Supporting Information

Influence of interaction between surface-modified magnetic nanoparticles with infectious biofilm components in artificial channel digging and biofilm eradication by antibiotics *in vitro* and *in vivo*

Kecheng Quan[a,b], Guimei Jiang[b,c], Jian Liu[c], Zexin Zhang[a]*, Yijin Ren[d], Henk J. Busscher[b*], Henny C. van der Mei[b], Brandon W. Peterson[b]*

[a] College of Chemistry, Chemical Engineering and Materials Science, Soochow University, Suzhou 215123, P.R. China

[b]University of Groningen and University Medical Center Groningen, Department of Biomedical Engineering, 9713 AV Groningen, The Netherlands

[c]Institute of Functional Nano & Soft Materials (FUNSOM), Jiangsu Key Laboratory for Carbon-Based Functional Materials & Devices, Collaborative Innovation Center of Suzhou Nano Science and Technology, Soochow University, Suzhou 215123, P. R. China

[d]University of Groningen and University Medical Center Groningen, Department of Orthodontics, Hanzeplein 1, 9713 GZ Groningen, The Netherlands

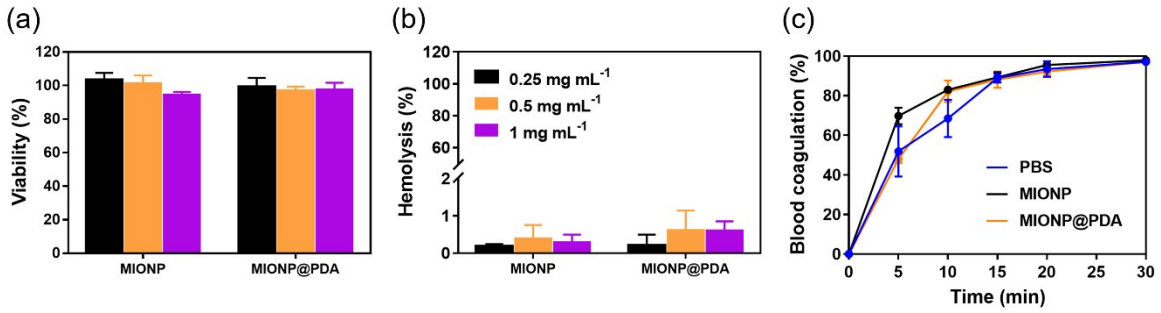

Fig. S1 *In vitro* biocompatibility of unmodified and PDA-modified magnetic nanoparticles.

(a) Relative viability of L929 fibroblasts after 24 h growth in cell culture medium in the presence of different concentrations of magnetic nanoparticles. Relative viabilities were obtained using a XTT-conversion assay,[19] setting the XTT-conversion of fibroblasts in PBS at 100%.

(b) Relative hemolysis of mouse red blood cells after 3 h exposure at 37°C to magnetic nanoparticles. Relative hemolysis was derived from UV absorption at 540 nm,[20,21] setting hemoglobin absorption of cells exposed to ultrapure water at 100%.

(c) Relative blood coagulation in anticoagulant citrate dextrose whole blood in presence of magnetic nanoparticles as a function of time after initiating coagulation through the addition of $CaCl_2$.[21,22] 0% blood coagulation indicates hemoglobin absorption of a suspension at 0 min, while coagulation in PBS as observed after 30 min was taken as 100%.

Data are expressed as means ± standard deviations over three separate experiments. No statistical differences were observed.

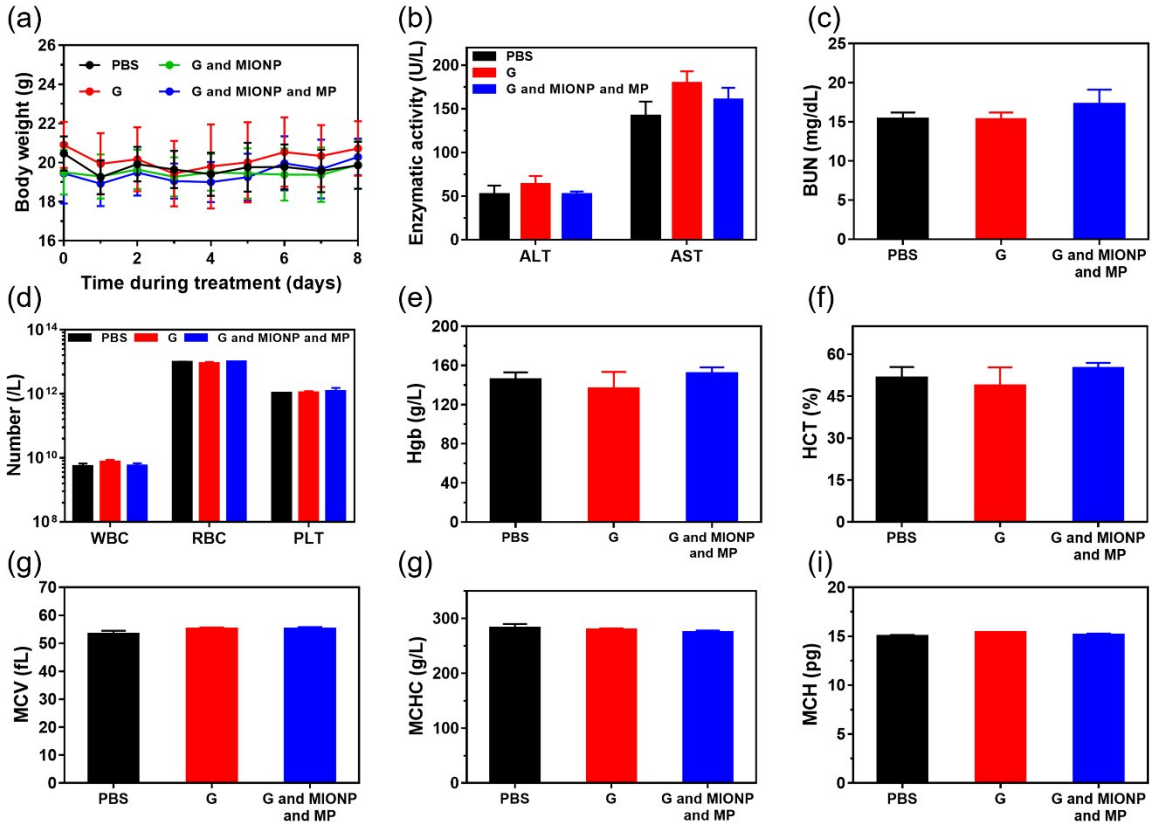

Fig. S2 Body weight of mice during treatment and *in vivo* blood biocompatibility of non-interacting, unmodified MIONPs during gentamicin administration in absence and presence of magnetic-propulsion (MP), (for experimental scheme see Fig. 5a).

(a) Body weight of the mice in each group as a function of time during treatment.

(b-i) Blood chemistry and routine blood parameters of the mice at day 8 after initiating drug administration (prior to sacrifice). ALT stands for alanine transferase, AST for aspartate transferase, BUN for blood urea nitrogen, WBC and RBC for white and red blood cell respectively, PLT for platelets, Hgb for hemoglobin, HCT for hematocrit, MCV for mean cell volume, MCHC for mean corpuscular hemoglobin concentration and MCH for mean corpuscular hemoglobin.