Biomechanical and Molecular Characteristics of Heritable Equine Regional Dermal Asthenia in Quarter Horses

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Despite the name, biomechanical properties of heritable equine regional dermal asthenia (HERDA) are not regionally confined to specific areas of the horse’s skin. Authors’ addresses: Department of Clinical Sciences, Mississippi State University, Mississippi State, Mississippi 39759 (Grady, Swiderski, Rashmir-Raven); Department of Agricultural and Biological Engineering, College of Agriculture and Life Sciences, Mississippi State University, Mississippi State, Mississippi 39759 (Elder); and Department of Pathobiology and Population Medicine, College of Veterinary Medicine, Mississippi State University, Mississippi State, Mississippi 39759 (Ryan); e-mail: rashmir@cvm.msstate.edu. © 2009 AAEP. *Presenting author.

1. Introduction
Heritable1 equine regional dermal asthenia (HERDA) is an autosomal recessive skin disorder that has yet to be fully characterized. It is predominately expressed in Quarter Horses, the majority of which disseminate from elite cutting horse bloodlines. This has lead to the increased incidence of HERDA in recent years. Affected horses have loose, hyper-extensible, fragile skin and are frequently euthanized because of poor wound healing and disfiguring scars.

2. Materials and Methods
Biomechanical parameters (tensile strength, modulus of elasticity, and energy to failure) were evaluated from 10 affected and 6 unaffected horses using a mechanical testing instrument.a Total soluble collagen and glycosaminoglycan concentrations of skin were analyzed from 13 affected and 12 unaffected horses using soluble collagen assayb and sulfated glycosaminoglycan assays,c respectively.

3. Results
Affected horses exhibited a two- to three-fold reduction in tensile strength, modulus of elasticity, and energy to failure with statistically significant differences at six of seven sample locations (p ≤ 0.05). Affected horses exhibited significantly higher amounts of total soluble collagen than unaffected horses (p ≤ 0.05). No significant difference in glycosaminoglycan concentration was shown between groups.

4. Discussion
Horses affected with HERDA showed uniformly weaker skin over their dorsum, ventrum, and extremities than age-matched controls.

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Footnotes
aInstron Universal Testing Instrument, Instron®, Norwood, MA 02062.
bSircol Soluble Collagen, Biocolor, Belfast, Ireland BT9 5BN.
cBlyscan Sulfated Glycosaminoglycan, Biocolor, Belfast, Ireland BT9 5BN.

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