

THE TOXIC EFFECT OF AFLATOXIN B1 ON EARLY PORCINE EMBRYONIC DEVELOPMENT

Kyung-Tae Shin, Jing Guo, Ying-Jie Niu, Xiang-Shun Cui

Department of Animal Science, Chungbuk National University, Cheongju, Chungbuk, Republic of Korea

Introduction

Aflatoxin B1 (AFB1) is a type of mycotoxin produced by the fungi *Aspergillus flavus* and *Aspergillus parasiticus*. AFB1 is considered as the most toxic mycotoxin owing to its toxic effect on health. Many mycotoxins display cytotoxicity due to the excessive production of reactive oxygen species (ROS) that result in oxidative stress. Excessive ROS leads to the induction of DNA damage, apoptosis, decreased ATP production, and further detrimental effects. Our study indicates that exposure to AFB1 impairs porcine preimplantation embryonic development due to ROS-induced DNA damage repair failure, apoptosis, and autophagy.

Materials and Methods

In this study, we are used the porcine embryos and token to ROS staining, TUNEL assay, Immunofluorescence, BrdU analysis, comet assay, RT-PCR to observe the changes in ROS generation, apoptosis, mitochondria function and cell cycle.

Results and Discussion

The results showed that the presence of AFB1 induced the generation of reactive oxygen species (ROS). And excessive ROS caused DNA damage. Additionally, AFB1 also disrupted the DNA damage repair through the regulation of 53BP1. TUNEL assay confirmed the generation of apoptosis, further resulting in the occurrence of autophagy. These results showed that the presence of AFB1 impaired porcine early embryonic development through oxidative stress, as well as DNA damage and repair, apoptosis, autophagy.