1. No.
   2022G013

2. Title
   Cigarette Smoke-Derived Oxidative Stress and Antioxidant Response by Immunoproteasome

3. Period
   2022-2024

4. Summary
   The proteasome plays a vital role in maintaining cellular homeostasis, and the immunoproteasome (IP) has been reported to be involved in the oxidative stress response, with its dysregulation affecting human diseases. IP is expressed not only in lymphoid tissues but also in vascular endothelial cells (VECs). In this study, we investigated the effect of smoking on IP expression in VECs. In cell-based experiments, treatment with cigarette smoke extract led to a decrease in IP expression in VECs. Similarly, in human lung tissue samples, a significant reduction in β5i expression in VECs was observed in smokers. Furthermore, experiments using an IP inhibitor revealed that suppression of IP contributed to VEC injury and increased production of reactive oxygen species (ROS). In atherosclerotic lesions, inflammatory macrophages are known to play a key role, and our study showed that inhibition of IP significantly increased the expression of inflammatory factors related to macrophage recruitment and activation, such as MCP-1 and E-selectin. These findings suggest that decreased IP expression promotes endothelial cell damage and vascular inflammation, potentially contributing to the pathogenesis of cardiovascular diseases.