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***DNA methylation in Black Widow Spiders: The Epigenome of An Urban Pest***

Urbanization alters community structure and challenges species to adapt to new conditions. DNA methylation adjusts the genetic codes of species, which ultimately plays a role in stress response, development, and adaptation. The variations in DNA methylation patterns may explain why some species are able to tolerate urban disturbance. The Western Black Widow spider (*Latrodectus hesperus*) is a pest species of medical importance due to their highly toxic venom and explosive urban population growth. We hypothesize that urban disturbance will affect DNA methylation patterns. We predict that spiders collected from urban habitats will display heightened methylation. In October of 2025, adult spiders were collected from the Sonoran Desert (N=3) and urban Phoenix (N=3) sites. Spiders were weighed (mg) in the field and immediately frozen at -80 °C. Methylation is currently being analyzed using nanopore sequencing at the University of Buffalo and results are not yet available. Eventually, we hope to expand sampling to additional urban and rural sites across Arizona. We would also like to compare methylation patterns across various developmental stages and examine how urban stressors affect black widow spider epigenomics and survival rates.

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Interdisciplinary Research Team:

Adapting to City Life