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CIRCADIAN RHYTHMS AND METABOLIC HOMEOSTASIS

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A functional circadian clock is a prerequisite to metabolic homeostasis. Whereas, the daily continuum of nutrition requires adequate caloric intake and balanced macronutrients, many genes involved in nutrient utilization are either themselves orchestrated into daily rhythms or are interlocked circuitously with circadian clock genes. The circadian/metabolic interplay confers adaptive advantages and has pleiotropic implications in organismal survival. In humans, metabolic disruption is corrigible through restoration of circadian rhythms. Since light and food entrain central and peripheral circadian oscillators, robust sleep-wake and feeding fasting cycles can arrest predisposition to metabolic diseases. Any intervention intended to restore these rhythms requires knowledge of causal lifestyle factors. We are involved in longitudinal monitoring of sleep and daily eating patterns using smartphones in school students and adults living in Delhi area. Preliminary result indicated that increased caloric consumption corresponds to increased duration of eating and erratic eating pattern exacerbated circadian disruption. Studying seasonal metabolic machinery of migratory birds offers unique advantages as these birds undergo a state of overeating during migration, accumulating twice as much their body weight, without any consequence of a metabolic syndrome. Our studies comprise daily patterns of food intake, perching activity, temperature, hormonal assay and serum metabolic profiling to understand seasonal changes in night migratory songbirds under simulated conditions. At behavioral, physiological and endocrinological level, the observations suggested that an endogenous timing device based on circadian oscillator mechanism mediates annual photoperiodic changes in buntings. The bio-fluid metabo-typing using GCMS revealed diurnal variations in metabolites intermediating catabolism of proteins and lipids; further behavioral and nutritional changes in wintering, pre- and post- migratory life-history stages were concomitant with altered metabolic phenotypes of migratory red headed buntings.

Biography

Neelu Jain Gupta has completed her PhD from CCS University, Meerut, India. She works as an Associate Professor in affiliate college of CCS University, Meerut, India and also worked at University of Delhi while she was honored with UGC National research Award. She has 22 publications and 105 citations with h-index 4 excluding self-citations. She has been serving as Reviewer/Editorial Board Member of reputed Journals.

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