Table S1: Summary of fatty acids changes due to induced genotype detected following analysis by GC-FID, comparing gastrocnemius muscle, blood serum, and liver tissue from the controls and DTG mice. A reduction of C22:6 (all-cis-4,7,10,13,16,19) was consistently detected in gastrocnemius muscle of the DTG mice, across the effects of diet and ageing. The *P*-values were obtained from t-test comparing HF/HS-fed controls and DTG mice (* $P<0.05$, ** $P<0.01$, *** $P<0.001$). Stearic acid, C18:0 was found significantly increased in the DTG mice following a two-way ANOVA test ($^{\#}$ $P<0.05$), showing the increase was consistent across the effect of diet. The R^2 and Q^2 values of the corresponding PLS-DA model were detailed along the differential metabolites for that model.

Samples	**Increased in DTG mice**	**Decreased in DTG mice**
Gastrocnemius Muscle PLS-DA: $R^2X = 52\%$ $R^2Y = 68\%$ $Q^2 = 57\%$	**SFA** C18:0* **n-6 PUFA** C20:4 (all-cis-5,8,11,14)*	**SFA** C14:0* C15:0* C16:0* C24:0** **MUFA** C16:1 (cis-9)* **n-3 PUFA** C18:3 (all-cis-9,12,15)* C22:6 (all-cis-4,7,10,13,16,19) ***
Blood serum PLS-DA: $R^2X = 49\%$ $R^2Y = 60\%$ $Q^2 = 46\%$	**SFA** C14:0* C16:0* C18:0$^{\#}$ **MUFA** C18:1 (cis-9)* **n-3 PUFA** C18:3 (all-cis-9,12,15)* **n-6 PUFA** C20:2 (all-cis-11,14)*	**n-3 PUFA** C20:3 (all-cis-11,14,17)*
Liver tissue PLS-DA: $R^2X = 78\%$ $R^2Y = 83\%$ $Q^2 = 48\%$	**SFA** C18:0$^{\#}$ **MUFA** C24:1(cis-15)*	**MUFA** C20:1 (cis-11)* **n-6 PUFA** C20:3 (all-cis-8,11,14)*