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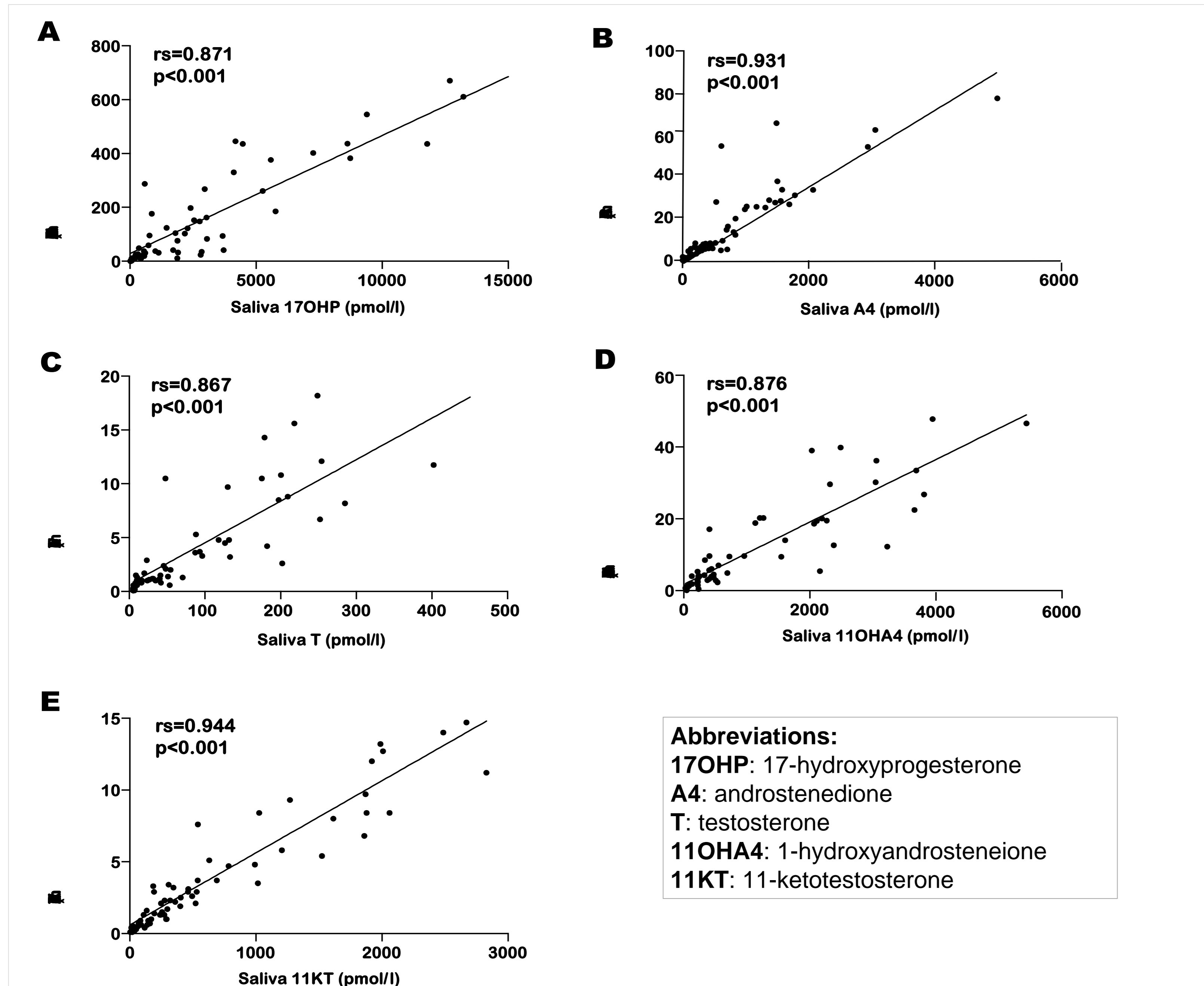
Introduction and Objectives

Monitoring of glucocorticoid treatment in congenital adrenal hyperplasia (CAH) is currently suboptimal, relying on blood tests which are traumatising in children and young persons (CYP). Evidence indicates a crucial role of 11-oxygenated C19 androgens in the pathogenesis of CAH.

We aimed to explore the use of 11-oxygenated C19 androgens in developing non-invasive monitoring tests by establishing the correlation between plasma and salivary androgens in CYP with CAH.

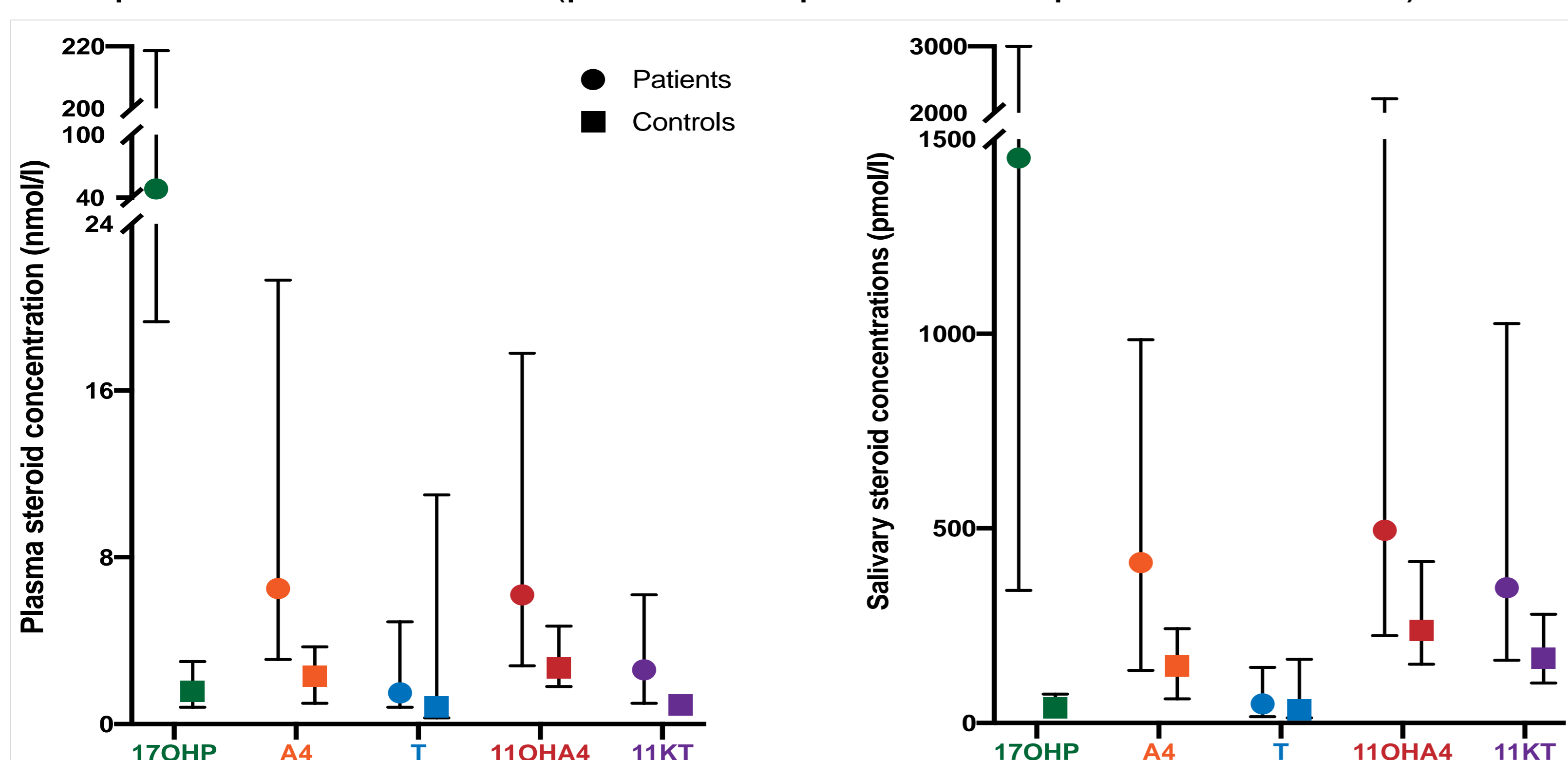
Results

Salivary and plasma concentrations correlated well for all the five steroids measured, with the strongest correlations found for androstenedione and 11-ketotestosterone.



We found consistently strong correlations between plasma and salivary steroids when analysing patients subgroups based on age and gender. We found weaker correlations in controls: 17OHP ($r_s=0.641$, $p<0.001$), A4 ($r_s=0.925$, $p<0.001$), T ($r_s=0.787$, $p<0.001$), 11OHA4 ($r_s=0.828$, $p<0.001$), 11KT ($r_s=0.842$, $p<0.001$).

Plasma and salivary steroid concentrations were significantly raised in patients compared to controls for all hormones ($p<0.001$) with the exception of testosterone ($p=0.143$ in plasma and $p=0.681$ in saliva).



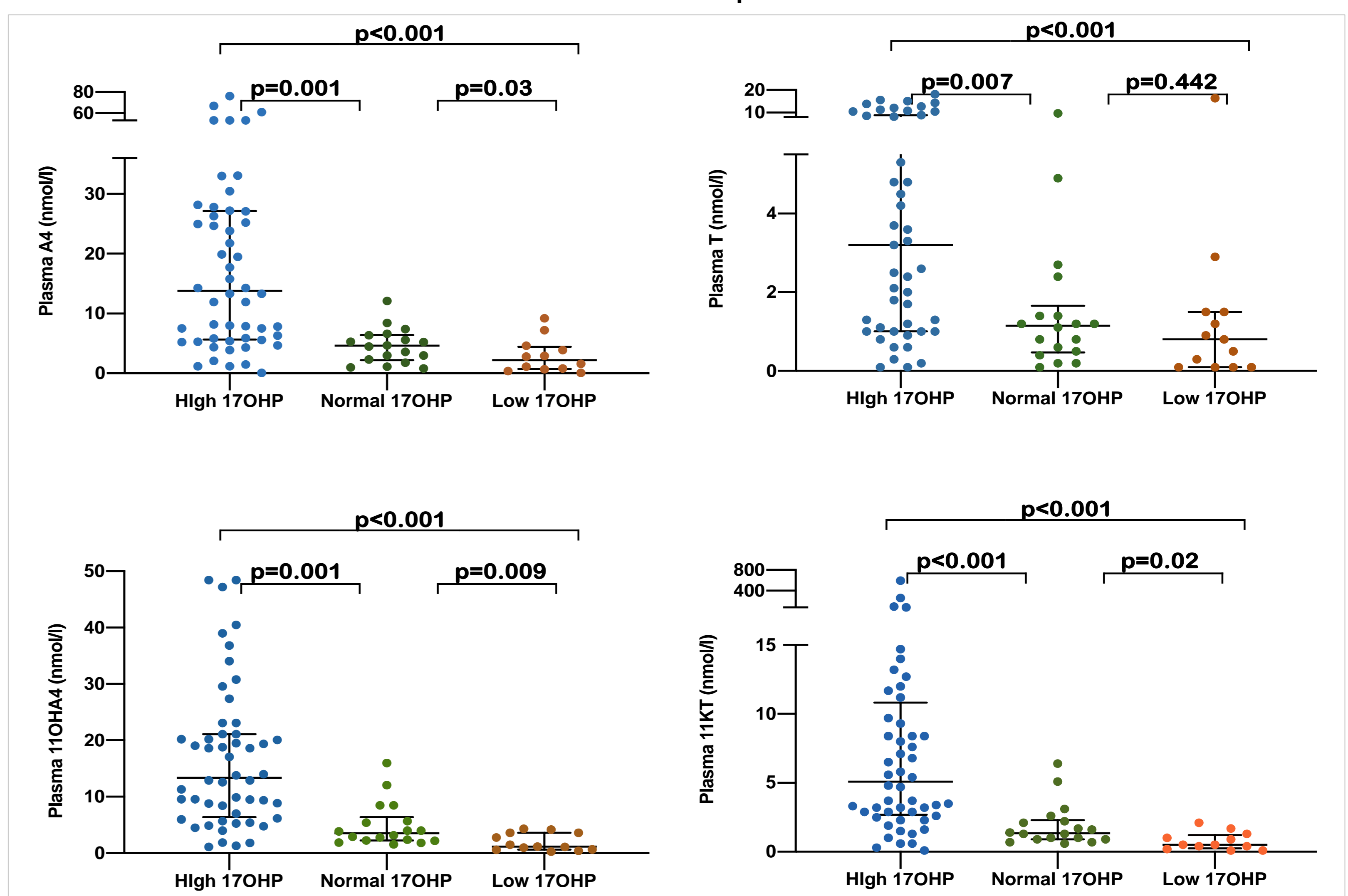
Acknowledgements:

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Conclusion

Salivary concentrations correlate well with plasma concentrations for androgens used as markers of therapy control in CAH. The best correlations were found for adrenal-derived 11-oxygenated C19 androgen 11-ketotestosterone as well as 17-hydroxyprogesterone and androstenedione. This novel combination of salivary steroid hormones can serve as non-invasive monitoring tool to help improve the medical management and outcomes in CAH.

Comparing patient subgroups of treatment control based on the plasma 17OHP concentration, we found consistent overlap between groups for all the other four steroids measured in both plasma and saliva.



We found significant correlations among the plasma and salivary concentrations of all the steroids analysed.

Spearman correlations	Plasma 17OHP	Plasma A4	Plasma T	Plasma 11OHA4	Plasma 11KT	Salivary 17OHP	Salivary A4	Salivary T	Salivary 11OHA4	Salivary 11KT
Plasma 17OHP										
Plasma A4	$r_s=0.784$ $p<0.001$									
Plasma T	$r_s=0.527$ $p<0.001$	$r_s=0.673$ $p<0.001$								
Plasma 11OHA4	$r_s=0.837$ $p<0.001$	$r_s=0.889$ $p<0.001$	$r_s=0.702$ $p<0.001$							
Plasma 11KT	$r_s=0.816$ $p<0.001$	$r_s=0.806$ $p<0.001$	$r_s=0.691$ $p<0.001$	$r_s=0.923$ $p<0.001$						
Salivary 17OHP	$r_s=0.877$ $p<0.001$	$r_s=0.825$ $p<0.001$	$r_s=0.530$ $p<0.001$	$r_s=0.838$ $p<0.001$	$r_s=0.779$ $p<0.001$					
Salivary A4	$r_s=0.749$ $p<0.001$	$r_s=0.931$ $p<0.001$	$r_s=0.705$ $p<0.001$	$r_s=0.843$ $p<0.001$	$r_s=0.790$ $p<0.001$	$r_s=0.866$ $p<0.001$				
Salivary T	$r_s=0.618$ $p<0.001$	$r_s=0.746$ $p<0.001$	$r_s=0.867$ $p<0.001$	$r_s=0.753$ $p<0.001$	$r_s=0.738$ $p<0.001$	$r_s=0.693$ $p<0.001$	$r_s=0.807$ $p<0.001$			
Salivary 11OHA4	$r_s=0.749$ $p<0.001$	$r_s=0.765$ $p<0.001$	$r_s=0.644$ $p<0.001$	$r_s=0.876$ $p<0.001$	$r_s=0.811$ $p<0.001$	$r_s=0.804$ $p<0.001$	$r_s=0.758$ $p<0.001$	$r_s=0.728$ $p<0.001$		
Salivary 11KT	$r_s=0.785$ $p<0.001$	$r_s=0.841$ $p<0.001$	$r_s=0.701$ $p<0.001$	$r_s=0.932$ $p<0.001$	$r_s=0.944$ $p<0.001$	$r_s=0.826$ $p<0.001$	$r_s=0.869$ $p<0.001$	$r_s=0.802$ $p<0.001$	$r_s=0.861$ $p<0.001$	
Strength of correlation:	$r_s > 0.8$		$r_s = 0.6-0.8$			$r_s = 0.4-0.6$				

Methods

We recruited 78 CAH patients (43 females, (12.87 \pm 3.04 years)) from 13 centres in the United Kingdom and 62 controls. Using liquid chromatography tandem mass spectrometry, we measured plasma and salivary concentrations for 17-hydroxyprogesterone, androstenedione, testosterone, 11-hydroxyandrostenedione and 11-ketotestosterone. We used Spearman correlations to analyse the relationship between plasma and salivary steroids.