Electronic Supplementary Material (ESI) for Nanoscale

SUPPORTING INFORMATION

SiO_2 nanoparticles biocompatibility and their potential for gene delivery and silencing

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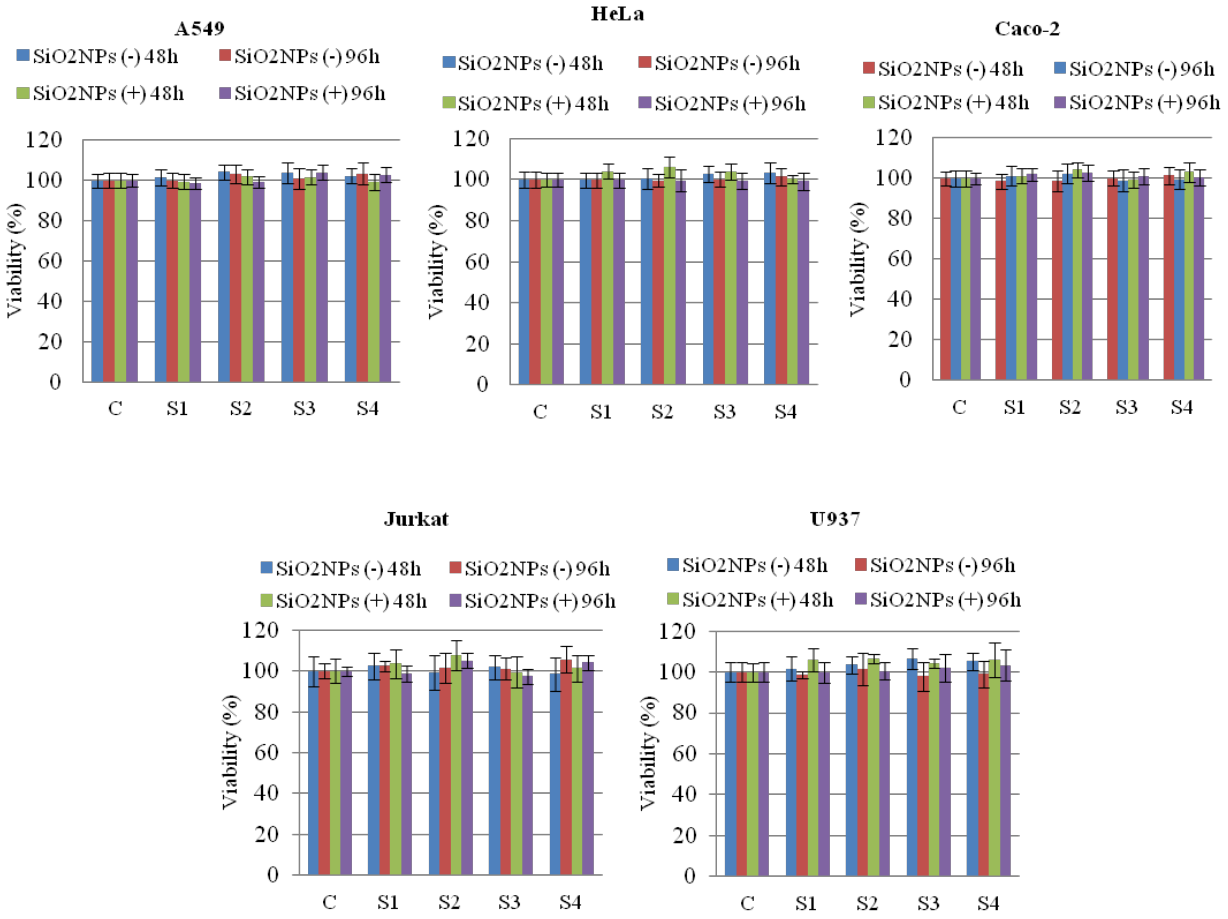


Figure S1. Viability of A549, HeLa, Caco-2, U937, Jurkat cells after 48 and 96 h exposure to increasing doses (S1: 2.5 pM, S2: 25 pM, S3: 250 pM, S4: 2500 pM) of SiO_2NPs with a diameter of 60 nm, evaluated with WST-8 assay. Percent viability of nanoparticle-treated cells is expressed relative to non-treated control cells (C). As positive control, cells were incubated with 5% DMSO (showing a viability decrease of ca. 50%). Error bars represent the standard deviation.

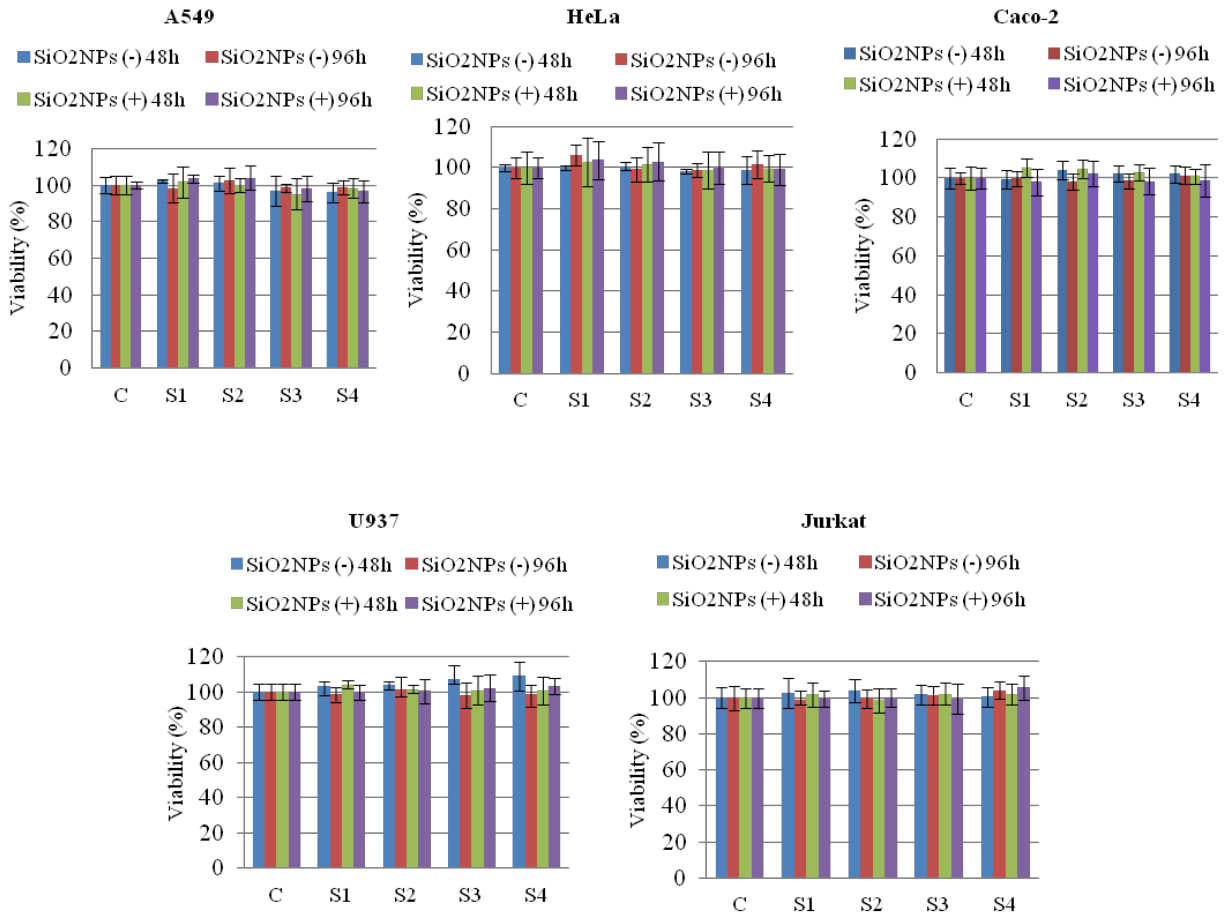
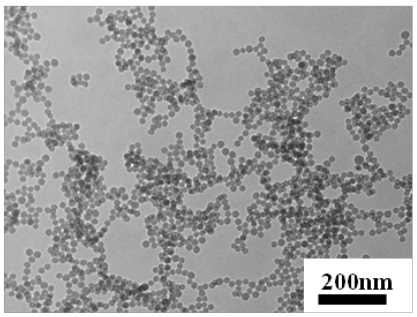
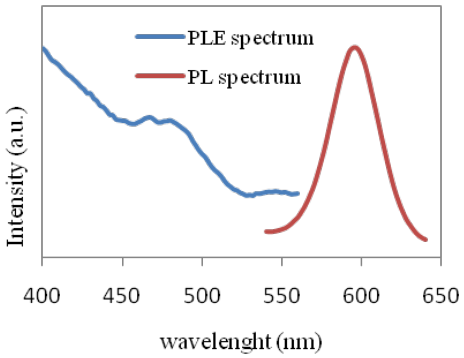


Figure S2. Viability of A549, HeLa, Caco-2, U937, Jurkat cells after 48 and 96 h exposure to increasing doses (S1: 2.5 pM, S2: 25 pM, S3: 250 pM, S4: 2500 pM) of SiO_2NPs with a diameter of 115 nm evaluated with WST-8 assay. Percent viability of nanoparticle-treated cells is expressed relative to non-treated control cells. As positive control, cells were incubated with 5% DMSO (showing a viability decrease of ca. 50%). Error bars represent the standard deviation.

A



B



C

	DLS (nm)	ζ-Potential (mV)
QDs SiO_2NPs 25 nm (-)	25±3	-34 ± 2
QDs SiO_2NPs 25 nm (+)	25±2	+ 33 ±3

Figure S3. Characterization of SiO_2NPs doped with QDs (as a representative example, 25 nm SiO_2NPs are reported). A) TEM image; B) Spectroscopic characterization; C) ζ-potential and Dynamic light scattering measurements of 25 nm SiO_2NPs doped with QDs with negative and positive surface charge.

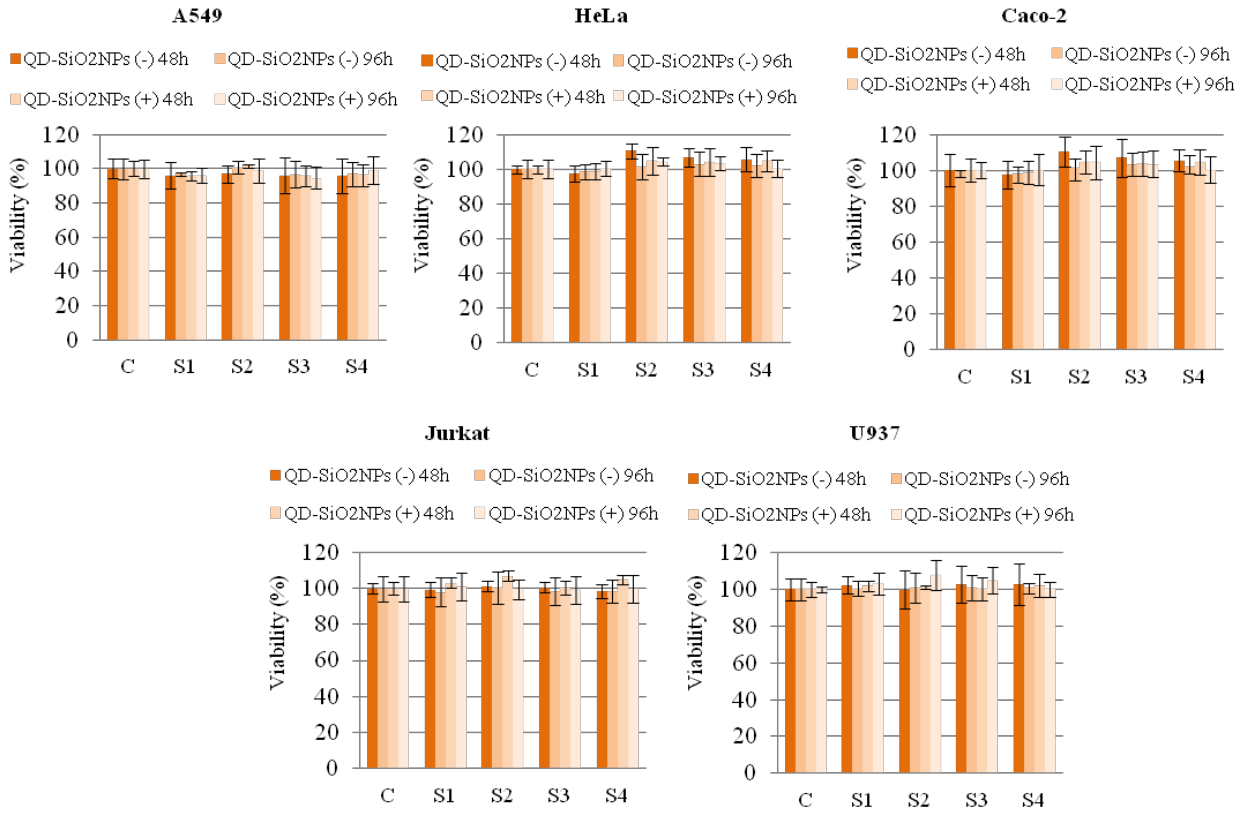


Figure S4. Viability of A549, HeLa, Caco-2, U937, Jurkat cells after 48 and 96 h exposure to increasing doses (S1: 2.5 pM, S2: 25 pM, S3: 250 pM, S4: 2500 pM) of 25 nm SiO_2NPs doped with QDs, evaluated with WST-8 assay. Percent viability of nanoparticle-treated cells is expressed relative to non-treated control cells. As positive control, cells were incubated with 5% DMSO (showing a viability decrease of ca. 50%). Error bars represent the standard deviation.

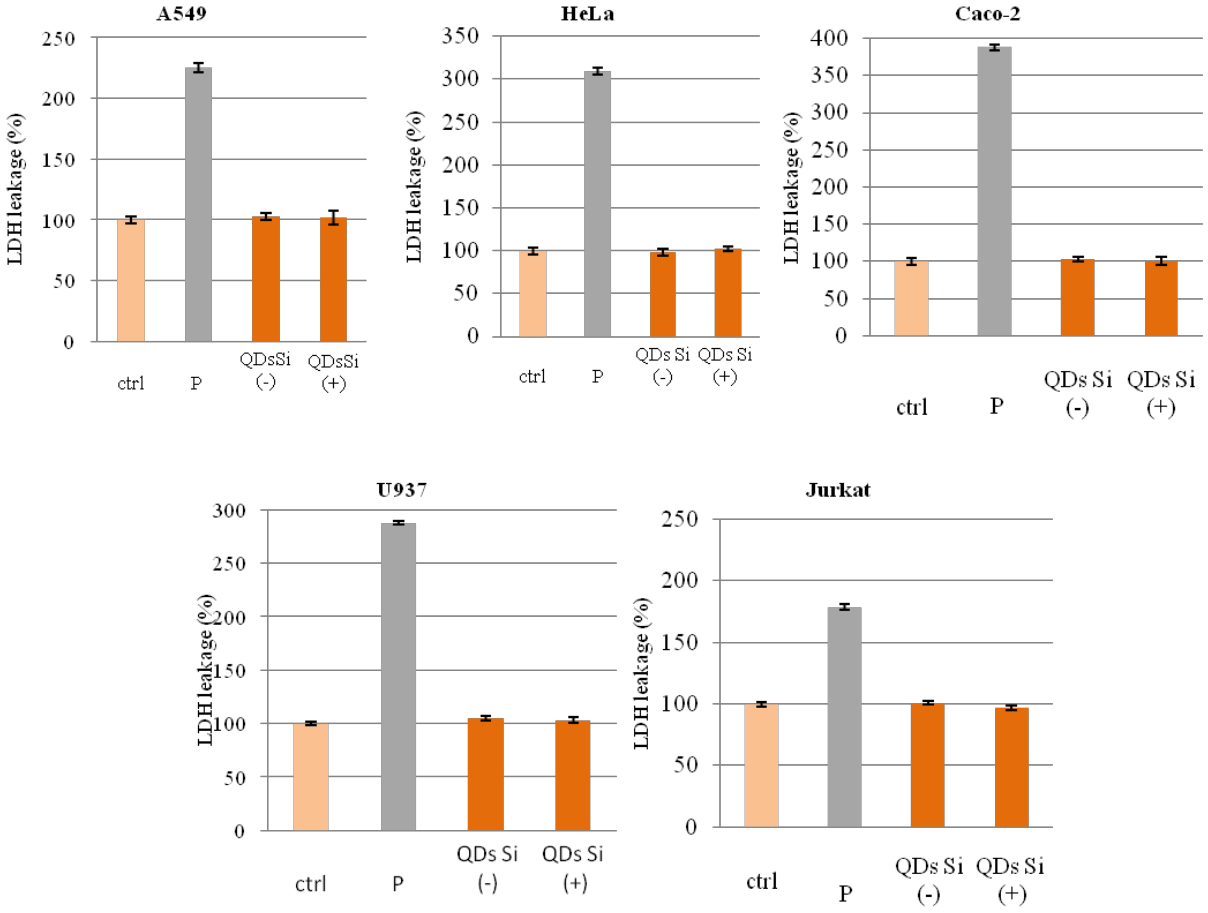


Figure S5. LDH release in the five cell lines after 96 h exposure to 25 nm negatively and positively charged SiO_2NPs doped with QDs, at the highest concentration (2.5 nM). Percent of LDH leakage of nanoparticle-treated cells are expressed relative to non-treated control cells. Positive controls (P) consisted in the treatment of cells with 0.9% Triton X-100.

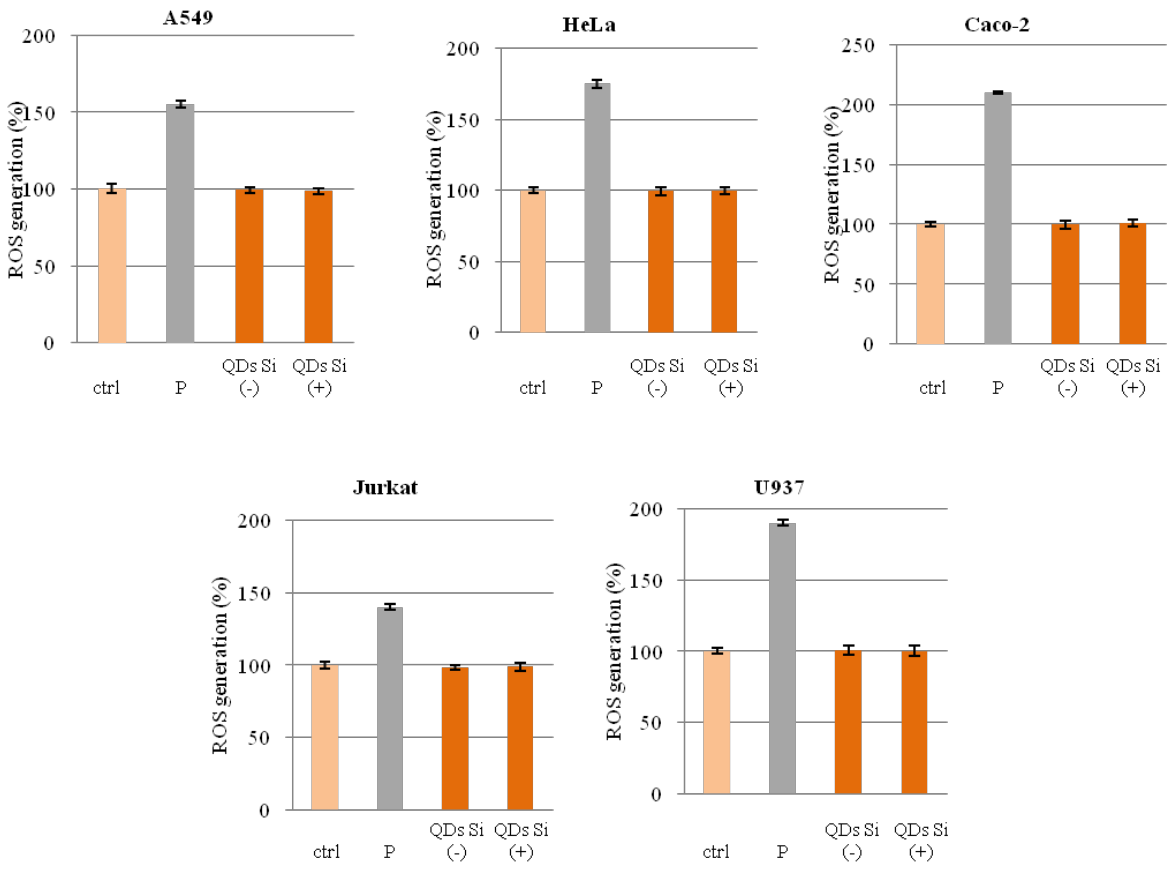


Figure S6. Effects of 25 nm negatively and positively charged SiO_2NPs doped with QDs, on the level of ROS in the five cell lines probed by the DCFH-DA assay. Cells were treated with the highest concentration (2.5 nM) of NPs for 96 h. Percent ROS generation of nanoparticle-treated cells is expressed relative to non-treated control cells. As a positive control, cells were incubated with 500 µM H_2O_2.

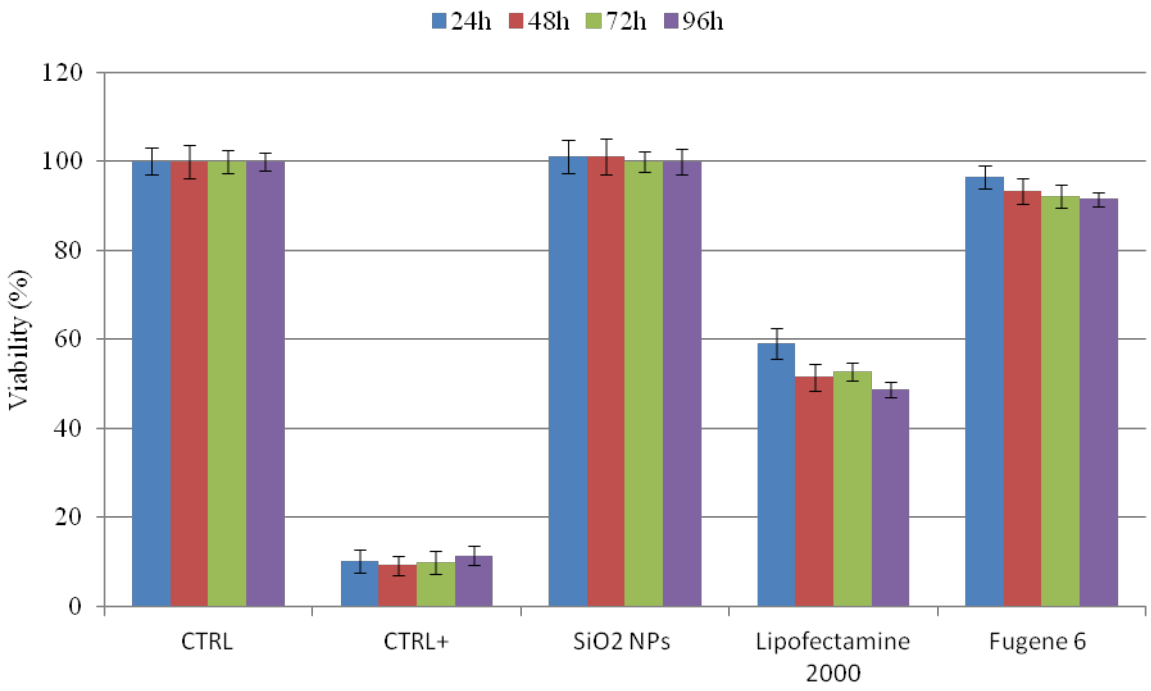


Figure S7. Viability of green fluorescent HeLa cell line 24, 48, 72 and 96 h after the exposure to 2.5 nM SiO_2NPs (25 nm diameter), Lipofectamine 2000 and Fugene 6, evaluated by the WST-8 assay. This test was performed in the same conditions used in the transfection experiments (Fig. 9 in the main text). Viability of treated cells is expressed relative to non-treated control cells (error bars indicate the standard deviation). As positive control (P), cells were incubated with 5% DMSO. As shown, prolonged treatment with SiO_2NPs does not impact the cellular viability, at variance with classical transfection agents (especially in the case of Lipofectamine).