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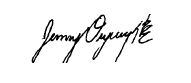
To the scientific editors of *Current Biology,*

Please consider our manuscript titled ‘What happens when the lights are left on? Habituation to light pollution’ for submission to *Current Biology.* We present the first experimental demonstration of avian habituation to artificial light at night, using an integrative approach that links behavioral, physiological, and transcriptomic responses. Individuals were tolerant to chronic light at night exposure, exhibiting persistent behavioral responses even 8 weeks following exposure and habituation to subsequent re-exposure. Moreover, within-individual changes in gene expression revealed unique and parallel responses to both naïve and secondary exposure to light pollution.

Animals living in the Anthropocene are faced with rapid, human-induced environmental changes. Habituation, or reducing responses to stimuli over time, is likely an important mechanism by which species may persist in altered environments1. Nonetheless, empirical tests of habituation to some of the most immediate global threats are rare. Artificial light at night has become a ubiquitous pollutant, covering over 23% of the earth’s land surface and affecting over 83% of the human population2. Though exposure to artificial light at night is known to alter behavior and physiology and lead to severe health consequences3,4, many animals persist and even thrive in light polluted environments. Habituation may be a mechanism for animal resilience in face of this global threat but remains untested.

Our findings shed light on the mechanisms underlying this resilience. We conducted a long-term repeated-measures experiment measuring behavior, biomarkers of physiological stress, and gene expression in zebra finches. We found that individuals can behaviorally habituate to artificial light at night, reducing their behavioral responses to re-exposure, without incurring oxidative damage or accelerated telomere attrition. In addition to showing physiological and behavioral habituation to light pollution, we report lasting responses even 2 months after exposure and unique responses to re-exposure, at the transcriptome level. These data aid in our understanding of genetic changes underlying organismal response to global change, as we show substantial long-term ‘memory’ from genome to phenome of previous exposure to sensory pollution.

This research represents a novel, integrative approach to understanding complex avian responses to one of the most widespread and rapidly increasing anthropogenic pollutants, informing the fields of evolutionary ecology, circadian and stress physiology, and global change biology. Furthermore, results exemplify the value of using interdisciplinary tools to understand population responses to anthropogenic disturbance over time in management decisions (*i.e*., organismal capacity for resilience and tolerance), which should interest the broad readership of *Current Biology*.

Thank you for your time and consideration,



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**Works Cited**

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