Electronic Supplementary Material (ESI) for Environmental Science: Nano.

Supporting Information

Emerging investigator series: Long-term exposure of amorphous silica nanoparticles disrupts the lysosomal and cholesterol homeostasis in macrophages

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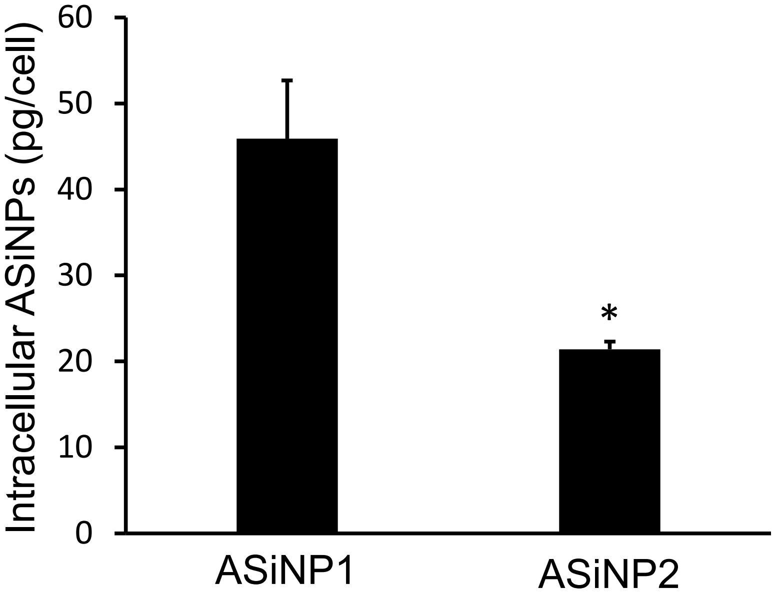

Figure S1 ICP-OES detection of intracellular silica contents

RAW 264.7 cells exposed to 100 μg/mL ASiNP-1 or ASiNP-2 solutions for 24 h were collected and pre-digested in nitric acid solution, followed by further digestion in KOH solution. The Si contents in digestions were detected by ICP-OES (n=3). *, $p<0.05$ compared to ASiNP1 by two-tailed Student's T-test.

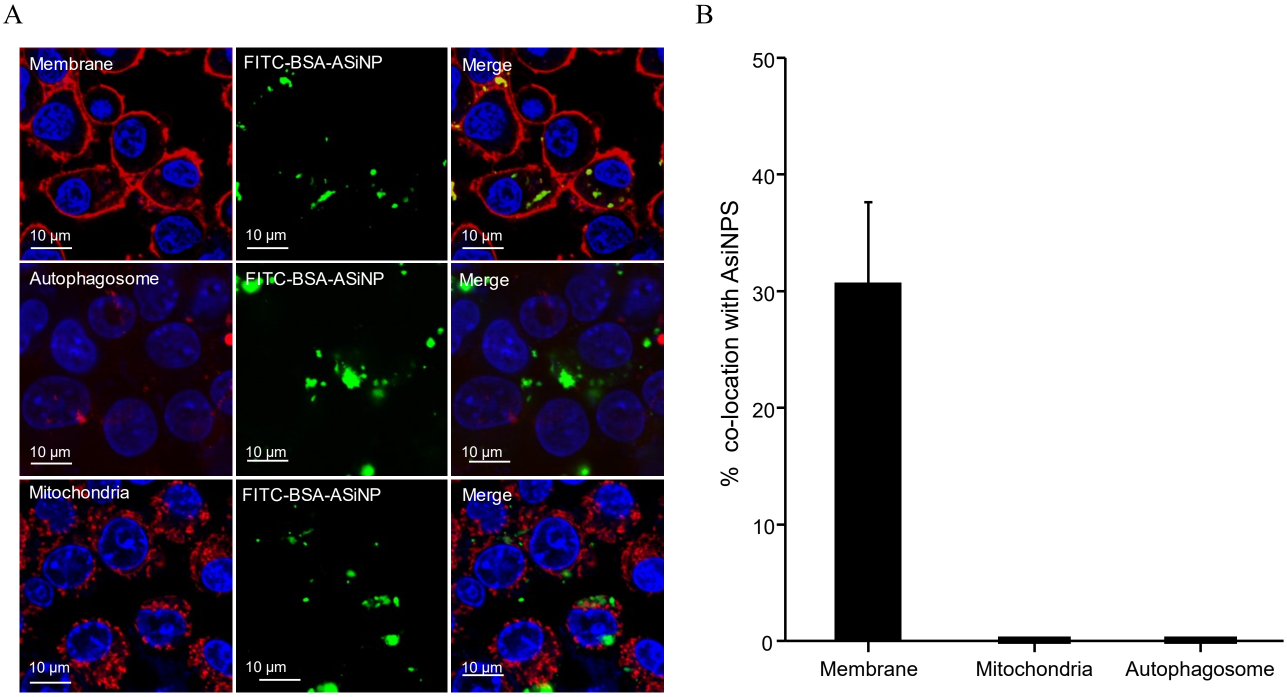

Figure S2. A) Confocal microscopy images of co-localizations of lysosomes with membrane, autophagosome and mitochondria;B) quantification of co-localization coefficients.

RAW264.7 cells were incubated with 20 μg/mL ASiNPs for 12 h. After three-time washing by PBS, the treated cells were stained by WGA-594, LC-3B immunofluorescence kit and mito-tracker dye for 30 min before visualization by confocal microscopy.

Table S1 Proteins involved mainly in five biological processes

Proteins	MW(Da)	PI	Autophagy	Lipid metabolism	Inflammation	Endocytosis	Apoptosis	Others	Reference
CD63 antigen (CD63) *	25,767	7.00	√	√	√	√	√	/	[1-5], UniProt, KEGG
Two pore segment channel 1 (Tpcn1) *	94,496	8.70	√	/	/	√	√	/	[6], UniProt, KEGG
Rho-related GTP-binding protein RhoB (Rhob)	22,123	4.85	√	√	√	√	√	/	[7-10], UniProt
Vam6/Vps39-like protein (Vps39) *	101,693	6.99	√	/	/	/	/	/	[11] UniProt
Regulatory-associated protein of mTOR (Rptor)	149,471	6.87	√	√	√	/	√	/	[12-14], UniProt, KEGG
Dynamin-2 (DNM-2) *	98,145	7.48	√	/	√	√	√	/	[15], UniProt, KEGG
Vacuolar protein sorting-associated protein 35 (Vps35) *	91,713	5.12	√	/	√	√	/	/	[16], UniProt, KEGG
Ras-related protein Rab-12 (Rab12) *	27,329	8.58	√	√	/	√	/	/	[17], UniProt, KEGG
AP-1 complex subunit beta-1 (Ap1b1) *	103,935	4.79	√	√	/	√	/	/	UniProt, KEGG
Glucocerebrosidase (Gba)	57,622	7.84	√	√	/	/	/	/	[18], UniProt, KEGG
Vesicle-associated membrane protein 7 (Vamp7) *	24,967	8.79	√	√	√	√	/	/	[19], UniProt, KEGG
Interferon-induced transmembrane protein 3 (Ifitm3) *	14,954	7.50	√	/	√	√	/	/	[20], UniProt, KEGG
ADP-ribosylation factor 1 (Arf1)	20,697	6.80	√	√	/	√	/	/	[21], UniProt, KEGG
Lysosomal acid lipase (Lipa) *	45,325	8.21	√	√	√	/	/	/	[22], UniProt, KEGG
Progranulin (Grn)	65,018	6.99	√	√	√	/	/	/	[23], UniProt, KEGG
Vesicle-associated membrane protein 2 (Vamp2)	12,691	8.48	/	√	√	√	/	/	[24-26], UniProt
Beta-glucuronidases (Gusb)	74,195	6.69	/	/	/	/	/	√	UniProt
Ankyrin repeat domain-containing protein 27 (Ankrd27)	116,809	6.64	/	/	/	√	/	/	UniProt, KEGG
N-acetylglucosamine-1-phosphate transferase (Gnptab)	140,984	7.71	√	√	/	/	/	/	[27, 28], KEGG
Serum paraoxonase/arylesterase 2 (Pon2)	39,617	5.69	/	√	/	/	√	/	[29, 30], UniProt, KEGG
Dipeptidyl-peptidase 7 (Dpp7)	56,254	5.02	/	/	/	/	/	√	UniProt
Regulator of MON1-CCZ1 complex (Mic1) *	74,922	7.89	√	√	/	/	/	/	UniProt
Protein Cln8 (Cln8)	33,109	9.02	/	√	/	/	√	/	UniProt
Unconventional myosin-Va (Myo5a)	215,538	8.88	/	√	/	√	/	/	UniProt
Cathepsin C (Ctsc)	52,376	6.88	/	/	/	/	√	/	UniProt, KEGG
Amount			17	16	10	13	8	2	
Percent			25.8%	24.3%	15.1%	19.7%	12.1%	3.0%	

* represent that proteins are correlated with the fusion of lysosomes and autophagosomes

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