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THE TRANSITION FROM DIET TO BLOOD: EXPLORING THE HAEMOLYMPH NUTRIENT POOL

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The importance of diet for homeostasis and disease resistance has been highlighted across multiple fields. Yet, studies exploring nutritional regulation remain limited to a few species and a narrow range of diets. Building on from previous work highlighting the importance of the haemolymph (blood) resource pool, we introduce a caterpillar model to investigate haemolymph macronutrient interactions resulting from variation in host diet. Sixth instar *Spodoptera littoralis* caterpillars were restricted to 20 diets varying in protein and carbohydrate ratio and concentration, and their haemolymph macronutrients were measured. Utilising the geometric framework approach, we then placed post-digestion nutritional status in a macronutrient space. Data were analysed using an information theoretic approach, allowing us to identify multiple candidate models to explain haemolymph nutrient variation. As expected, there was a large amount of variation in the abundance of various nutrients. Moreover, there was disparity in the amount of variation explained by diet offered within the different nutrient groups. Diet correlated strongly with blood proteins and carbohydrates, variably with amino acids and sugars, and not at all with certain nutrients such as lipids. Our findings provide further insights into nutritional homeostasis, suggesting that whilst some nutrients fluctuate with diet, others are more tightly regulated.

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