Curcumin (Turmeric extract)

Study Details	Hewlings S and Kalman D. Curcumin: a review of its effects on human health. Foods. 2017;6(10):92.
Study Design	Review
Included Studies	Systematic reviews, meta-analyses, clinical, and pharmacodynamic studies
Study Duration	Varies. Reviewed studies were typically 4-12 weeks and up to 8 months
Intervention(s)	Curcumin or curcuminoids often in combination with piperine
Control	Placebo, ibuprofen
Primary Outcomes	Summarization of updated information on the health benefits of curcumin, including the mechanisms of actions responsible for its antioxidant and anti-inflammatory properties as well as efficacy in arthritis/osteoarthritis, metabolic syndrome, and healthy adults.
Results and Conclusion(s)	Curcumin's antioxidant and anti-inflammatory properties are the primary mechanisms responsible for its beneficial effects on osteoarthritis, metabolic syndrome, and healthy subjects (exercise recovery, cognitive function, mood, etc.) The reviewed studies provide substantial evidence for the use of curcumin as a therapeutic treatment for different types of pain, including arthritis/osteoarthritis and acute physical stresses such as exercise-induced muscle soreness. In one study, turmeric (Curcuma domestica) extract (1500 mg) containing 75-85% total curcuminoids was as effective as ibuprofen (1200 mg) after four weeks of daily administration in patients with knee osteoarthritis without the gastrointestinal side effects reported in the ibuprofen group. Curcumin was also shown to attenuate metabolic syndrome by improving insulin sensitivity, suppressing adipogenesis, and reducing blood pressure, inflammation, and oxidative stress.
Adverse Events	Curcumin has a long-established safety record. Diarrhea, headache, rash, and yellow stool was reported in a dose response study. Nausea, diarrhea, and increased serum alkaline phosphatase and lactate dehydrogenase was reported in another study.
Summary	This 2017 review summarized updated information on the health benefits of curcumin, including mechanisms of actions and efficacy in arthritis/osteoarthritis, metabolic syndrome, and healthy adults. Systematic reviews, meta-analyses, clinical, and pharmacodynamic studies were included in the review. Pain was evaluated in relation to curcumin's antioxidant and anti-inflammatory mechanisms of actions, arthritis/osteoarthritis, and acute physical stresses.

Study Details	McFarlin BK, Venable AS, Henning AL, et al. Reduced inflammatory and muscle damage biomarkers following oral supplementation with bioavailable curcumin. BBA Clinical. 2016;5:72-78.
Study Design	Double-blind, randomized, placebo-controlled trial
Participants	28 students from the University of North Texas
Study Duration	Six days

Intervention(s)	Curcumin (400 mg; Longvida; Verdure Science Corp., Noblesville, IN) capsule once daily
Control	Placebo capsule containing rice flour once daily
Primary Outcomes	A pilot experiment was conducted before the study to evaluate curcumin dose-response and determine the optimal dose (400 mg). Subjective quadriceps muscle soreness and activities of daily living soreness (modified Knee injury and Osteoarthritis Outcome Score (KOOS), creatine kinase, and inflammatory cytokines (TNF-α, IL-6, IL-8, IL-10) from exercise-induced muscle damage (EIMD) with eccentric-only dual-leg exercise assessed before day-one and on days one, two, three, and four after EIMD.
Results and Conclusion(s)	The intervention group had no significant reduction in subjective quadriceps muscle soreness or activities of daily living soreness. The authors note that "this finding was somewhat expected because we powered our study to detect changes in TNF-α, but not necessarily changes in muscle soreness." Curcumin significantly blunted creatine kinase (P = 0.035). Further, curcumin had significant interaction effects for TNF-α (P = 0.028) and IL-8 (P = 0.030); however, changes in IL-6 and IL-10 did not reach statistical significance.
Adverse Events	No adverse events were reported
Summary	This was a double-blind, randomized, placebo-controlled study evaluating the effects of oral curcumin supplementation on muscle soreness, activities of daily living soreness, creatine kinase, and inflammatory cytokines in 28 students following 60 repetitions of eccentric-only dual-leg press exercise at 110% of the 1 repetition maximum. The students were supplemented two days prior and four days post-EIMD with 400 mg curcumin capsules or placebo once daily; blood samples were also collected during these times. At the study's conclusion, curcumin significantly blunted creatine kinase (P = 0.035) and had significant interaction effects for TNF-α (P = 0.028) and IL-8 (P = 0.030) for up to four days following EIMD.

Study Details	Wang J, Ghosh SS, and Ghosh S. Curcumin improves intestinal barrier function: modulation of intracellular signaling, and organization of tight junctions. American Journal of Physiology-Cell Physiology. 2017;312(4):438-445.
Study Design	In vitro
Intervention(s)	Curcumin
Control	None
Primary Outcomes	Delineate the underlying mechanisms by which curcumin attenuates Western-type diet-induced chronic inflammation associated with metabolic diseases. Two human colon carcinoma cell lines, Caco-2 and HT-29, were pretreated with curcumin and exposed to lipopolysaccharide, a gut bacteria-derived endotoxin.

Results and Conclusion(s)	Lipopolysaccharide initiated proinflammatory signaling in intestinal epithelial cells and subsequently caused inflammation and disruption of the intestinal tight junctions. Curcumin attenuated lipopolysaccharide-induced secretion of IL-1β in intestinal epithelial cells, macrophages, and p38 MAPK inflammatory signaling. Subsequently, MLCK expression was reduced, tight junction disorganization was prevented, and paracellular transport was also attenuated.
Summary	This was an in vitro study evaluating the underlying mechanisms by which curcumin attenuated chronic inflammation in Caco-2 and HT-29 colon carcinoma cell lines exposed to lipopolysaccaaride. The primary endpoint was attenuation of IL-1β secretion in intestinal epithelial cells, macrophages, and p38 MAPK signaling, reduction in MLCK expression, prevention in tight junction disorganization, and attenuation of paracellular transport. The authors concluded that “curcumin is expected to not only reduce local inflammation in the gut, but by altering intestinal barrier function it will also reduce systemic inflammation triggered by release of LPS (lipopolysaccharide) into circulation…despite poor absorption and low bioavailability, oral curcumin likely mediates its anti-inflammatory…effects by its local action in the gut.”