

## EPIGALLOCATECHIN-3-GALLATE (EGCG) PROTECTS THE OOCYTES FROM METHYL PARATHION-INDUCED CYTOPLASMIC DEFORMITIES BY SUPPRESSING OXIDATIVE AND ENDOPLASMIC RETICULUM STRESS

Hegde, Shweta<sup>1</sup>; Rasquinha, Rhea<sup>1</sup>; Crasta, Daphne<sup>1</sup>; Gopalan, Divya<sup>2</sup>; Mutalik, Srinivas<sup>2</sup>; Adiga, Satish<sup>1</sup>; Kalthur, Guruprasad<sup>1</sup>

<sup>1</sup>Department of Clinical Embryology, Kasturba Medical College, Manipal, Manipal Academy of Higher Education, Manipal, INDIA, <sup>2</sup>Department of Pharmaceutics, Manipal College of Pharmaceutical Sciences, Manipal Academy of Higher Education, Manipal, INDIA

### Abstract Body

Methyl parathion (MP) is a common broad spectrum insecticide used in agriculture, which persist in the soil and ambient air for a very long duration after its use. It is known to cause serious health hazards and also gamete toxicity by increasing oxidative stress in non-target species including humans. Present study was designed to investigate if addition of epigallocatechin-3-gallate (EGCG), a potent anti-oxidant extracted from green tea can mitigate MP-induced oocyte toxicity. For the study, Germinal vesicle (GV) stage oocytes were collected from adult *Swiss albino* mice and subjected to *in vitro* maturation (IVM) in medium containing MP (100 µg/mL) and/or EGCG (25 µM). At 24h after incubation, nuclear maturation, ROS level, spindle integrity and cytoplasmic organelle distribution pattern (mitochondria, endoplasmic reticulum, Golgi bodies) were assessed. Oocytes were subjected to strontium chloride induced artificial activation to understand their developmental potential. MP resulted in a significant decrease ( $p<0.01$ ) in nuclear maturation which was improved by EGCG ( $p<0.01$ ). In addition, mitochondrial aggregation ( $p<0.01$ ) and abnormal spindle organization ( $p<0.01$ ) was significantly higher in MP exposed oocytes, which was reduced by EGCG. These changes induced by MP were associated with significant elevation in ROS and expression of ER stress markers GRP78 and XBP1 ( $p<0.01$ ). Further, MP exposure resulted in poor activation rate and developmental potential compared to the control and EGCG+MP group. Overall, supplementation of EGCG to the IVM medium has shown to improve the nuclear maturation, spindle organization and organelle distribution pattern and development potential of the oocytes which seems to be mediated through reduction in oxidative stress and ER stress induced by MP.