1. No.
   2020G012

2. Title
   Effect of Smoking on mTOR Activity in Vascular Endothelial Cells and Its Relevance to ARDS

3. Period
   2020-2024

4. Summary
   The present study's principal aim was to clarify the association between the behavior of mechanistic target of rapamycin complex-1 (mTORC1) activity in pulmonary vascular endothelial cells in acute respiratory distress syndrome (ARDS) and the pathological condition to develop a preventive/therapeutic method for ARDS targeting mTORC1 activity. mTORC1 activity was significantly elevated in the pulmonary vascular endothelial cells of the mouse ARDS model. Mice with mTORC1 activation in vascular endothelial cells exhibited several abnormalities, including ARDS-like symptoms (e.g., dyspnea, death, pleural effusion, pulmonary edema, vascular hyperpermeability). In addition, mTORC1 activation mice showed abnormal lung tissue structure and disruption of vascular homeostasis. These phenotypes were markedly suppressed by treatment with the mTORC1 inhibitor rapamycin. These results suggest that mTORC1 plays an important role in lung tissue structure, vascular homeostasis and cellular properties of vascular endothelial cells, indicating that there might be a correlation between the onset of ARDS and mTORC1 signaling in vascular endothelial cell in lung.