Akkermansia muciniphila inhibits serotonin-induced fibrosis progression in liver injury mouse model

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Introduction

Serotonin is an important transmitter that mediates various neurological and non-neurological physiological processes. However, paradoxically, while it may promote liver regeneration, it also has the potential to accelerate liver damage. *Akkermansia muciniphila* (*A. muciniphila*) has been reported to improve various metabolic diseases and liver diseases by modulating the gut-liver axis.

Aim

We identified the exacerbation of liver fibrosis by serotonin treatment in liver injury mouse model and evaluated the inhibitory effect of *A. muciniphila* on serotonin-induced liver damage.

Method

Six-week-old male C57BL/6J mice were divided into 6 groups (n=5/group; Normal control, normal control + serotonin, 3,5-Diethoxycarbonyl-1,4-Dihydrocollidine diet-fed [DDC, 0.1%], DDC diet + serotonin [100μM], 2 DDC diet-fed + serotonin [100μM] + A. muciniphila [109 CFU/200ul for 2 times; live A. muciniphila, pasteurized A. muciniphila]). Serotonin was injected 100μM once through spleen injection. A. muciniphila was administered orally 24 hours and 12 hours before spleen injection. The weight, blood biochemistry, histopathology, and molecular biological analysis were performed.

Conclusions

Serotonin promote fibrosis progression in a DDC diet-induced liver injury mouse model. *A. muciniphila* is effective in inhibiting serotonin-induced fibrosis progression by down-regulating serotonin receptor 5-HTR 2A/2B.

Acknowledgements

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Results

Figure 1. Schematic of study design

Figure 2. Effect of *A. muciniphila* treatment on mouse liver injury

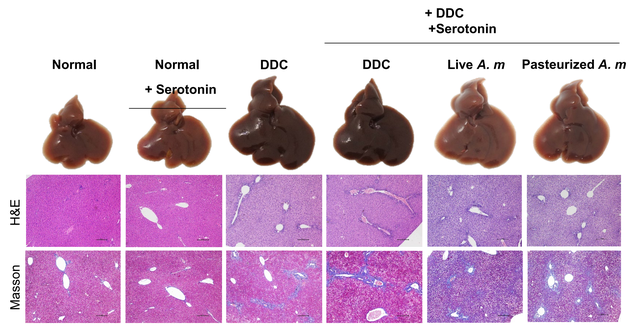

Figure 3. Effect of *A. muciniphila* treatment on plasma liver function indices

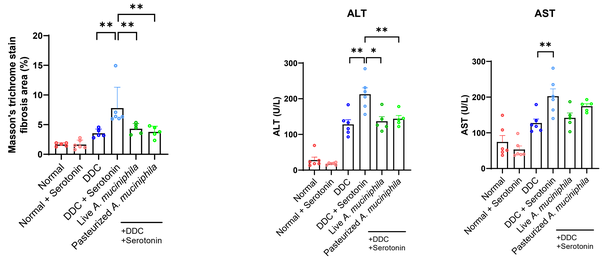

Figure 4. Effect of *A. muciniphila* treatment on liver mRNA expression

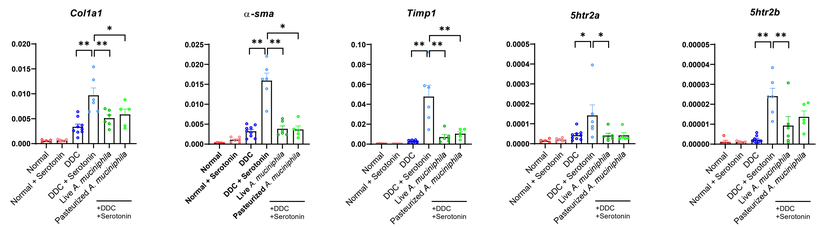

Figure 5. Immunofluorescence staining of serotonin receptors in mouse liver injury model