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Regardless Of Bladder Size, All Mammals Subject To The 'Law Of Urination'

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redOrbit Staff & Wire Reports – Your Universe Online

All mammals, regardless of the size of their bladders, take approximately 21 seconds to [urinate](#), researchers from Georgia Tech have discovered – and they have [video evidence](#) to back up their claims.

According to Ron Dicker of [The Huffington Post](#), the investigators observed mammals at Zoo Atlanta in Georgia, and found that species, bladder size, and even gender had little to no impact on the time it took these creatures to complete the urination process. They set out to establish what they call the “law of urination,” which asserts that any mammal weighing at least one kilogram in weight requires 21 seconds (plus or minus 13 seconds) to relieve themselves.

The research might elicit a giggle or two, but as the authors explain in their [study](#), there was a serious scientific reason for the research: “The urinary system evolved to eject fluids from the body quickly and efficiently. Despite a long history of successful urology treatments in humans and animals, the physics of urination has received comparatively little attention.”

“In this combined experimental and theoretical investigation, we elucidate the hydrodynamics of urination across five orders of magnitude in animal mass, from mice to elephants,” they added, according to [Discover Magazine](#). The “nearly constant duration” of urination held true despite the fact that the creatures’ bladder volumes ranged from 100 mL to 100L, and was made possible “by the increasing urethra length of large animals which amplifies gravitational force and flow rate.”

They also analyzed the unique biological mechanisms that make this phenomenon possible. For example, they explain that rodents and other small mammals are forced to urinate one drop at a time, and that their findings reveal that the urethra evolved as a flow-enhancing mechanism that allows the urinary system to be scaled upwards without any parts of its function being compromised. Likewise, with elephants, they found that the massive creatures have wider, longer urethras which compensate for the immense volume of discharge they

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"This study may help in the diagnosis of urinary problems in animals and in inspiring the design of scalable hydrodynamic systems based on those in nature," David L. Hu, an assistant professor of biology whose research interests include "fluid mechanics," and colleagues Patricia J. Yang, Jonathan C. Pham, and Jerome Choo wrote in their study.

Most previous research in the field had focused primarily on bladder pressure, Hu told Dicker, and expressed hope that his team's research could be applied to improve human-created hydrodynamic systems such as water towers. And for those interested, Hu confirms that the average urination time for humans is also 21 seconds, and that many of the properties of our bladders "match what would be expected for a mammal of that mass."

Source: redOrbit Staff & Wire Reports - Your Universe Online

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