

Study shows endocrine-disrupting chemicals linked to equine metabolic syndrome

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Researchers studied Morgan horses and Welsh ponies, like this one, as these breeds are more likely to develop EMS than others. Credit: University of Minnesota College of Veterinary Medicine

Endocrine-disrupting chemicals (EDCs) in a horse's environment may play a role in the development of equine metabolic syndrome (EMS). This finding, made by Morris Animal Foundation-funded researchers at The University of Minnesota, could explain some of the variability in EMS severity that can't be explained by other commonly measured factors, such as diet, exercise and season. The study was published in *Chemosphere*.

"This is a pivotal piece of a very complicated jigsaw puzzle. There are a lot of horse owners out there who are very diligent about providing their horses fantastic care, but the horse is still diagnosed," said Dr. Molly McCue, Professor and interim Associate Dean of Research in the College of Veterinary Medicine, University of Minnesota. "It's important to be aware that these chemicals contribute to the problem, so we can look for ways to reduce horses' exposure to them."

The team studied more than 300 horses from 32 farms in the United States and Canada. They focused on Welsh ponies and Morgan horses, as these breeds are more likely to develop EMS than others. The team collected data on the horses' lifestyles, including diet, exercise and past illnesses, as well as their farm location.

Researchers also examined plasma from the horses and looked for EDCs that have effects on receptors in the horse (estrogen [EEQ] and aryl hydrocarbon [TEQ] receptors). Simultaneously, they determined whether an individual horse had blood test results consistent with an EMS profile (including insulin and glucose at rest and following a sugar challenge). The team then analyzed the results to look for correlations between plasma EDC concentration and these variables.

The team concluded that accumulation of EDCs may explain some

environmental variance seen in horses with EMS, but the precise role and dose response to EDCs in horses with EMS is not clear at this time.

Endocrine-disrupting chemicals usually are man-made substances, found in products such as pesticides, plastics and personal care products. They are heavily prevalent in the environment and can mimic a body's hormones, blocking real ones from doing their jobs. Because of this, they are known to produce harmful effects in humans and wildlife. Horses likely come into contact with EDCs through their food.

Equine metabolic syndrome, which has no cure, is characterized by endocrine abnormalities in horses and ponies. Affected horses and ponies have a tendency to develop pockets of fat and/or become obese, and they have altered insulin dynamics. EMS also is one of the most common causes of laminitis, a painful and very debilitating inflammation of tissue in a horse's hooves, leading to reduced performance, and in severe cases necessitating euthanasia.

"The more we know about a disease, especially a devastating and [incurable disease](#) like EMS, the more we can find innovative ways to prevent it," said Dr. Kelly Diehl, Morris Animal Foundation Interim Vice President of Scientific Programs. "While EDCs are difficult to avoid at the moment, the information from this study will greatly improve veterinarians' ability to predict the disease and provide opportunities to prevent it."

This is the first study to examine associations between EDCs and disease in domestic animals. Dr. McCue said it remains to be seen how significant the association is, but hopes future studies will further scientific understanding and help advance veterinary care for [horses](#).

More information: S.A. Durward-Akhurst et al, Associations between endocrine disrupting chemicals and equine metabolic syndrome

phenotypes, *Chemosphere* (2018). DOI:
[10.1016/j.chemosphere.2018.11.136](https://doi.org/10.1016/j.chemosphere.2018.11.136)

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