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THE *BACILLUS CEREUS* TOXIN CEREULIDE CAUSES SEVERE NEUROLOGIC SYMPTOMS IN THE PIG

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Introduction

The *Bacillus cereus* cyclic depsipeptide cereulide is known to evoke emesis a short time after ingestion in humans, but besides this generally mild course of the disease, also severe clinical cases leading to death associated with liver failure and encephalopathy within a few hours following exposition have been described. These cases were mostly associated with ingestion of contaminated rice or pasta dishes. Here we established a porcine cereulide intoxication model.

Material and Methods

16 pigs (10-15 kg BW) were fed cereulide at concentrations of 10, 30, or 150 µg/kg BW and observed for either 2 or 7 days (acute vs chronic toxicity). At specific time points venous blood was drawn for hematologic analyses. At the end of the study, pigs were euthanized and select organs including liver and brain sampled for pathology.

Results

All pigs suffered from a transient depression and recurrent seizures in lateral recumbency for appr. 4-7 hours starting one hour after toxin intake. Then the pigs gradually recovered. To analyze chronic toxicity, 10 µg/kg cereulide were administered daily for 7 days. Similar to acute toxicosis, pigs developed a transient depression and seizures after 2-6 hours. Clinical signs again disappeared every day. Histological as well as hematological and blood chemical examinations did not reveal any notable pathological changes. Only creatine kinase was upregulated 8 hours post intoxication for up to 48 hours.

Discussion and Conclusion

Due to its lipophilic and ionophoretic character cereulide might be able to cross the blood-brain-barrier by transmembrane diffusion and further lead to an alteration of the potassium content of the cerebrospinal fluid, which is known to cause seizures. In summary, the pig seems to be a valuable model for studying cereulide intoxication.