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The level of methionine deficiency determines its effects on energy metabolism in growing rats

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Poster 198

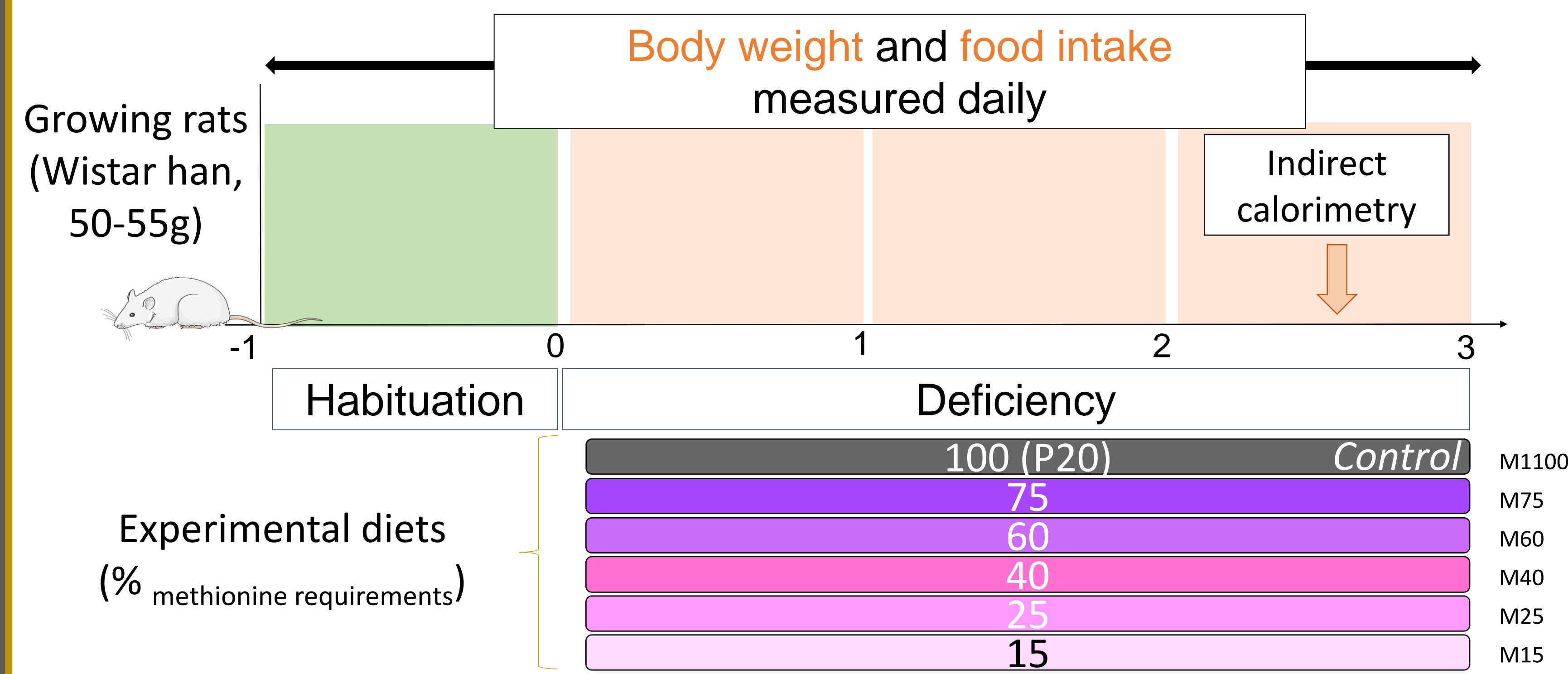
Objective

Methionine deficiency has been reported as beneficial for health through an increase in energy expenditure and an improvement of insulin sensitivity, which in turn lowers blood lipids and adiposity, despite an increased energy intake.

However, when fed to young animals, methionine-deficient diets are not suitable for growth. In the majority of studies, the consequences of methionine deficiency have been studied on the same level (0.17% of diet).

Thus, the aim of this study is to characterize the effects of different methionine deficient levels on growth, body composition, and energy metabolism in growing rats.

Methods

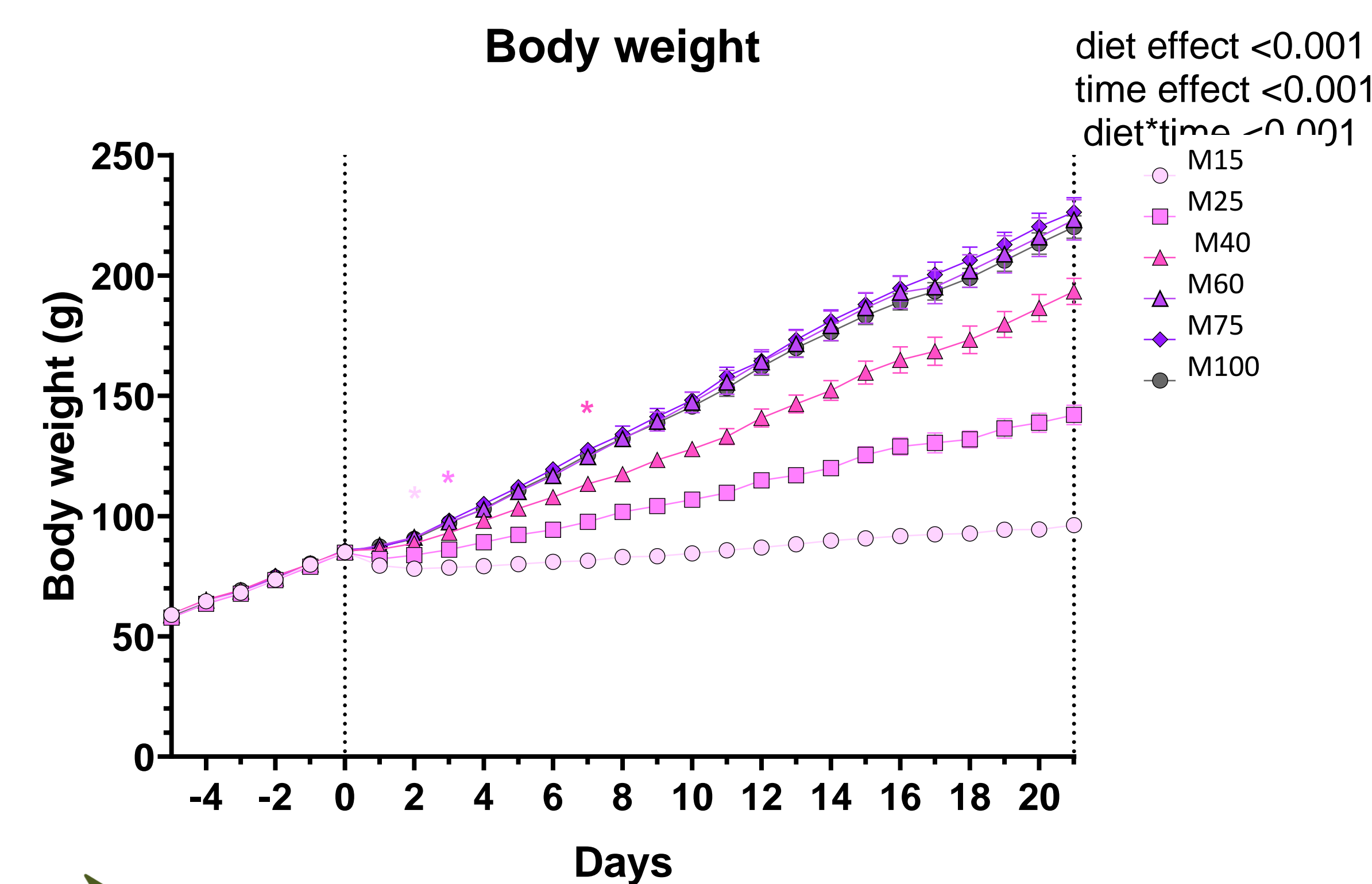


Body weight and food intake (FI) were daily measured, energy expenditure (EE) was measured by indirect calorimetry.

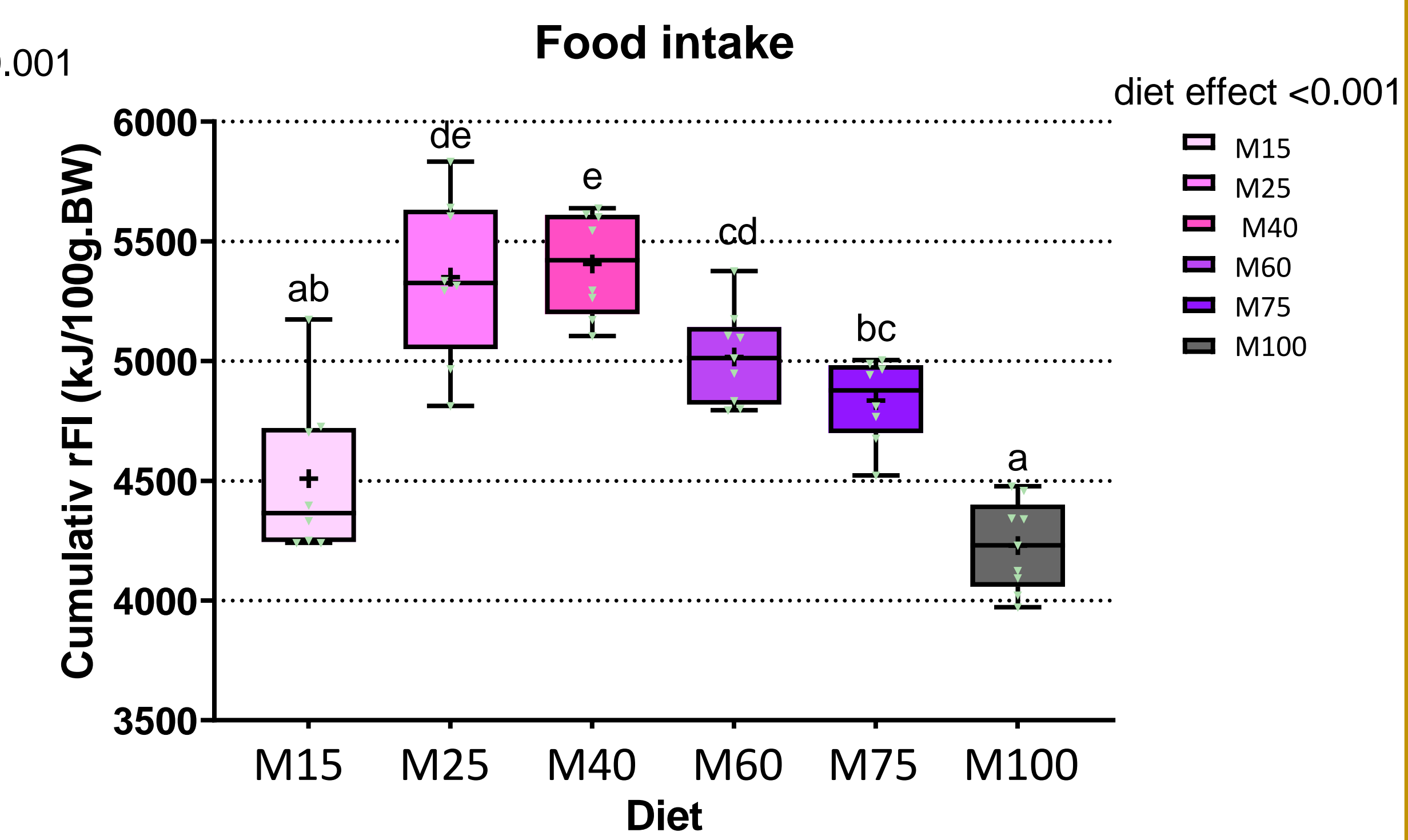
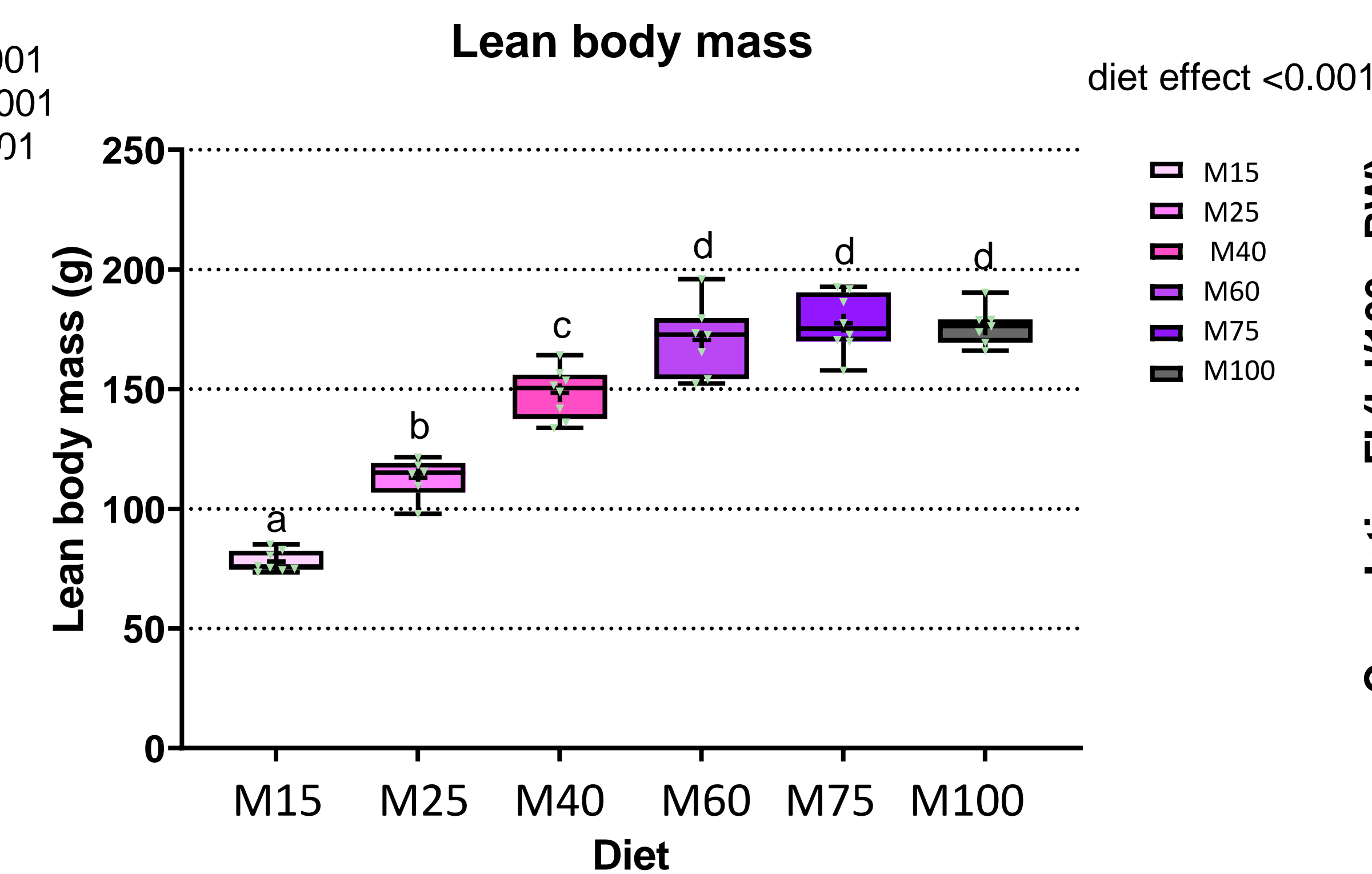
Body composition was determined by the weighting of the main tissues and organs.

Body weight was analyzed by repeated measures mixt model and other variables by one-way ANOVA.

Results

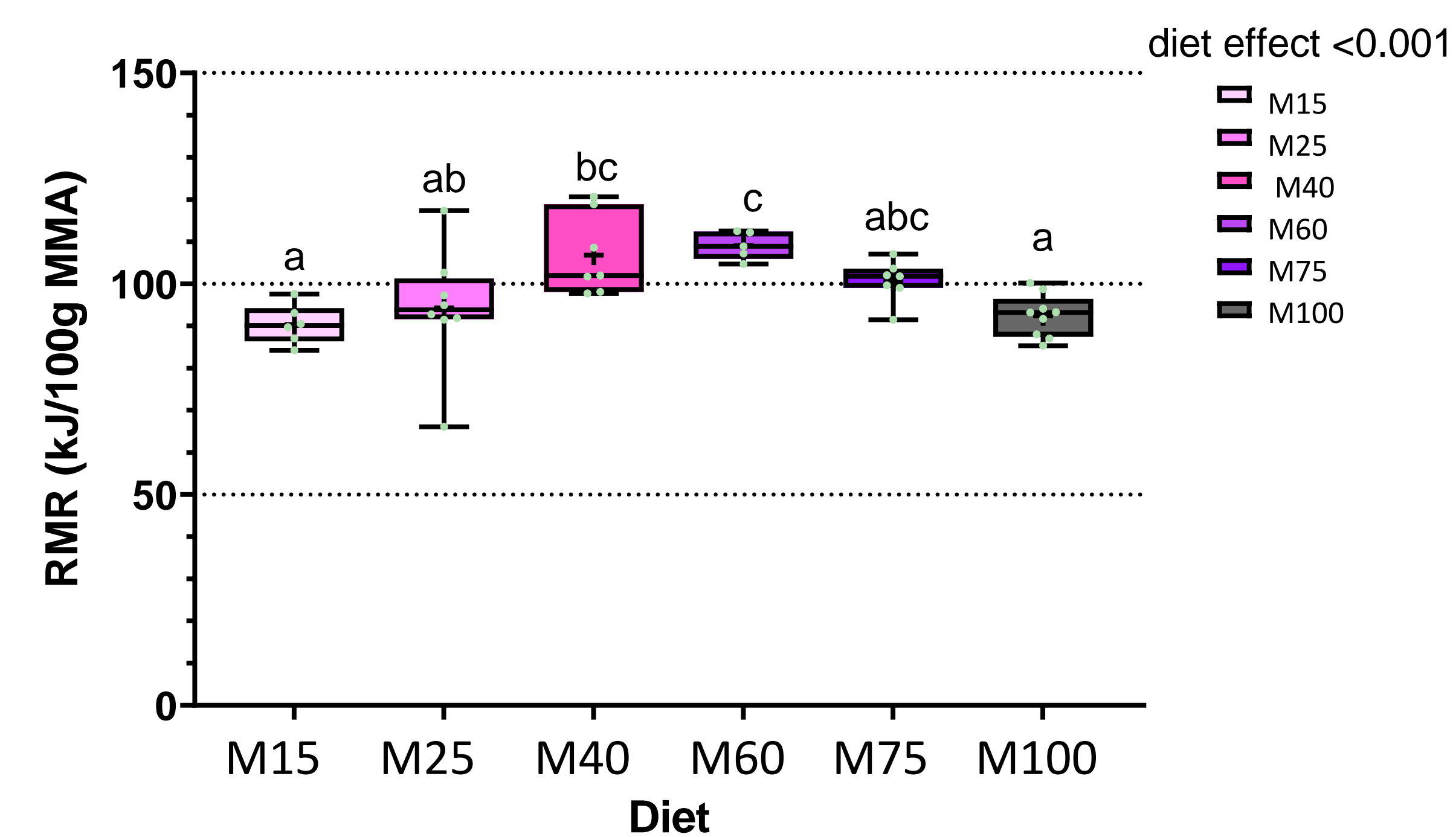


Methionine-deficient diets were not able to support growth, as shown by a decrease in weight gain, mainly reflected by a reduced lean body mass for severely to moderately deficient diets (15, 25, 40% of methionine requirement)



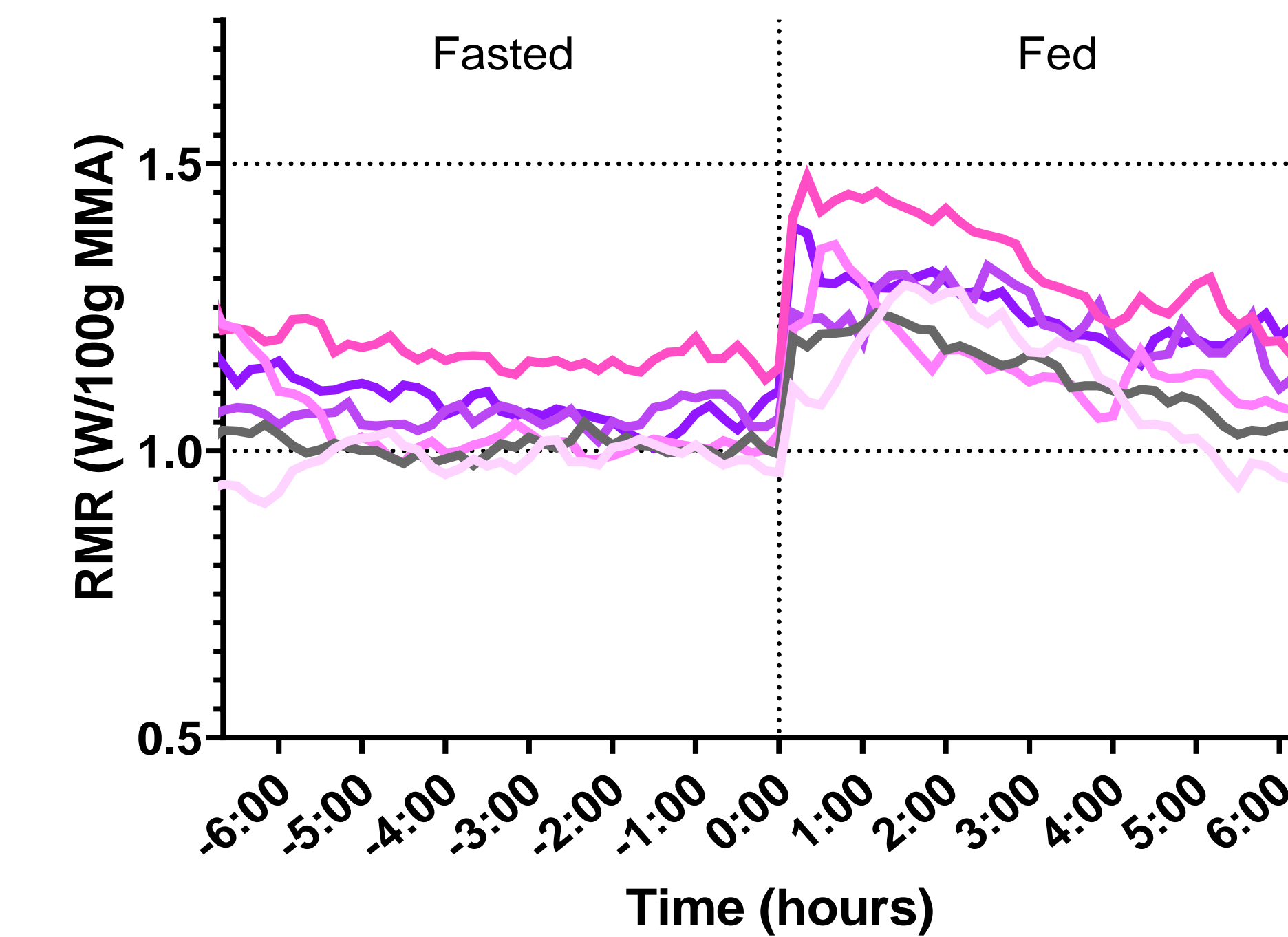
Growing rats fed methionine-deficient diets increased their FI, unless the latter is too severe (15% of methionine requirement), probably to offset the methionine deficiency. The increase in FI was maximal for the 0.14% diet.

Resting energy expenditure

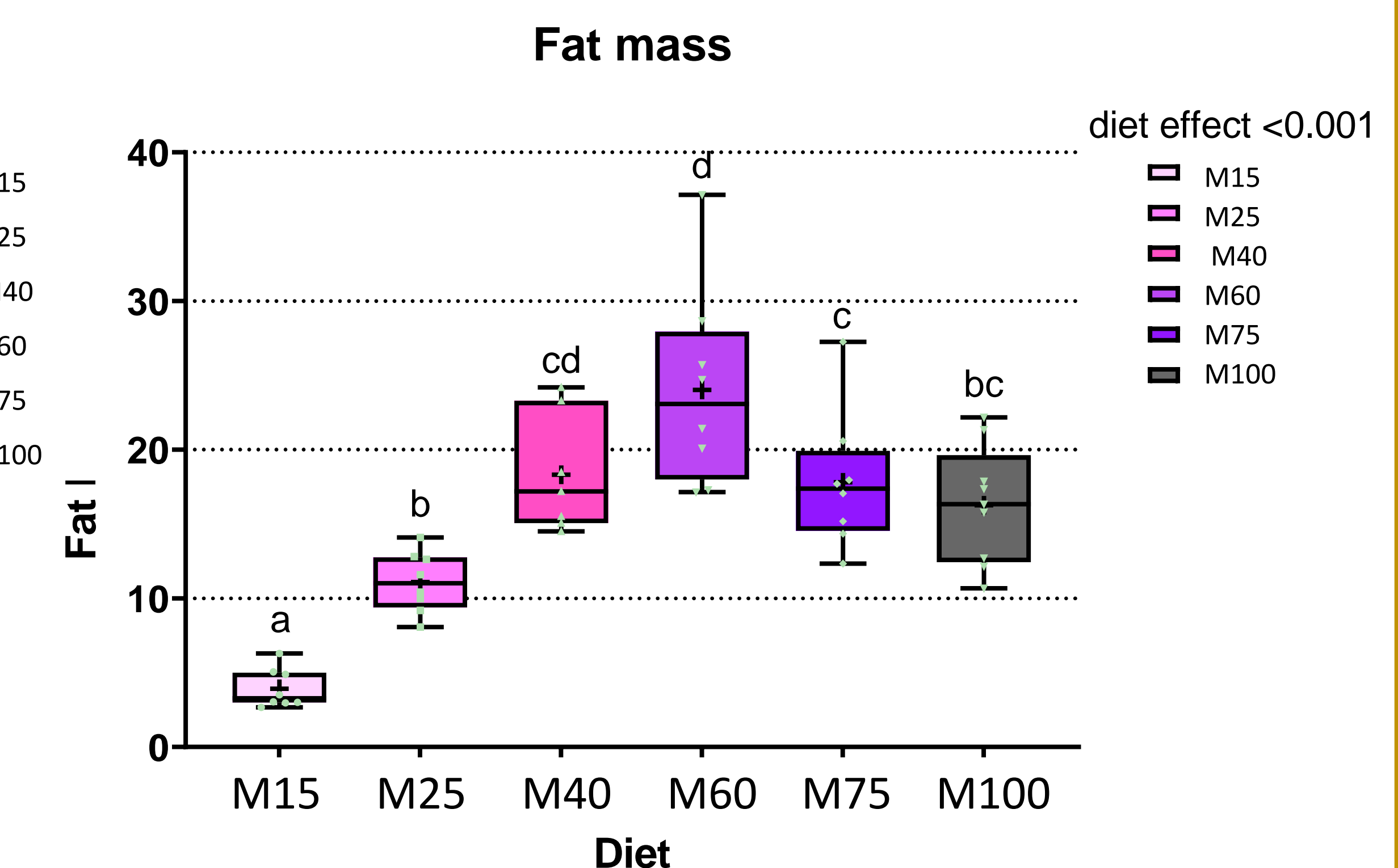


Rats subjected to a moderate deficiency (40 and 60% of methionine requirement) increased their resting energy expenditure (EE).

Resting energy expenditure kinetics



The increase EE does not seem to be sufficient to expend the excess energy consumed by the M60 rats, which have an increase in body fat.
In the absence of dietary compensation (15% of methionine requirement), fat mass was also decreased.



Conclusion

This study shows that the level of methionine deficiency is crucial to understand its effects in young rats.

For a severe deficiency, food intake can not offset methionine deficiency and growth retardation, whereas for a moderate level of methionine deficiency, the food intake increased and energy expenditure can not offset the excess of energy intake, leading to a higher fat mass.