

## Fullerenol C<sub>60</sub> as a new therapeutic nanomedicine for inflammatory bowel disease

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Inflammatory bowel disease (IBD) is intractable disease that shows unexplained inflammation in the gastrointestinal tract. Although diverse therapeutic drugs such as 5-aminosalicylic acid (5-ASA) and N-acetyl-L-cysteine (NAC) were used, there were some problems with adverse effects and unresponsiveness. Therefore, it is expected to develop novel medicines. In this regard, we have focused on Fullerene C<sub>60</sub>, which is one of the most promising nanomaterials because of their antioxidant effect. We previously demonstrated that C<sub>60</sub>(OH)<sub>36</sub>, which is water-soluble fullerenol C<sub>60</sub>, have strong anti-oxidative and anti-inflammatory effects in vitro. Here, we evaluated the efficacy of C<sub>60</sub>(OH)<sub>36</sub> as a new therapeutic nanomedicine (~1 nm) for IBD. We examined the effects of C<sub>60</sub>(OH)<sub>36</sub> on IBD in animal model of dextran sulfate sodium (DSS). The DSS-induced colitis model has been extensively used because it shows similar symptoms compared to human colitis. Myeloperoxidase (MPO) activity is an index of acute inflammatory reaction with neutrophil infiltration into the colon. Therefore, we measured the levels of MPO activity in mice. MPO activity in C<sub>60</sub>(OH)<sub>36</sub>-treated and 5-ASA-treated mice were significantly decreased on the day 7 after DSS administration compared to that in distilled water-treated mice. These results indicated that C<sub>60</sub>(OH)<sub>36</sub> had a potential to be useful therapeutic nanomedicine for acute DSS experimental colitis. We expect that our studies might provide useful information for creating innovative nanomedicine for IBD.

### Biography

Kazuma Higashisaka has completed his M.S. at the Graduate School of Pharmaceutical Sciences, Osaka University, Japan. His work was supervised by Professor Yasuo Tsutsumi, Ph.D. who is a specialist of nano-safety science/design/drug-delivery, and disease proteomics. Higashisaka is now working in Osaka University as Assistant Professor and studied the efficacy and toxicity of drugs and nanomaterials using ADMET approach. His works have already accepted and published in *Biomaterials* and it was selected as leading opinion paper. Additionally, the results of his works were presented at several congresses and one of his works had been prized a best poster award at SENN2012.

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