Introduction

*Curcuma longa*, more commonly known as the medicinal and culinary spice turmeric, is an herb found in the ginger family, and native to India and Southeast Asia. Turmeric has long been advised for use in the treatment of a variety of inflammatory conditions because of its active constituent curcumin. Curcumin research has suggested its ability to modulate multiple cell signaling pathways thereby reducing inflammation. Curcumin appears to be a promising natural therapy for pro-inflammatory diseases including inflammatory bowel diseases (IBD) specifically Crohn’s disease and ulcerative colitis. Curcuminoids are a family of compounds that possess both anti-oxidant and anti-inflammatory properties. The current pharmacological treatment model for IBD is not curative and often causes unwanted side effects. Developing adjunctive approaches for IBD treatment to include Curcumin may improve disease management and quality of life outcomes for those with IBD.

Anti-Inflammatory & Anti-oxidant Properties

Curcumin plays a role in modulation of the inflammatory response in a number of ways. For example, curcumin has the ability to suppress inflammatory cytokines, interleukins (IL-1, -2, -6, -8, and -12) and tumor necrosis factor alpha (TNF-α). In addition, curcumin also plays a role in the down-regulation of pro-inflammatory enzymes including COX-2, lipoxygenase, and nitric oxide synthase (iNOS). COX-2 and iNOS inhibition occurs because of curcumin’s ability to suppress the activation of nuclear factor kappa B (NF-κB), which is partially involved in the regulation of inflammation. *In vitro* studies have shown that curcumin has the ability to suppress cytokine gene expression. This suppression is thought to contribute to curcumin’s anti-inflammatory ability. Pre clinical research has also demonstrated curcumin’s ability to inhibit epithelial interferon-γ (IFN-γ), and thus mitigate intestinal inflammation.

Implication for Inflammatory Bowel Disease

Inflammatory bowel disease (IBD) is comprised of Crohn’s disease (CD) and ulcerative colitis (UC). Both conditions share a strong inflammatory response to intestinal microbes in a person with genetic susceptibility for IBD. IBD is a multifaceted condition where environmental, immune and genetic factors interact. Much of the morbidity, including the damage to the intestinal surfaces, is due to the inflammatory response to the bacterial microflora. Elevated levels of NF-κB family of proteins have been discovered in colon biopsies of people with IBD, and levels correlate with the severity of the disease. The increase in NF-κB leads to the increase in secretion of other inflammatory substances including TNF-α, and a number of interleukins, which can be linked to the damage seen on the intestinal surfaces.

In one small open label study of ten IBD patients, curcumin was given at a dose of 550mg twice daily for one month, followed by 550mg three times daily for one month, followed by 360mg four times daily for another two months. The participants were also using 5-aminosalicylic acid (5-ASA) and corticosteroid treatments concurrently. Study participants reported improvement in symptoms, as well as a reduction in concomitant...
medication use. The Crohn's Disease Activity Index scores improved and there was also a reduction in inflammatory markers to normal levels (ESR, C-reactive protein). In another randomized double blind multicenter trial of 89 UC patients, researchers gave placebo or curcumen, 1000mg twice daily after breakfast and dinner in combination with 3g of sulfasalazine, or 1.5-3g of mesalamine daily for six months.

Patients were also followed for six months after treatment, while they took only the sulfasalazine or mesalamine treatments. Of the Curcumin treatment group only two participants relapsed during the 6-month follow up phase, compared to eight in the placebo group (p=0.040). Morbidity improved in the Curcumin group as evidenced by improvement in the Clinical Activity Index, and endoscopic index used for evaluation. Curcumin had better clinical efficacy when compared to placebo for preventing disease relapse when used as an adjunctive therapy, and Curcumin was well tolerated in the study.

Conclusions

Curcumin plays a key role in the regulation of the inflammatory response in the gastrointestinal system through the inhibition of pro-inflammatory cytokines, blocking the activation of NF-κB proteins and by inhibiting IFN-γ. The strong anti-inflammatory action of Curcumin may offer significant, non-pharmacological treatment possibility for those with IBD. Curcumin appears to be a safe intervention for IBD. Large-scale clinical trials are warranted to evaluate the effectiveness and optimal treatment scheme for Curcumin and IBD.

References


