



Post-weaning early life dietary macronutrient balance variably affects biometric and metabolic outcomes in adulthood

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It is well established that early life environment affects health outcomes in adulthood. However, while many preclinical studies have focused on the gestational and weaning period, there is sparse information on whether the post-weaning period of early life nutrition affects health outcomes in adulthood. To address this, we conducted a study in male C57Bl/6J mice fed 9 different diets varying in macronutrient (i.e. carbohydrate, fat, and protein) composition from age weeks 3-12, and then switched to a standard diet from weeks 12-24. Body biometrics, grip strength, and metabolic indices were measured using standard techniques. Early life low protein and fat affected total body mass but these effects did not substantially persist into adulthood. Early life protein affected lean and fat mass, and early life fat affected fat mass. Low protein effects on lean mass persisted into adulthood. This was reflected on adult skeletal muscle mass but this did not affect adult grip strength. Early life fat and protein level effects on glucose homeostasis and insulin did not affect later life glucose homeostasis, but higher early life fat intake affected later life dyslipidaemia as reflected by higher liver and serum triglyceride levels. In conclusion, post-weaning early life dietary fat and protein levels affect early life biometric and metabolic traits, with some traits being malleable but others persisting into adulthood despite diet switching.