

### E 03.

## Enfermedad de sobrecarga lisosomal glicolipídica en un potrillo Morgan. *Glycolipid lysosomal storage disease in a Morgan foal.*

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Lysosomal storage diseases are a group of inherited and acquired disorders affecting mammals and birds in which specific substrates accumulate in lysosomes as a result of deficient activity of lysosomal hydrolases. Progressive accumulation of these substrates due to abnormal lysosomal enzymatic degradation results in impairment of cell function and eventually cell death. Multisystemic involvement is common in these disorders so many cell types from a variety of organs and tissues can be affected. Most affected ones would be those with a high turnover of the substrate in question. Neurons are usually involved in these disorders. To date, there are only two published reports of lysosomal storage diseases in horses: a neuronal ceroid lipofuscinosis of presumptive inherited nature, and an acquired mannosidosis associated with the ingestion of the toxic plant *Sida carpinifolia*. In this case report, the preliminary results of a study about a previously unrecognized lysosomal storage disease in horses are presented.

This was a 10-month-old Morgan filly with neurological signs first noticed at 4 months of age which included repeated stumbling and falling, stiffness of the hind limbs progressing to hind limb weakness, intention tremors of the head, abnormal mentation, fore- and hindlimb ataxia, and abnormal stance; there was no evidence of trauma that would justify such clinical abnormalities. Results of a series of ancillary laboratory tests including X-rays of the vertebral column, testing for EHV, EPM and WNV, and hematology and serum biochemistry were either negative or within normal parameters. The clinical picture worsened over the next couple of months so euthanasia was elected due to poor prognosis. At necropsy, no significant gross lesions were observed. Histologically, neurons throughout different areas of the brain including the cerebral cortex, basal ganglia, brainstem, and cerebellar cortex of the white matter, and also from the grey matter of the spinal cord, were pale, markedly enlarged and swollen, with finely vacuolated or foamy, faintly eosinophilic cytoplasm. Scattered axonal spheroids were also observed in the

CNS. These microscopic lesions were consistent with a lysosomal storage disease. No histological changes suggestive of a lysosomal storage disorder were observed in the other organs and tissues examined. Transmission electron microscopy of the affected neurons revealed the presence of numerous storage bodies distending the perikarya of these cells; these intracytoplasmic bodies consisted of multilayered, membranous, concentrically arranged lamellar structures interpreted as enlarged secondary lysosomes packed with unprocessed lipids (probably gangliosides). Lectin histochemistry was done on sections of the cerebellum of this foal. There was intense staining of the cytoplasm of the Purkinje cells with the *Dolichos biflorus* agglutinin (DBA) lectin.

The results of the light microscopy, lectin histochemistry, and transmission electron microscopy suggest that maybe this is a new glycolipid lysosomal storage disease of horses, possibly a sphingolipidosis (a gangliosidosis). Similar pathological, histochemical and ultrastructural findings have been reported for Sandhoff disease of human beings which is also a sphingolipidosis (a GM<sub>2</sub> gangliosidosis). This was the first case of this disease diagnosed in this farm, and there are no records of such disease in foals from previous offsprings related to the dam or stallion. Also, there is no evidence of exposure to plants, drugs or chemicals that would induce such disease. Therefore, an inherited disorder is suspected here. Genetic lysosomal storage diseases have an onset of progressive neurologic impairment at a young age as in this case. It is worth mentioning that hereditary disorders such as congenital nuclear cataracts, neuroaxonal dystrophy of the accessory cuneate nucleus, and persistent hyperammonemia have been suggested to occur more often in Morgan horses because of a common single origin by the founding stallion, "Figure" (1789–1821). Reporting of similar cases of the same lysosomal storage disease in this particular equine breed might warrant future genetic investigation.