Proceedings of the Nutrition Society (2022), **81 (OCE1)**, E3 doi:10.1017/S0029665122000039

Winter Conference 2021, 7–8 December 2021, Obesity and the brain

Associations between body composition, glycaemia and complement C3 in black African and white European men

R.M. Reed[1], O. Hakim[1], S. Lockhart[2], S. O'Rahilly[2], M.B. Whyte[3] and L.M. Goff[1]
[1]*Department of Nutritional Sciences, Faculty of Life Sciences and Medicine, King's College London, London, UK,*
[2]*MRC Metabolic Diseases Unit, University of Cambridge, Cambridge, UK and*
[3]*Faculty of Health and Medical Sciences, University of Surrey, Guildford, Surrey, UK*

Complement system dysregulation is involved in type 2 diabetes (T2D) pathogenesis. Increased C3 is associated with obesity, insulin resistance and T2D[(1)]. Despite greater prevalence of T2D in Back African (BA) compared to White European (WE) populations[(2)], C3 has not been compared between ethnicities. We investigated associations between C3 and glycated haemoglobin (HbA1c) and body composition, in WE and BA men.

Participants were 97 WE and 88 BA adult men, recruited from the general population and primary care practices, across a range of body mass index (BMI) and either healthy or with prediabetes/T2D. Fasting C3 concentration was measured by ELISA and in a subset, visceral and subcutaneous adipose tissue area (VAT/SAT; WE: n = 50, BA: n = 48) were measured by magnetic resonance imaging (MRI). Normally distributed data were analysed with independent t-Test and Pearson Correlation (means ± SD) and skewed data were log transformed (geometric mean (95% confidence interval)) or analysed with Mann-Whitney U (median (IQR)). Multiple regression was performed including VAT and HbA1c in a model of C3.

BMI was no different between WE and BA (29.3 ± 5.2 *vs.* 29.1 ± 4.0 kg/m^2 respectively, $p = 0.79$). BA were younger (45 (21) *vs.* 54 (23) years, $p = 0.002$), and had higher HbA1c (43 (41, 45) *vs.* 40 (38, 42) mmol/L, $p = 0.002$).

C3 was no different between WE and BA (1.12 ± 0.20 *vs.* 1.16 ± 0.19 g/L respectively, $p = 0.268$). Compared to WE, BA displayed lower VAT (121 (97, 151) *vs.* 79 (64, 98) cm^2, $p = 0.003$) despite no differences in SAT (237 (206, 273) *vs.* 232 (198, 272) cm^2, $p = 0.921$).

In both ethnic groups, C3 correlated with VAT (WE: r = 0.73, $p < 0.001$; BA: r = 0.53, $p < 0.001$), SAT (WE: r = 0.67, $p < 0.001$; BA: 0.42, $p = 0.003$) and HbA1c (WE: r = 0.31, $p = 0.002$; BA: r = 0.51, $p < 0.001$). In regression modelling, VAT and HbA1c explained 53% and 34% of C3 variability in WE and BA, respectively (both $p < 0.001$). However, no independent effect of HbA1c was found in WE (beta = −0.011, $p = 0.927$) but there was a trend in BA (beta = 0.30, $p = 0.06$).

We found no differences in C3 between BA and WE. C3 was associated with VAT and SAT in both ethnicities but the associations were stronger in WE, possibly suggesting factors outside of adiposity may be important determinants of C3 in BA. Furthermore, HbA1c may be an independent predictor of C3 in BA, however more research is required to determine its importance.

References

1. Shim K, Begum R, Yang C *et al.* (2020) *World J Diabetes* **11**, 1–12.
2. Tillin T, Hughes A, Godsland I *et al.* (2013) *Diabetes Care* **36**, 383–939.