**Rice Bran-derived Nanoparticles for the Treatment of Peritoneal Dissemination and Inflammatory Bowel Disease**

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**Background and aims.** Plant-derived nanoparticles have gained attention in drug delivery due to their biocompatibility, natural abundance, and potential for functionalization. This study aimed to investigate the therapeutic potential of rice bran-derived nanoparticles (rbNPs) for two difficult-to-treat conditions: peritoneal dissemination, a form of cancer metastasis, and inflammatory bowel disease (IBD), a chronic inflammatory disorder of the gastrointestinal tract.

**Methods.** rbNPs were prepared from a suspension of *Koshihikari* rice bran by sequential centrifugation and ultracentrifugation. Their physicochemical characteristics, including particle size, surface charge, and morphology, were analyzed using dynamic light scattering and transmission electron microscopy. Cellular uptake and cytotoxicity were evaluated using cultured cancer cells and intestinal epithelial Caco-2 cells. The therapeutic efficacy of rbNPs was assessed in mouse models of peritoneal dissemination and IBD.

**Results.** The obtained rbNPs were negatively charged, exosome-like nanoparticles with an average diameter of 100-130 nm. They selectively inhibited the proliferation of cancer cells without notable cytotoxicity in normal cells. Intraperitoneal injection of rbNPs significantly suppressed tumor growth in a mouse model of peritoneal dissemination of murine adenocarcinoma colon26 cancer cells, with no observable adverse effects (1). Additionally, rbNPs demonstrated strong antioxidant activity by scavenging hydrogen peroxide, and were efficiently taken up by Caco-2 cells, protecting them from oxidative stress. Oral administration of rbNPs in a dextran sulfate sodium-induced colitis model markedly alleviated disease symptoms, including body weight loss, colon shortening, and elevated pro-inflammatory cytokine levels.

**Conclusion/Discussion.** These findings highlight the potential of rbNPs as a novel and biocompatible nanoplatform for treating peritoneal dissemination and IBD. Their combined anti-tumor and anti-inflammatory activities, together with a favorable safety profile, support their continued development toward clinical applications in these challenging diseases.

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**References:**

(1) Sasaki, D. (2024) J Nanobiotechnology 22:114.