Title:	NMR-based investigation of the Drosophila melanogaster metabolome under the influence of daily cycles of light and temperature
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Abstract:	We utilized an NMR-based metabolomic approach to profile the metabolites in Drosophila melanogaster that cycle with a daily rhythm. 1H 1D and 2D NMR experiments were performed on whole-body extracts sampled from flies that experienced strong time cues in the form of both light and temperature cycles. Multivariate and univariate statistical analysis was used to identify those metabolites whose concentrations oscillate diurnally. We compared metabolite levels at two time points twelve hours apart, one close to the end of the day and the other close to the end of the night, and identified metabolites that differed significantly in their relative concentrations. We were able to identify 14 such metabolites whose concentrations differed significantly between the two time points. The concentrations of metabolites such as sterols, fatty acids, amino acids such as leucine, valine, isoleucine, alanine and lysine as well as other metabolites such as creatine, glucose, AMP and NAD were higher close to the end of the night, whereas the levels of lactic acid, and a few amino acids such as histidine and tryptophan were higher close to the end of the day. We compared signal intensities across 12 equally spaced time points for these 14 metabolites, in order to profile the changes in their levels across the day, since the NMR metabolite peak intensity is directly proportional to its molar concentration. Through this report we establish NMR-based metabolomics combined with multivariate statistical analysis as a useful method for future studies on the interactions between circadian clocks and metabolic processes
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