axis) with LPL (Roche) assay (x axis). 95% CI for intercept is -0.72 to 0.74; 95% CI for slope is 0.98 to 1.1.

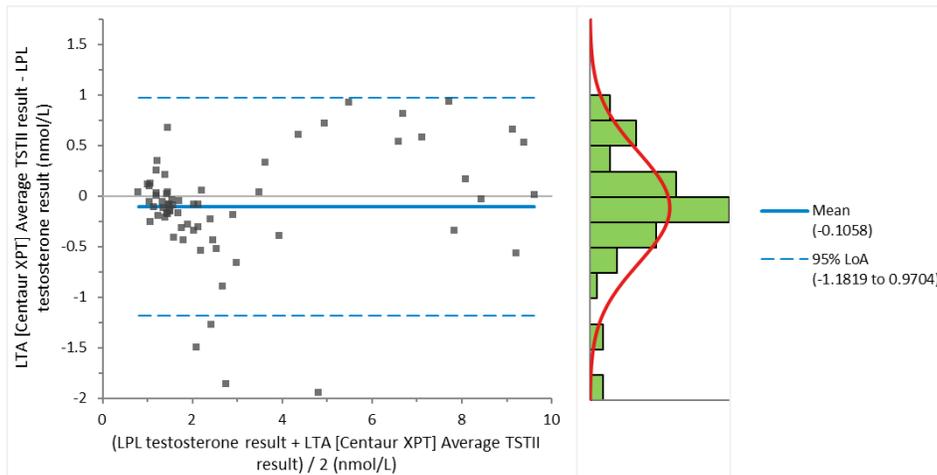


Figure 5: Difference Plot (TST II versus LPL (Roche))

Inter-assay analytical precision (CV) was found to be acceptable, 6.3% at a concentration of 1 nmol/L, 5.1% at a concentration of 1.43 nmol/L, and 3.4% at a concentration of 12.1 nmol/L.

Reference intervals have been modified. The new reference intervals are in line with those of LabPLUS (ADHB), with both methods being now aligned with mass spectrometry gold standard method.

The accuracy of the new assay is better defined and so is more reliable for clinical purposes. However, some exogenous testosterone formulations do show a strong interaction, especially *Nandrolone decanoate*, *11β-hydroxytestosterone*, and *11-keto-testosterone*. The manufacturer recommends against measuring samples in rare patients receiving these compounds. Table 1 summarises interferences stated by the manufacturer for both the old Siemens assay and the new TSTII assay, for comparison.

Table 1

Name of steroid	Degree of interference in old assay (%)	Degree of interference in <i>new TSTII assay</i> (%)
androstenedione	+0.94	+1.4
DHEAS	<0.1	+0.001
5alpha- DHT	+5.4	-1.4
ethisterone	not stated	+0.45
oxymetholone	<0.1	-0.58
prednisone	not stated	+0.011
prednisolone	not stated	+0.093
testosterone propionate	not stated	+2.95
cyproterone	<0.1	+0.13
danazol	<0.1	-0.12

SHBG and Calculated Free Testosterone

The SHBG assay has also been modified. The new assay is re-standardised to be better aligned to the WHO 2nd International Standard. Figure 6 and 7 demonstrate the difference between the old SHBG assay and the new re-standardised SHBG assay, and the correlation between the two, respectively.

The lower SHBG results mean that the calculated free testosterone results using the new assay combination (testosterone and SHBG) will be very similar to previously at low normal-low SHBG values (similar to many PCOS patients). However, calculated free testosterone results will be about 20-30% higher when SHBG lies in the mid-reference interval.

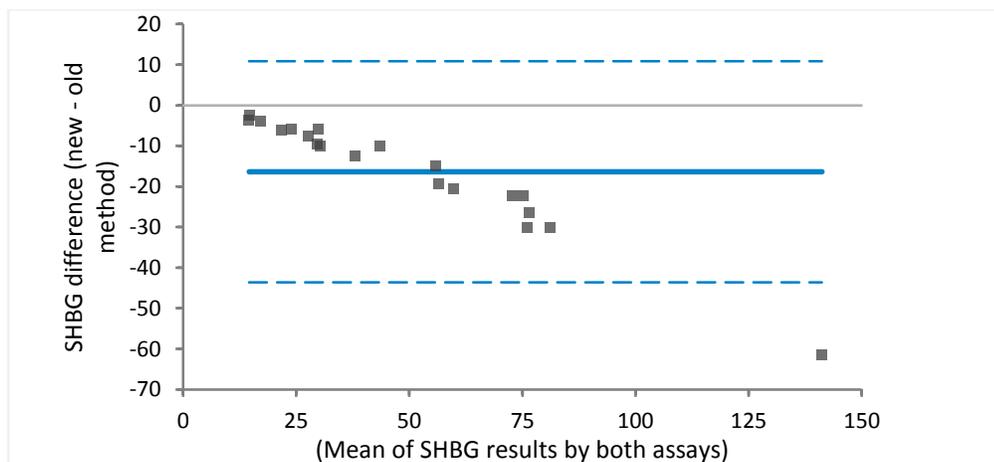


Figure 6: Difference Plot between old and new SHBG assays

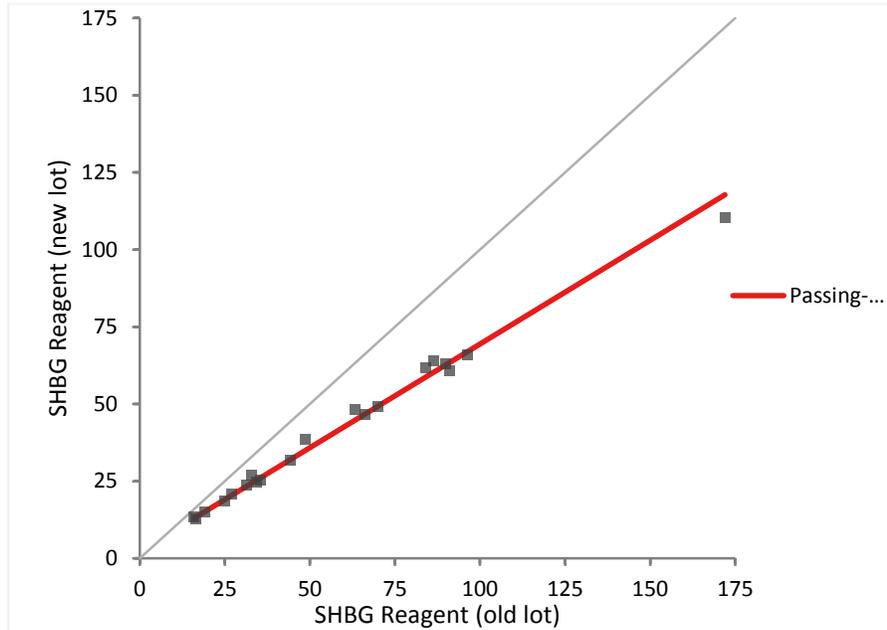


Figure 7: Passing & Bablok for SHBG comparing new assay, Lot 110 (y axis) to the old assay, Lot 26 (x axis). 95% CI for intercept is -1.3 to 4.2; 95% CI for slope is 0.63 to 0.72.

Free testosterone results also now show excellent correlation with the method used at LabPlus (Roche Cobas), see Figure 8. Accordingly the reference intervals are also identical.

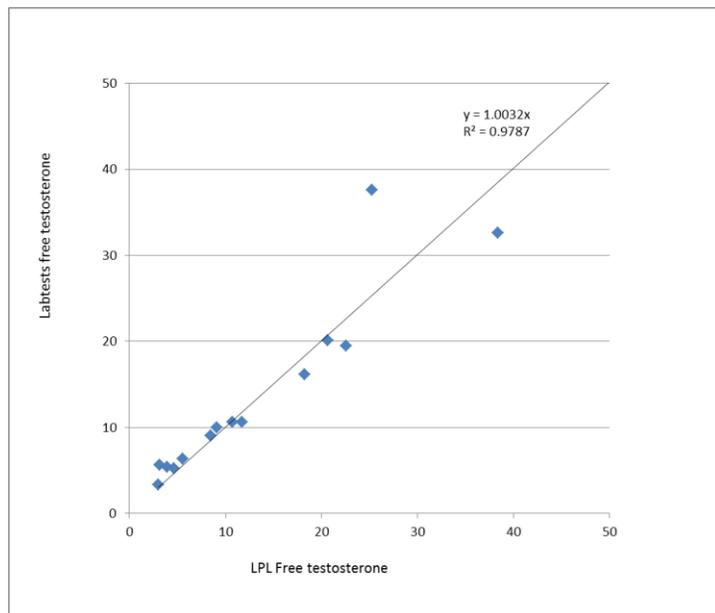


Figure 8: Free testosterone linear correlation.

For further information contact one of our Chemical Pathologists:



Dr Charles Ng
Phone: 09 574 7291 // 021 0215 6042



Dr Samarina Musaad
Phone: 09 574 7283 // 021 404 769



Dr Cam Kyle
Phone 027 276 0038