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The Fruit Bat as a Model System for Urogenital Function and Techniques for Non-invasive Assessment of Urine Output

Introduction: Lower Urinary Tract Symptoms (LUTS) become highly prevalent and worsen with age among people older than 40 years. Bats are an appealing model for aging studies because of their long captivity lifespan of ten years versus less than three for rodents. Their urogenital anatomy closely resembles that of humans, featuring a prostate, external penis, and testes in an external scrotum or a simplex uterus. We aim to characterize the urogenital tract anatomy of bats, optimize a non-invasive void spot assay for bats, and construct a frequency-volume chart to compare voiding patterns in young and old bats at baseline and after drug administration.

Method: We dissected and photographed young and old fruit bats, *Carollia perspicillata*, under a surgical microscope. We captured voids of individual bats in paper-lined cages. At two hours after feeding, urine was collected for two hours. The papers were photographed and the urine spots analyzed using Image J.

Results: We illustrate the internal and external anatomy of biological male and female bats. We optimized a void spot assay to quantify bat voiding behavior. The bats' hanging position at the top of their cages eliminated artifacts created by tracking through urine. Some bats exhibited unique void patterns. Single void volumes ranged from 10-15 μL , averaging 12-15 drops per hour.

Conclusion: Bats are a valuable model for studying age-related changes in urination pattern and LUTS. Their anatomical parallels with humans position bats as crucial for comparing surgical techniques and recovery rates post-surgery, offering insights into clinical applications.