

## PARVOVIRUS-ASSOCIATED CEREBELLAR HYPOPLASIA AND HYDROCEPHALUS IN DAY OLD BROILER CHICKENS

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### Important Findings

Cerebellar hypoplasia (CH) and hydrocephalus were identified in day-old broiler chickens showing nervous signs, impaired mobility, and diarrhea. A postmortem examination showed:

- The brains of chickens were misshapen and cerebellums were smaller than normal.
- Microscopically, cerebellar folia were reduced in size and irregularly shaped, and the ventricles were widely distended.
- Affected cerebellums had focal areas along the base of folia where the internal granular cell layer had been lost, and Purkinje cells were disorganized and located within the molecular layer.
- Parvovirus DNA was detected by polymerase chain reaction in three of nine brains with oligonucleotide primers designed for amplification of chicken and turkey parvoviruses. On the basis of phylogenetic analyses, the detected virus was most closely related to chicken parvoviruses.

These findings suggest that a chicken parvovirus might cause a neurologic disease of young chickens characterized by cerebellar hypoplasia and hydrocephalus; however, its role as the cause of the disease remains to be confirmed.

### Significance of Findings

This study describes the first case of CH and hydrocephalus in commercial broiler chickens showing both enteric disease and neurologic signs. Evidence for a possible etiologic association of chicken parvovirus in this disease was provided by detection of the virus in affected brains by the polymerase chain reaction (PCR) procedure.

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## HIPOPLASIA CEREBELOSA E HIDROCEFALIA ASOCIADA A PARVOVIRUS EN POLLOS DE ENGORDA DE UN DÍA DE EDAD

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### Hallazgos Importantes

La hipoplasia cerebelosa (CH, por sus siglas en inglés) y la hidrocefalia fueron identificadas en pollos de engorda de un día de edad, mostrando signos nerviosos, discapacidad de movimiento y diarrea. El examen post-mortem muestra:

- Deformidad de los cerebros y los cerebelos eran más chicos de lo normal.

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### Additional Information

Neurologic disease is a common cause of early culling and death in both chickens and turkeys. Established etiologies include avian encephalomyelitis (picornavirus), bacterial encephalitis (e.g., *Salmonella* sp., *Escherichia coli*, *Pseudomonas aeruginosa*, *Enterococcus* sp.), nutritional encephalomalacia (vitamin E deficiency), encephalocoelexencephaly, and pox vaccination reaction. These diseases can usually be differentiated by gross and microscopic lesions in the brain. Hypoglycemia and poult flip-over syndrome result in neurologic signs with less well understood etiologies and absence of lesions in the central nervous system (CNS).

Two congenital neurologic diseases characterized by grossly small cerebellums are CH and cerebellar abiotrophy (CA). Although these are common in mammalian neonates, reports in birds are rare. Cerebellar hypoplasia has been experimentally induced by yolk sac inoculation of chicks with both fowl glioma-inducing virus (FGV), a member of avian leukosis virus subgroup A, and Aino virus (AV), a virus of the family *Bunyaviridae* known to cause fetal deformities, CH, and hydranencephaly in cattle and sheep. Naturally occurring cerebellar hypoplasia in chickens or turkeys has not previously been reported.

Parvovirus is known to cause cerebellar hypoplasia in both kittens and puppies, although in the dog, the enteric form of the virus is most prevalent. Parvovirus is also a well-characterized enteric pathogen of young geese and Muscovy ducks and has been described in both turkeys and chickens. Parvovirus has been associated with poult enteritis complex in turkeys and runtting-stunting syndrome in chickens. The partial genome sequences of both the turkey and chicken enteric parvoviruses have recently been described and are closely related to each other, representing novel members of the *Parvoviridae* subfamily. Zsak *et al.* have also characterized the ubiquitous nature of enteric parvovirus in commercial flocks in the United States. The virus is transmitted both vertically and horizontally and can become systemic; however, detection of the virus in neurologic tissues has not been previously reported.

- Microscópicamente, la Folia tenía un tamaño reducido y forma irregular, y los ventrículos estaban muy distendidos.
- Los cerebelos afectados tenían áreas focales en la base de la folia donde la capa de células granulares internas se había perdido, y las células Purkinje estaban desorganizadas y localizadas en dentro de la capa molecular.
- Se detectó ADN de parvovirus por reacción en cadena de la polimerasa en 3 de los nueve cerebros con cebadores de oligonucleótidos diseñados para la amplificación de parvovirus de pollo y pavo. Con base del análisis filogenético, los virus