

# USC Dornsife

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Human and Evolutionary Biology*



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## **Energetic trade-offs: urinary C-peptide in the Zanzibar red colobus (*Ptilocolobus kirkii*) across a habitat-disturbance gradient**

Individual fitness depends on the ability to mobilize energy in the face of environmental challenges. As humans continue to disrupt natural landscapes, animals may adjust energetic strategies in response to diminished native food sources and physiological tipping points. Researchers have turned to non-invasive tools to develop our understanding of habitats in active transition, where species may change their activity levels to balance energetic demands with new foraging challenges and access to anthropogenic foods. C-peptide (connecting peptide) is a byproduct of endogenous insulin secretion that can be non-invasively measured from urine (uCP) and has been applied as a biomarker of energetic condition in studies of wild primates. We examined the relationship between uCP and activity in seven groups of Zanzibar red colobus (*Ptilocolobus kirkii*), an endangered forest primate, across four types of progressively degraded habitat: forest (low); forest edge (moderate); agriculture (high); village (high). We found uCP negatively associated with daily travel distance and strongly correlated with resting time. Whilst poorly resourced agricultural groups rested most and maintained the highest uCP levels, moderately resourced forest edge groups traveled most and recorded significantly lower uCP. Previous studies have shown colobus monkeys adjust energy expenditure to endure nutritional deficit and here we report divergent energetic responses to habitat degradation in *P. kirkii*. Highly disturbed groups pursue an energy-minimizing behavioral shift to resting, whilst moderately disturbed groups pursue a resource-maximizing shift to traveling. Our results may capture the tipping point for an adaptive trade-off in *P. kirkii*, and underscore the responsiveness of uCP to energy expenditure in primates.

**IN PERSON**

**HEB Seminar**

April 15, 2024 | 12:00 PM – 1:00 PM

Allan Hancock Foundation Building - Torrey Webb Room