Lingzhi or Reishi Medicinal Mushroom *Ganoderma lucidum* (Agaricomycetes) Nanogel in a Complete Freund's Adjuvant-Induced Rheumatoid Arthritis Rat Model: Anti-Arthritic, Anti-Inflammatory, and Antioxidative Activity

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Abstract	Lingzhi or reishi mushroom, Ganoderma lucidum, is a medicinal mushroom quite widely developed as herbal medicine because it has acted as an anticancer, antitumor, antioxidant, and anti-inflammatory. The active my-cochemical compounds of G. lucidum mushrooms, such as flavonoids and polysaccharides, can suppress the release of pro-inflammatory cytokines and prevent lipid peroxidation due to oxidative stress. Rheumatoid arthritis (RA) is an autoimmune disease where the exact cause is unknown, and RA prevalence continues to increase yearly. In patients with RA, joint damage and inflammation occur. This study aims to evaluate the effectiveness of G. lucidum nanogels as an-ti-arthritis, anti-inflammatory, and antioxidative. The research method was a true experiment using a control group and treatment group that randomly assigned, using 24 male Wistar rats (Rattus norvegicus) induced with complete Freund's adjuvant (CFA) 0.1 mL. The rats were divided into six groups; healthy control/HCt (did not receive the treatment), neg-ative control/NCt (induced by CFA), and positive control/PCt (given 0.012 diclofenac sodium). TG1 (given 250 mg G. lucidum nanogels), TG2 (given 500 mg G. lucidum nanogels), TG3 (given 750 mg G. lucidum nanogels). IgG, eNOS, IL-1 beta, COX-2, NOS, TNF-alpha, and IL-6 parameters were measured using ELISA, and the data obtained were analyzed by one-way ANOVA using SPSS ($P < 0.05$). The results showed that administering G. lucidum nanogels significantly reduced IgG, NOS, TNF-alpha, COX-2, IL-1 beta, and IL-6 and increased eNOS levels. The anti-inflammatory and antioxida-tive activities in suppressing pro-inflammatory cytokines and increasing eNOS levels prove that the nanogel extract G. lucidum have the potential to be developed as anti-arthritis natural therapeutic
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