MELATONIN PROTECTS OOCYTES FROM MEHP EXPOSURE INDUCED MEIOSIS DEFECTS IN PORCINE

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Introduction

In 2011, DEHP (plasticizer) was reported to illegally be added in food and beverage products in Taiwan, which caused great concerns about food safety worldwide. DHEP has multiple toxic effects to human and animals like endocrine disruption and cardiotoxicity. However, the toxic effects of DEHP on mammalian oocyte quality are still unclear.

Materials and Methods

We used porcine oocyte as model to explore the effects of active metabolite of DEHP - MEHP on oocyte maturation and we also studied the effects of melatonin administration on MEHP exposure-induced meiosis defects.

Results and Discussion

Our results showed that exposure to MEHP significantly decreased the oocyte polar body extrusion. Cell cycle progression, meiotic spindle organization and actin assembly were all disturbed after MEHP exposure. Moreover, the DNA and histone methylation levels were also affected, showing with altered 5mC and H3K4me2 levels. While MEHP exposure induced meiotic defects were all remarkably ameliorated by the administration of melatonin in porcine oocytes. We further tried to explore the causes of MEHP toxicity on oocytes, and we found that MEHP exposure resulted in significant elevations of oxidative stress and induced early apoptosis as well as autophagy, while melatonin administration could reduce these. Taken together, our results indicated that MEHP exposure induced deterioration of oocyte quality, whereas melatonin supplement showed amelioration on oocyte maturation through its rescue effects on oxidative stress mediated apoptosis and autophagy.