

Toxicological Pathology

EFFECTS OF SKIN BARRIER DISRUPTIONS ON THE PENETRATION OF AHAPS-FUNCTIONALIZED SILICA NANOPARTICLES IN THE MOUSE

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Introduction: The skin is a possible route of entry for nanoparticles (NPs) in various biomedical applications. However, the role of a disturbed barrier function on altered skin penetration remains unclear. This study aimed to identify effects of different kinds of skin barrier disruptions on the penetration of silica NP in the mouse.

Materials and Methods: Fluorescein-labelled silica NPs (diameter of 55 ± 6 nm) with a N-(6-aminohexyl)(3-aminopropyl)trimethoxysilane (AHAPS)-functionality were applied topically to tape-stripped inflamed or healthy skin of SKH1 mice ($n = 3$ per group) for 1 or 5 consecutive days, respectively. Twenty-four h after the final treatment the mice were killed and tissues were examined histopathologically. NPs were detected by fluorescence microscopy.

Results: The silica NPs were localized in the superficial layers of the stratum corneum, but not in the deeper epidermal or dermal layers, regardless of the kind of barrier disruption.

Conclusion: AHAPS-functionalized silica NPs may not penetrate healthy, superficially disrupted or inflamed skin. We will now examine skin and draining and non-draining lymph nodes by transmission electron microscopy for a more sensitive localization of single NPs.

LESSER LOOSESTRIFE (*LYTHRUM HYSSOPIFOLIA*) POISONING IN SHEEP AND CATTLE

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Introduction: Lesser loosestrife (*Lythrum hyssopifolia*) is an annual plant growing on poorly drained or flood-prone areas. It is native to Europe and has been introduced to Australia and North America. In the UK, the largest population is around Swan Lake in Gloucestershire. Lesser loosestrife is relatively unpalatable, but may be eaten by sheep and cattle if it is the only available green feed.

Materials and Methods: Outbreaks of mortality in sheep and cattle in south western New South Wales, Australia, were investigated. Samples of blood were collected for biochemistry. Tissues were collected at post-mortem examination for histopathology. Plants were identified.

Results: Affected sheep and cattle were listless and inappetent. Mortalities ranged from 1 to >50%. Concentrations of urea and creatinine in serum were increased. Grossly, the kidneys were pale and swollen. In sheep, the liver sometimes had an accentuated lobular pattern. Histologically, there was nephrosis in sheep and cattle. Hepatocellular necrosis was evident in some sheep. Lesser loosestrife was the predominant green feed and had been grazed.

Conclusions: Lesser loosestrife poisoning has been reported in sheep and cattle in New South Wales and Victoria, Australia. The plant appears to be nephrotoxic for sheep and cattle, and hepatotoxic for sheep. The toxic principle is unknown.

Forensic Pathology

FORENSIC CASES OF BRUISES IN PIGS

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Introduction: Bruises in pigs inflicted by trauma are a significant animal welfare problem. Affected skin and muscle are regularly submitted for forensic investigation. Central to the evaluation is an assessment of the age of bruises.

Materials and Methods: Cases of bruises in pigs sent for forensic investigation were collected retrospectively. Data consisted of photographs of the gross lesions, microscope slides for histology and a written description of each case. The time from collecting the animals and delivery for slaughter was recorded together with the time of slaughter.

Results: Since 2005 there has been an increase in cases, with a peak in 2008 and 2009 involving 40 cases each year. At gross examination, the pattern of bruises often reflected the object by which the bruise was inflicted. Histologically, haemorrhage and cellular infiltration were often present. However, in 21.7% of cases a reaction was absent, making estimation of age impossible. Currently, the age of bruises may be estimated to be more or less than 4 h. The time from collecting the pigs until slaughter was, in 44.1% of cases, between 1 and 4 h, during which time the pigs had been handled by more people.

Conclusions: Precise methods to estimate the age of bruises with and without an inflammatory reaction is needed in order to determine in whose custody the pigs were when the bruises were inflicted.

Inflammatory Disease

SEVERE IDIOPATHIC EOSINOPHILIC PNEUMONIA AND VASCULITIS IN 11 HORSES

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Introduction: Various eosinophilic lesions have been described in horses. Multisystemic eosinophilic epitheliotropic disease (MEED) characterized by eosinophilic granulomas in various organs represents the most diffuse manifestation. In the present study we describe the gross and microscopical lesions of idiopathic eosinophilic pneumonia and vasculitis in 11 horses without systemic involvement.

Materials and Methods: During a 2-year period (2010–2011), lungs from 88 horses with gross signs of pulmonary disease were collected at a slaughterhouse. Lung sections were stained with haematoxylin and eosin, Giemsa and periodic acid–Schiff.

Results: In 11 horses, lungs were enlarged, pale pink and collapsed, with multifocal to coalescing, white–red, 0.4–4.0 cm diameter nodules distributed throughout the parenchyma. Histologically, the lesions ranged from severe eosinophilic bronchointerstitial pneumonia to severe eosinophilic lobular bronchopneumonia associated with eosinophilic necrotizing vasculitis affecting small to medium sized vessels. Mild interstitial fibrosis was also present. The other part of the parenchyma appeared emphysematous. There was no histological evidence of parasites within these lesions.

Conclusions: Eosinophilic pneumonia and vasculitis without intraleisional parasites are rarely described in horses. Histological findings do not resemble the typical eosinophilic granulomas observed in lungs of horses with MEED, but are similar to the findings in idiopathic chronic eosinophilic pneumonia of man and of Churg–Strauss syndrome of man.