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2. Title
   Evaluation of the Effect of Nicotine Treatment on Inflammatory Diseases by PET

3. Period
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4. Summary
   [Background] The purpose of this study is to clarify the relationship between nicotine and chronic inflammatory diseases such as atherosclerosis and inflammatory bowel disease (IBD). In this study, we evaluated the relationship between nicotinic receptors expressed on macrophages and the development of atherosclerotic plaques. Also, anti-inflammatory effects of nicotine in IBD were investigated using PET.
   [Methods] The uptake of [^{18}F]2FA or [^{11}C]MeQAA into M1 and M2 macrophages were evaluated using inhibitors of nicotine receptors. We also evaluated the uptake of [^{11}C]MeQAA in atherosclerotic plaques of ApoE$^{-/-}$ mice. Furthermore, anti-inflammatory effects of nicotine in IBD were evaluated by [^{18}F]FDG-PET.
   [Results] The uptake of [^{18}F]2FA and [^{11}C]MeQAA was lower in M1 macrophages than M2 macrophages. [^{11}C]MeQAA accumulated in all plaques in ApoE$^{-/-}$ mice, but nicotine had little effect on the accumulation. In a murine IBD model, nicotine suppressed inflammation in large intestine and [^{18}F]FDG-PET depicted the anti-inflammatory effects by nicotine. Immunohistochemical analysis showed that expression of α7 nicotinic receptor was significantly increased in large intestine by nicotine.
   [Conclusions] Expression of nicotinic receptor is low in pro-inflammatory M1 macrophages. In a IBD model, the anti-inflammatory effects of nicotine were visualized by [^{18}F]FDG-PET. To elucidate the relationship with nicotinic receptors and anti-inflammatory effects, further investigations using nicotinic receptor imaging agents are being conducted.