Wei Chang an Pill Alleviates TNBS-induced Ulcerative Colitis Through Inhibition of EMT Process

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Research

Keywords: ulcerative colitis, Wei Chang An pill, inflammation, epithelial-mesenchymal transition

Posted Date: January 7th, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-139702/v1>

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Abstract

Background: Wei Chang An pill (WCA) is a traditional Chinese pharmaceutical preparation which has been widely used to treat various gastrointestinal diseases including Ulcerative colitis (UC). The aim of our study was investigate the inhibitory effect and mechanism of WCA in the treatment of 2,4,6-trinitro-benzenesulfonic acid (TNBS)-induced UC in rats.

Methods: We established the TNBS-induced UC model and then WCA was administrated orally for one week. Body weight, colon lengths, Disease Activity Index (DAI) score and Colon Mucosa Damage Index (CMDI) score were recorded. The expression of cytokines factors in LPS-stimulated THP-1 cells was recorded to evaluate the anti-inflammatory effects of WCA and its herb active ingredients. Immunohistochemistry and immunofluorescence were used to evaluate the Epithelial-Mesenchymal Transition (EMT) process in UC rats and Caco-2 cells which were induced by LPS-stimulated THP-1 cells upon WCA treatment.

Results: WCA significantly decreased the body weight loss, higher DAI and CMDI score, colon length shortening and histological damage in UC rats. Furthermore, both of the activities of myeloperoxidase dismutase (MPO) and the mRNA expressions of cytokine in UC tissues were significantly inhibited. In THP-1 cells, the mRNA expressions of IP-10, TNF- α , IL-6 and I κ B α were significantly suppressed by WCA or its active ingredients. In UC rats and Caco-2 cells, both of their EMT process were strongly suppressed by WCA.

Conclusion: These results show that through improving inflammatory microenvironment to inhibit the EMT process, WCA retarded the development of UC in rats to play its anti-inflammatory effect.

Full Text

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Figures

Betulinic acid (BA)

Chlorogenic acid (ChA)

Costundide (Cos)

Dehydrocostuslactone (DHL)

β-caryophyllene (BCP)

Atractylol (Atr)

Benzylacetone (Ben)

Nootkatone (NK)

Figure 1

Structures of components

Figure 2

Treated effects of WCA on TNBS-induced UC in rats. Compared with the TNBS-treated control group. a WCA reversed the decreased body weight, and b the decreased disease activity index, and c decreased the increased CMDI, and d colon length, and e histologic injury, and f MPO activity in TNBS-treated rats. All data are expressed as the mean $\pm$ SD (n=6). ##P<0.01 vs control group. *P<0.05, **P<0.01 vs TNBS-treated group.

Figure 3

WCA-treated suppression of inflammatory in TNBS-induced UC in rats. The mRNA levels of a TNF- α , b IL-6, c IL-18 and d IL-1 β in UC models. Data are expressed as the mean $\pm$ SD (n=6). ##P<0.01 vs control group. *P<0.05, **P<0.01 vs TNBS-treated group.

Figure 4

WCA and the herb active ingredients isolated from WCA inhibited cytokines expression in THP-1 cells. a WCA, c Cos and h DHL decreased the high expression of IP-10, TNF- α , IL-6 and IκB α in THP-1 cells. Data are expressed as the mean $\pm$ SD. n=3. ##P<0.01 vs control group. *P<0.05, **P<0.01 compared to LPS-stimulated group.

Figure 5

Effects of WCA on EMT-related protein expression. a Immunohistochemical staining (scale bar=100μm) and b Immunofluorescence double staining of E-cadherin, vimentin in rat colonic tissues.

Figure 6

WCA-treated suppression of EMT in vitro. CM-WCA reversed the decrease of a E-cadherin and the increase of b Vimentin in the Caco-2 cell treated with CM-LPS compared with the control (C, LPS, WCA-LPS, CM-C) by immunofluorescent staining.

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