DETECTION OF PORCINE CIRCOVIRUS 3 IN STILLBORN PIGLETS WITH MULTISYSTEMIC INFLAMMATION

T. Floyd*, L. Wilson†, R. Collins†, S. Grierson‡, N. Woodger§, M. Wessels§, A. Dastjerdi‡ and S. Williamson†

**Pathology Department, †Surveillance and Laboratory Services Division ‡Virology Department, Animal and Plant Health Agency and §Finn Pathologists, UK*

Introduction: An increase in stillbirths, some with arthrogryposis, and neurological disease in pre-weaned pigs was investigated.

Materials and Methods: Post-mortem examinations were undertaken by the Animal and Plant Health Agency (APHA) on four stillborn piglets and three preweaned pigs with neurological signs submitted from one herd. Histopathology, immunohistochemistry (IHC) and virology were performed.

Results: Increased numbers of stillborn piglets were recorded over a 4-month period, some of which had arthrogryposis. Occasional pigs in affected litters developed postnatal tremors and paraparesis. Non-suppurative angiocentric inflammation was observed in a wide range of tissues (including CNS, heart, liver and kidney) in the stillborn piglets and the tremor-affected piglets, suggesting a chronic systemic antigenic stimulus and likely reflecting in-utero systemic viral infection. IHC and/or PCR was negative for porcine circovirus 2 and porcine reproductive and respiratory syndrome virus. Porcine circovirus 3 (PCV3) alone was detected by virus microarray in the stillborn piglets and then confirmed by RT-PCR with low Ct values in both presentations.

Conclusions: Since the first detection in 2016, PCV3 has been identified in pig populations in numerous countries globally. Additionally, some reports describe detection of PCV3 in association with respiratory disease, reproductive failure, neurological disease or porcine dermatitis and nephropathy syndrome-like lesions, either alone or in combination with other agents. These findings complement previous reports and suggest a need for wider surveillance for PCV3 in cases of stillbirth and neurological disease in young piglets, with multisystemic non-suppurative inflammation acting as a potential indicator for further testing.

THE IL-6-STAT3 SIGNALLING PATHWAY: A POTENTIAL ROLE IN PATHOGENESIS OF OVINE PULMONARY ADENOCARCINOMA

C. Toma*, R. Popa†, L. Ciobanu‖, B. Sevastre‡, V. Balteanu§, C. Catoi† and M. Taulescu†

**Veterinary Pathology, †Veterinary Pathology, ‡Veterinary Pathophysiology, §Institute of Life Sciences, University of Agricultural Sciences and Veterinary Medicine and ‖Gastroenterology and Hepatology, University of Medicine and Pharmacy, Cluj-Napoca, Romania*

Introduction: Signal transducer and activator of transcription 3 (STAT3) activation promotes the pathogenesis of some cancers. STAT3 may be activated through IL-6 and EGFR. Ovine pulmonary adenocarcinoma (OPA) has a known aetiology, Jaagsiekte sheep retrovirus (JSRV); however, the precise mechanisms of oncogenesis are still controversial. We aimed to evaluate the IL-6–STAT3 pathway in OPA for its potential role in ovine pulmonary carcinogenesis.

Materials and Methods: Twenty cases of JSRV-positive OPA and nine cases of pulmonary bronchioalveolar hyperplasia (BAH) sampled from the periphery of the tumours were included. Normal pulmonary tissues from five animals were used as negative controls. Tissue samples were labelled with antibodies recognizing IL-6 and STAT3 and immunoexpression was evaluated statistically.

Results: IL-6 was expressed by stromal, inflammatory and epithelial cells in all cases of OPA and BAH, with a significantly higher intensity ($U = 16.5$, $P = 0.019$) and higher number ($U = 18.5$, $P = 0.023$) of IL-6$^+$ epithelial cells in tumours compared with BAH. STAT3 expression was detected in epithelial cells of both OPA and BAH, with a significantly higher score of STAT3$^+$ cells in OPA than in BAH ($U = 0$, $P = 0.001$). Normal pulmonary tissue showed weak and multifocal immunoexpression. A significant correlation between IL-6 and STAT3 immunoexpression was not found either in BAH ($r = 0.224$, $P = 0.602$) or OPA ($r = 1$, $P = 0.391$).

Conclusions: The data suggest that overexpression of IL-6 and STAT3 may have an important role in OPA carcinogenesis. However, further studies, using a large number of samples and different histological types of OPA are required.

OF FRENCH FRIES AND HORSES: BIOCHEMICAL CHANGES IN EQUINE INTERVERTEBRAL DISC DEGENERATION

W. Bergmann*, C. van de Lest†, M. Tryfonidou‡, A. Groene§, I. Wijnberg‖, W. Back‖, H. Vernooij¶, S. Plomp‖ and G. Grinwis§

**Department of Pathobiology, †Department of Biochemistry and Cell Biology, ‡Department of Clinical Sciences of Companion Animal, §Pathobiology, ‖Department of Equine Sciences and ¶Department of Farm Animal Health, Utrecht University, Utrecht, The Netherlands*

Introduction: The anatomy and gross characteristics of degeneration of equine intervertebral discs (IVDs) are akin to those of man and dogs, although there are differences. The aim of this research was to determine whether the biochemical changes in IVD degeneration are also similar.

Materials and Methods: IVDs (22 with degeneration grade 1, 30 grade 2, 11 grade 3 and 10 grade 5) from 13 horses were selected for biochemical evaluation. From samples of the annulus fibrosus (AF) and the nucleus pulposus (NP), hydration, dry weight, the amount of DNA (by fluorometric quantitation), glycosaminoglycans (GAGs) (by a modified 1.9-dimethylmethylene blue assay) and also hydroxyproline (as proxy for collagen), hydroxylysine, hydroxylysylpyridinoline, pentosidine (responsible for the brown colour of French fries), collagen type 1 and 2, aggrecan and fibronectin (all by high-performance liquid chromatography) were measured. With heat maps, correlations between the biochemical parameters and degeneration were determined.

Results: Hydroxylysine was negatively and pentosidine positively correlated with degeneration in the AF and NP. With degeneration, GAGs increased in the AF. Collagen type 1 and total collagen were positively correlated in the NP. Fibronectin was positively correlated in the AF and NP taken together. No correlation was established between degeneration and the amount of hydration, cellularity, aggrecan, collagen type 2 or hydroxylysylpyridinoline.

Conclusions: The biochemical changes of the equine IVD appear to be different from those occurring in dogs and man. Decrease in hydroxylysine and increase in pentosidine appear to be the most characteristic changes in the horse. A decline of GAGs and dehydration are not seen.

EVALUATION OF LESIONS AND THE DISTRIBUTION OF VIRAL ANTIGEN IN DOMESTIC PIGS INOCULATED BY THE INTRANASAL ROUTE WITH DIFFERENT DOSES OF AFRICAN SWINE FEVER ISOLATE KEN05/TK1

P.J. Sánchez-Cordón*, T. Floyd*, S. McCleary†, R.R. McCarthy†, F. Steinbach†, H. Crooke† and A. Núñez*

**Pathology Department and †Virology Department, Animal and Plant Health Agency, Weybridge, UK*

Introduction: African swine fever (ASF) is a viral disease that affects domestic and wild pigs. The aim of the present study was to evaluate the virulence of ASFV isolate Ken05/Tk1 (genotype X) when applied intranasally and determine how disease progression might be influenced by the dose of inoculated virus.

Materials and Methods: Clinical signs and lesions, together with the distribution of viral antigen in tissues by immunohistochemistry (IHC) from domestic pigs inoculated by the intranasal route with low, medium and high doses of isolate Ken05/Tk1, were evaluated.

Results: All pigs challenged with the lowest dose survived until the end of the experiment (21 days post infection; dpi) without showing any clinical signs, while animals in the medium and high dose groups developed clinical signs from 5–7 dpi. Pigs were killed when clinical end points were reached, between 9 and 12 dpi (high dose) and 13 and 20 dpi (medium dose). Pigs inoculated with the lowest dose revealed only non-specific gross lesions and viral antigen was not detected by IHC. Pigs inoculated with medium or high doses developed acute or subacute forms of ASF with characteristic haemorrhagic lesions. Differences in the severity of lesions and number of immunolabelled cells in tissues were observed between both groups. However, IHC revealed that the severity of lesions was not accompanied by a high number of cells immunolabelled for viral antigen.

Conclusions: Lesions induced by the ASFV Ken05/Tk1 isolate might not correlate to the presence of infected cells, but likely to indirect mechanisms of inflammation that further studies should clarify.