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How Tongue Size and Roughness Affect Lapping M.J. HUBBARD[1], K.M. HAY[2], Pacific Lutheran University Tacoma, WA — The biomechanics of domestic cat lapping (Felis catus) and domestic dog lapping (Canis familiaris) is currently under debate. Lapping mechanics in vertebrates with incomplete cheeks, such as cats and dogs, is a balance of inertia and the force of gravity likely optimized for ingestion and physical necessities. Physiology dictates vertebrate mass, which dictates vertebrate tongue size, which dictates lapping mechanics to achieve optimum liquid ingestion; with either touch lapping, scooping, or a hybrid lapping method. The physics of this optimized system then determines how high a column of liquid can be raised before it collapses due to gravity, and therefore, lapping frequency. Through tongue roughness model variation experiments it was found that pore-scale geometrical roughness does not appear to affect lapping or liquid uptake. Through tongue size model variation experiments it was found that there is a critical tongue radius in the range of 25 mm to 35 mm above which touch lapping is no longer an efficient way to uptake liquid. Vertebrates with incomplete cheeks may use a touch lapping method to ingest water if their tongue radius is less than this critical radius and use an alternative ingestion method if their tongue radius is larger.

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