

# Porcine astrovirus type 3 is an emerging cause of atypical neurologic disease: Diagnostic cases and infection dynamics on affected flows

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## Introduction

Astroviruses (AstVs) are viral agents in the Family *Astroviridae* that are able to infect and cause disease in a wide variety of host species.<sup>1</sup> Despite the broad host range and ability to cause disease, there are significant gaps in knowledge concerning the epidemiology, ecology, and pathophysiology of a majority of AstVs. Porcine astroviruses (PoAstVs) are distributed worldwide.<sup>2</sup> Five PoAstV lineages (PoAstV1–PoAstV5) have been identified perhaps reflecting diverse origins, interspecies transmission, and recombination events, some presumably with human strains.<sup>3–6</sup> In the past decade, different members of the genus *Mamastrovirus* have been associated with neurologic disease in humans,<sup>7</sup> bovine,<sup>8</sup> mink<sup>9</sup> and most recently, porcine astrovirus 3 (PoAstV3) in swine.<sup>10,11</sup>

## Clinical signs

Lateral recumbency is one of the most common clinical signs reported. Others include knuckling over on forelimbs and ataxia. Animals can move their legs and seem to have more use of their hind limbs than forelimbs; however, they appear unable to bear weight and if able to move commonly crawl with their abdomen near or touching the ground (astasia) as shown in Figure 1. Note that “paddling” is NOT a characteristic sign of neurologic disease due to this type of viral agent that primarily affects spinal cord function.

## Diagnostic cases

There has been an increase in the number of cases submitted to the Iowa State University Veterinary Diagnostic Laboratory. Zero

**Figure 1:** Astasia and knuckling of a pig with PoAstV3 polioencephalomyelitis.



to three cases per year were identified between 2010 to 2017 with 13 cases as of November 2018 suggesting this virus is affecting more flows than in the past.<sup>12</sup>

## Distribution of PoAstV3 on farms

To gain a better understanding of the infection dynamics and epidemiology of PoAstV3, cross-sectional studies were conducted that included gilts, sows, and suckling piglets on farms with and without a diagnosis of neurologic disease due to PoAstV3 but previous detection of PoAstV3 in feces. The overall detection frequency of PoAstV3 by PCR in a breed-to-wean farm with no previous history of PoAstV3 neurologic disease was 77% (54/70), with the highest detection frequency in suckling piglets (92%) followed by due-to-wean pigs (90%), sows (90%), neonates (73%), and incoming gilts (20%). The same farm was intensely sampled after 3 months to reassess viral prevalence. The overall detection frequency was 85% (207 of 244), with similar detection frequencies in categories reported previously. A longitudinal study was conducted following 64 individually identified newly weaned pigs to market on a farm with neurologic disease due to PoAstV3. PoAstV3 was detected by qPCR on fecal swabs intermittently over time suggesting that pigs shed PoAstV3 in their feces intermittently or can be re-infected with PoAstV3. The fecal swabs and pen-oral fluids had the highest concentration of PoAstV3 RNA compared to other sample types, and the longest duration of detection lasting for up to 126 days.

## Conclusion

PoAstV3 is an emerging cause of neurologic disease affecting spinal cord functions in adult females, nursery pigs, and finishing pigs. It should be considered a possible cause of disease in pigs that are found on their side or have difficulty controlling their limbs when they walk. On farms in which it has been detected, PoAstV3 is frequently detected in the feces of pigs at various stages of production and in the environment.

## References

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