"Biochemical studies on the effect of curcumin on rheumatoid-arthritis inflammation in rats."

By

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6. SUMMARY

Rheumatoid arthritis (RA) is a systemic and debilitating autoimmune disease. The varying levels of severity of rheumatoid arthritis make it notably unique. Rheumatoid arthritis is not strictly an inflammatory disease of the joints; it is an extensive disease with many extra-articular manifestations that complicate its treatment and management. In addition to being a disease that is internally driven by the body's immune system, current research reveals the pervasive influence of environmental factors on the disease's severity and activity.

Curcumin (Cur) is a polyphenolic pigment derived from the herb *Curcuma longa's* rhizome. Cur possesses antibacterial, antioxidant, anti-inflammatory, anti-virus, and even anti-cancer properties. Among the challenges associated with the therapeutic application of curcumin, include its rapid digestion, low bioavailability, and poor water solubility. The efficacy of Cur can be improved by changing it into nanoparticles called Curcumin Nanoparticles (Cur-Nps).

The current study was performed to estimate the anti-inflammatory and antioxidant activities of Cur and Cur-Nps against RA in albino rats.

48 Wistar rats were divided into eight groups, 6 rats in each group. Group I (control group), Group II (Cur group): rats were administered orally with curcumin (200 mg/kg /day) for 4 weeks.

Group III (Cur-Nps group): rats were administered orally with curcumin nanoparticles (15 mg/kg /day) for 4 weeks. Group IV (Rheumatoid Arthritis group" RA"): rats were injected with a single

subcutaneous injection of 0.1 mL of CFA into the subplantar region of the left hind foot paw to induce arthritis . Group V (Curcumin treated group" Cur Tr") & Group VI (Cur-Nps treated group " Cur-Nps Tr"): rats were injected with a single subcutaneous injection of 0.1 mL of CFA into the sub-plantar region of the left hind foot paw to induce arthritis after one-day rats were administered orally with Cur and/or Cur-Nps for 4 weeks. Group VII (Curcumin protective group" Cur Pr") & Group VIII (Cur-Nps protective group "Cur-Nps Pr"): rats were administered with Cur and/or Cur-Nps orally for 2 weeks and after that rats were injected with a single subcutaneous injection of 0.1 mL of CFA into the sub-plantar region of the left hind foot paw to induce arthritis then rats were administered with Cur and/or Cur-Nps during the subsequent period.

In this study there was significant increase in serum MDA, RF, Anti-CCP, IL-6, and TNF- α levels and a greatly marked drop in levels of TAC in the rheumatoid arthritis (RA) group in comparison to control group with improvement their levels in treated and protective groups.

In conclusion, our result showed that the administration of Cur and Cur-Nps provided antioxidant and anti-arthritic effects against the toxicity of CFA. The histological and x-ray findings confirm the biochemical observations.