Interspecies differences in the empty body chemical composition of domestic animals

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Supplementary material online

The degree of maturity

In general, the degree of maturity (**u** = BW/A), calculated as the proportion of BW to mature BW (**A**), has been adopted as a genetic scaling parameter (Taylor, 1985). Taylor (1985) assumed the constant fat content of the empty body at maturity in their model and theory. If one accepts the assumption that the fat content at a given fraction of mature BW is fixed, this means that the fat contents of the empty body may be a measure of the degree of maturity. Since the mature BW of both goats (Ogink, 1993) and pigs (Whittemore *et al*., 1988), derived from growth curve analysis, were available in these studies (109.6 kg for goats, and 225 kg for pigs), the relationship between the degree of maturity and fat content of the empty body for the two species was initially investigated in the present study. Supplementary Figure S1 shows the relationship between the degree of maturity in BW and the fat content of the empty body, indicating that fat percentages could provide an equivalent measure of the degree of maturity.

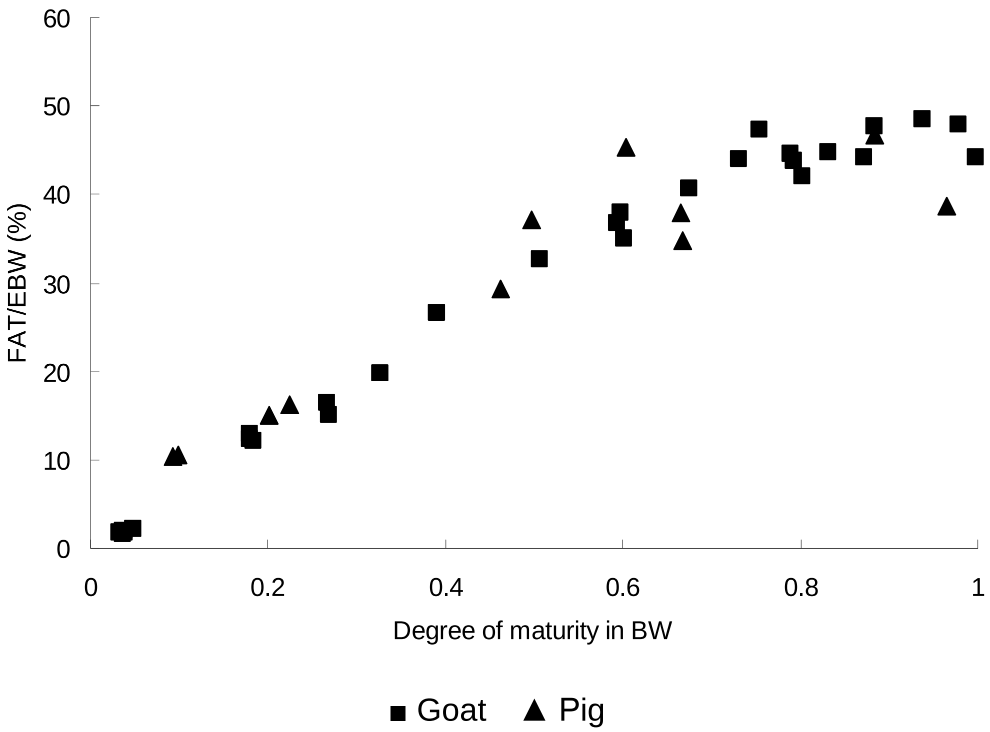


Figure S1 Relationship between fat content of the empty body (FAT/EBW, %) and degree of maturity in terms of BW for goats and pigs.

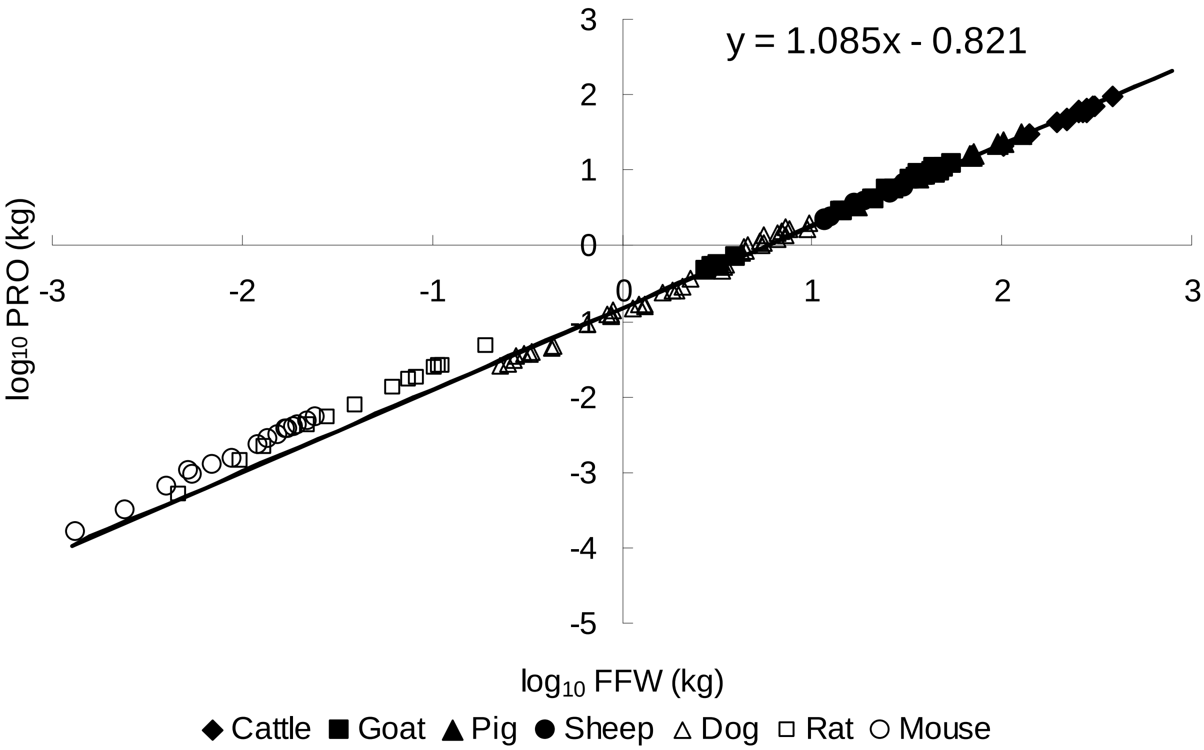
Allometric relationships between two components (protein and water weights) and fat-free empty BW

The relationships between $\log_{10}$ PRO and $\log_{10}$ FFW and between $\log_{10}$ WAT and $\log_{10}$ FFW are presented in the supplementary Figure S2. Since there were highly positive relationships among the 4 farm animals evaluated, the following allometric equations across farm-animal species could be obtained: PRO = 0.151 × $FFW^{1.085}$, and WAT = 0.830 × $FFW^{0.972}$. By contrast, these equations did not fit the data for laboratory-animal species.

The relationship between $\log_{10}$ WAT and $\log_{10}$ PRO is presented in the supplementary Figure S3. There was a highly positive relationship and the following allometric equation across farm-animal species was obtained: WAT = 4.581 × $PRO^{0.889}$. By contrast, this equation did not fit the data for laboratory animals; relatively more protein and less water for mice and rats were shown. This was likely due to the lower values of the intercept for mice and rats.

Although allometric growth was assumed in this study, there are several studies where fitting of allometric function to body component has been questioned. However, Schinckel *et al.* (2008) argued that allometric functions have several advantages including simple linear solutions after the log to log transformation, straightforward biological interpretation and the simple stable derivatives. The good fitting of allometric functions for body components in this study (Supplementary Figures S2 and S3) revealed that the allometric coefficients can be meaningfully interpreted and offer a basis for comparison between species in this study.

(A)



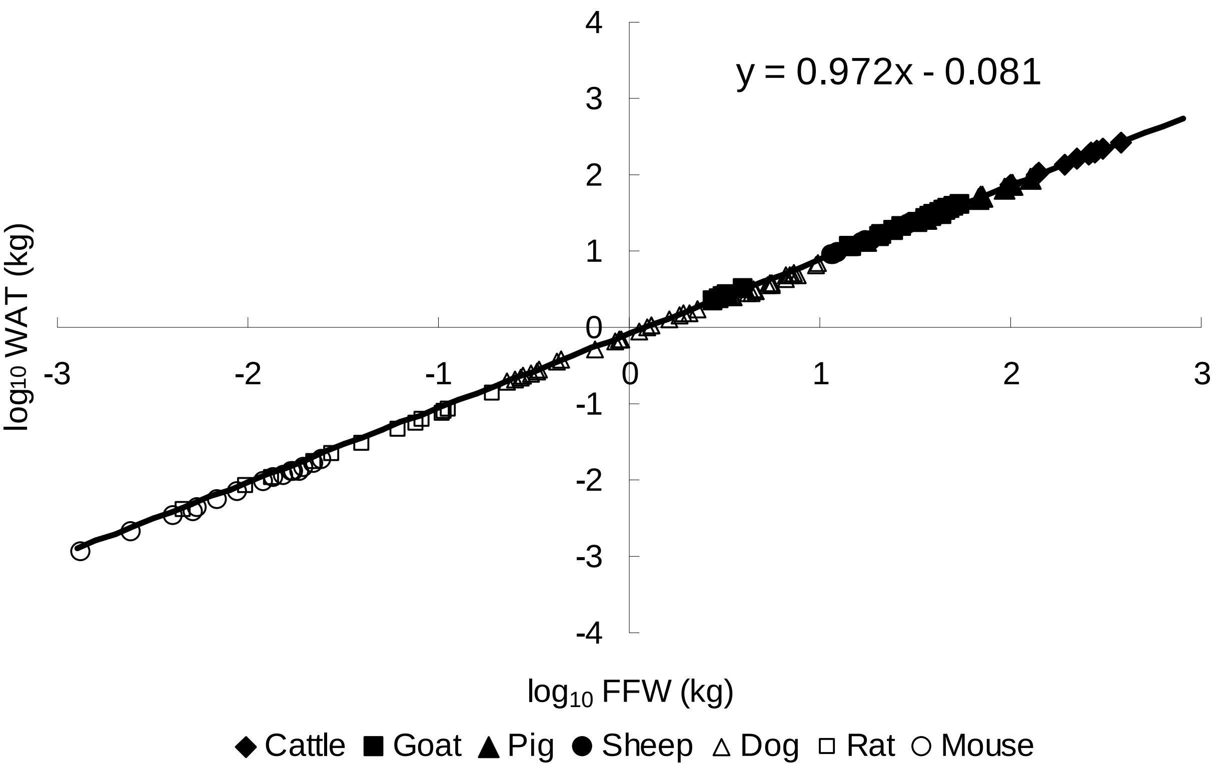


Figure S2 Relationships between (A) protein weight (log_{10}PRO, kg) and fat-free empty body weight (log_{10}FFW, kg), and (B) water weight (log_{10}WAT, kg) and fat-free empty body weight (log_{10}FFW, kg), with the linear regressions for farm animals.

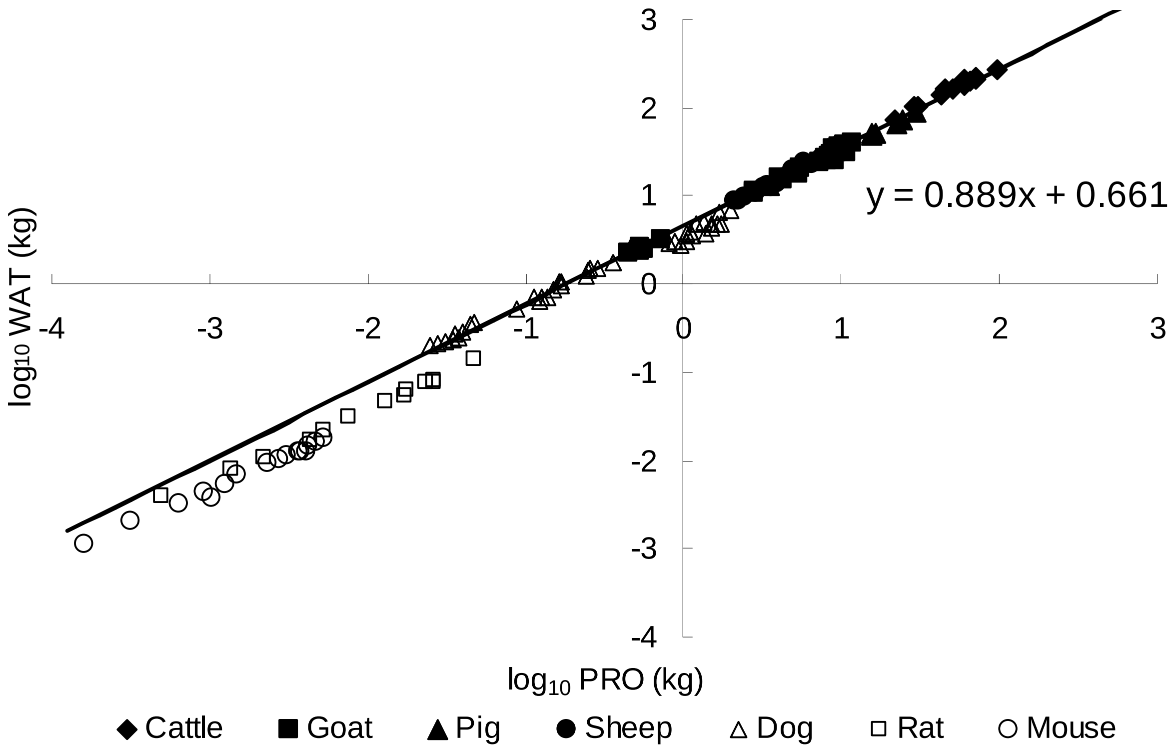


Figure S3 Relationship between water weight (log_{10}WAT, kg) and protein weight (log_{10}PRO, kg), with the linear regressions for farm animals.