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2. Title
   Activation Mechanism of Dendritic Cells by Cigarette Smoke Components and Application to Anti-Tumor Immunity

3. Period
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4. Summary
Dendritic cells (DCs) take up pathogen-derived antigens, including those from bacteria, viruses, and tumor cells, and induce the activation of antigen-specific T cells through antigen presentation via major histocompatibility complex (MHC) molecules. In recent years, anti-tumor effects of cigarette mainstream smoke deprived of nicotine and tar (cCSE) have been suggested. We have previously demonstrated that cCSE enhances the antigen-presenting function of dendritic cells and have been investigating its underlying mechanisms and active components. In this study, we analyzed the effects of its components—polycyclic aromatic hydrocarbons and quinone compounds—on the expression of antigen presentation–related molecules in dendritic cells. As a result, we identified that 1,2-naphthoquinone (1,2-NQ) enhances the expression of MHC class I molecules in dendritic cells. Further mechanistic analysis revealed that 1,2-NQ induces the upregulation of NLRC5, a transcription factor for MHC-I, through the production of reactive oxygen species (ROS). Moreover, dendritic cells activated by 1,2-NQ strongly stimulated $CD8^+$ cytotoxic T cells and enhanced the induction of interferon-γ (IFN-γ), which has anti-tumor activity. Taken together, these findings suggest that 1,2-NQ and its underlying mechanism may contribute to the enhancement of anti-tumor immunity.