Supporting Information

Enhanced Immune Adjuvant Activity of Aluminum Oxyhydroxide Nanorods through Cationic Surface Functionalization

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Figure S1

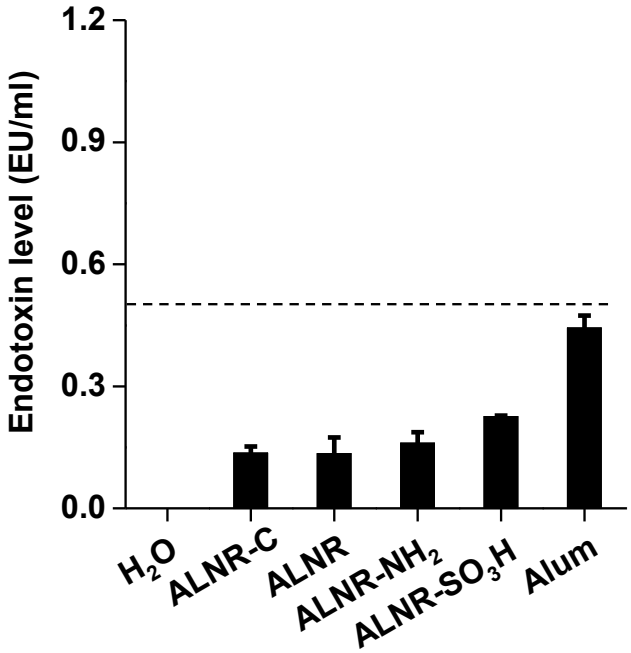

Figure S1. Endotoxin levels of ALNRs. The endotoxin levels in 25 μg of ALNRs (resuspended at 250 μg/mL) were determined using a Limulus Amebocyte Lysate assay kit (Lonza).

Figure S2

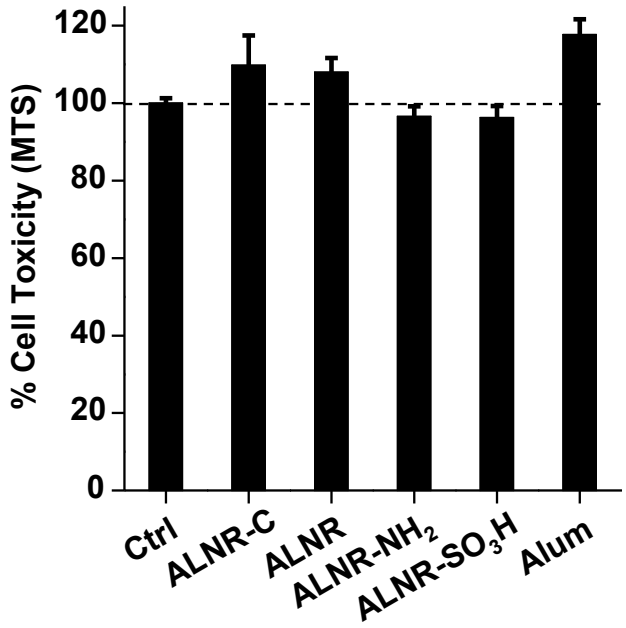

Figure S2. Cytotoxicity of ALNRs. Cell viability of THP-1 cells after exposure to ALNRs was determined using a MTS assay. The cell viability of the nanoparticle-treated cells was normalized according to the value of non-treated control cells, for which the vitality was regarded as 100%.

Figure S3

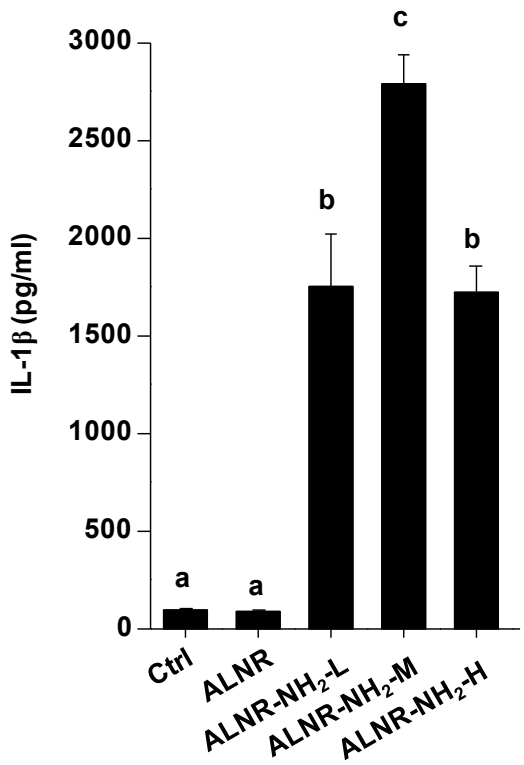

Figure S3. IL-1β production induced by ALNRs with different degree of NH_2 functionalization in THP-1 cells. (A) PMA-differentiated THP-1 cells were exposed to ALNRs with different degree of NH_2 functionalization (L, Low; M, Medium; H, High) at 500 μg/mL in the presence of LPS (10 ng/mL) for 6 h. IL-1β production was quantified by ELISA. Statistical analysis was performed using Tukey's test. Values that do not share the same letter indicate statistical differences at $p<0.01$.

Figure S4

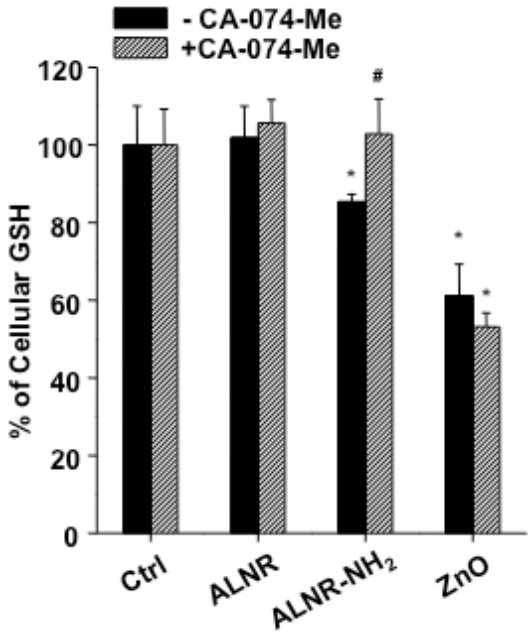

Figure S4. Cathepsin B inhibitor reduced oxidative stress induced by ALNR-NH_2 in THP-1 cells. PMA-differentiated THP-1 cells were pre-treated with 20 μM inhibitor for 30 min, and then exposed to particles in the presence of LPS (10 ng/mL) for 24 h. Intracellular GSH level was determined using a GSH-Glo assay. Zinc oxide (ZnO) (50 μg/mL) was used as a positive control. $^{\#}p<0.05$ compared to THP-1 cells without CA-074-Me treatment; $^{*}p<0.05$ compared to control.

Figure S5

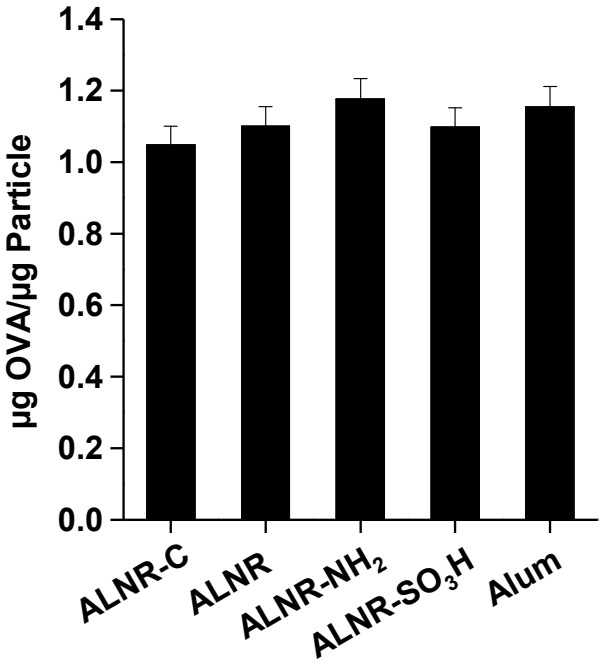

Figure S5. OVA binding efficiency to ALNRs. 100 μL of ALNRs (100 μg/mL in PBS) was mixed with 100 μL of OVA (100 μg/mL in PBS), and the mixture was incubated for 30 min at room temperature. The particles were centrifuged and the supernatant was collected to analyze the OVA concentration with a BCA protein assay.

Table S1. Peak assignments of FTIR analysis of aluminum oxyhydroxide nanorods with various surface functionalization.

Wavenumber (cm^{-1})	Assignments
3300	ν_{as}(Al)O-H stretching vibration of OH groups
3095	ν_{s}(Al)O-H stretching vibration of OH groups
1558	Deformation vibration of N-H bond
1539	N-H bending vibration
1413	$\nu_{as}(SO_2)$ stretching vibration
1335	$\nu_{as}(SO_2)$ stretching vibration
1156	(ν_{as}Al-O-H) OH deformation
1067	(ν_{s}Al-O-H) OH deformation