

**Notification No: 545/2023**

**Date of Award: 15.09.2023**

**Name of Scholar:** Shaniya Ahmad

**Name of Supervisor:** Dr. Syed Mansoor Ali

**Name of Co-Supervisor:** Dr. Kailash Manda

**Name of Department:** Biotechnology

**Topic of Research:** Role of Vitamin-D modulated miRNA in regulating Endoplasmic reticulum stress in acute lung injury

### **Findings**

Acute lung injury (ALI) is a life-threatening condition induced by sepsis (CLP) or endotoxins (LPS) and may be associated with enhanced Endoplasmic reticulum stress. The endoplasmic reticulum (ER) maintains homeostasis and this homeostasis disrupt under pathological conditions including ALI. Vitamin-D possesses an anti-inflammatory effect; however, this specific mechanism on ALI is still unknown. Here our study scrutinizes this anti-inflammatory mechanism on ALI models and explored the Vitamin-D modulated miRNA's role in regulating ER stress in ALI. We found that Vitamin-D improve hallmarks (edema, histoarchitecture, neutrophil infiltration, endothelial barrier) and alleviate ER stress markers Activating Transcription Factor-6 and C/EBP Homologous Protein expression elevated in ALI. Vitamin-D decreases nitric oxide production and ATF6 in macrophages induced by LPS. Vitamin-D augments miR-149-5p in macrophages, and mice models. miRNA-149-5p when overexpressed, inhibited ER-specific ATF6 inflammatory pathway in macrophages, and ALI models as well as improved hallmarks. This study demonstrate that Vitamin-D could improve ALI induced by CLP/LPS. In this regard, miR-149-5p may play a crucial role in inhibiting ALI. The mechanism might be an association of increased miR-149-5p and decreased regulated target ATF6, and downstream CHOP proteins. Thus, this demonstrate that the anti-inflammatory effect of Vit-D is achieved by miRNA-149-5p augmentation, which may be a key physiologic mediator in treatment of ALI.