1. No.
   2019Y003

2. Title
   Toxicological effects of unsaturated carbonyl compounds in cigarette smoke

3. Period
   2019-2021

4. Summary
   In 2019, pharmacological experiments revealed that ACR- and MVK-induced aorta cell death is ferroptosis. Moreover, ACR and MVK induced ferroptosis in other cell lines such as rat C6 glioma cells, THP-1 monocytes. PKC inhibitor suppressed ferroptosis induction by RSL3. In 2020, several isoform-specific PKC inhibitors have employed for identification of PKC isoform(s) involved in ACR- and MVK-induced ferroptosis. The results suggested that PKCβII is involved in ACR- and MVK-induced ferroptosis in J774 macrophages and SBC-3 small lung carcinoma cells. In 2021, the results of pharmacological experiments suggested that conventional PKCs were not involved in ferroptosis induction in airway epithelial cells. The lentiviral-driven shRNA expression system was employed for novel PKCs gene knockdown. PKCε knockdown partially suppressed ACR-induced ferroptosis in airway epithelial cells. These results suggest that the PKC isoform(s) involved in cigarette smoke gas phase-induced cell death (ferroptosis) is cell- and/or tissue-dependent. In addition, cigarette smoke gas phase, not tar phase, might play an important role in COPD pathogenesis.