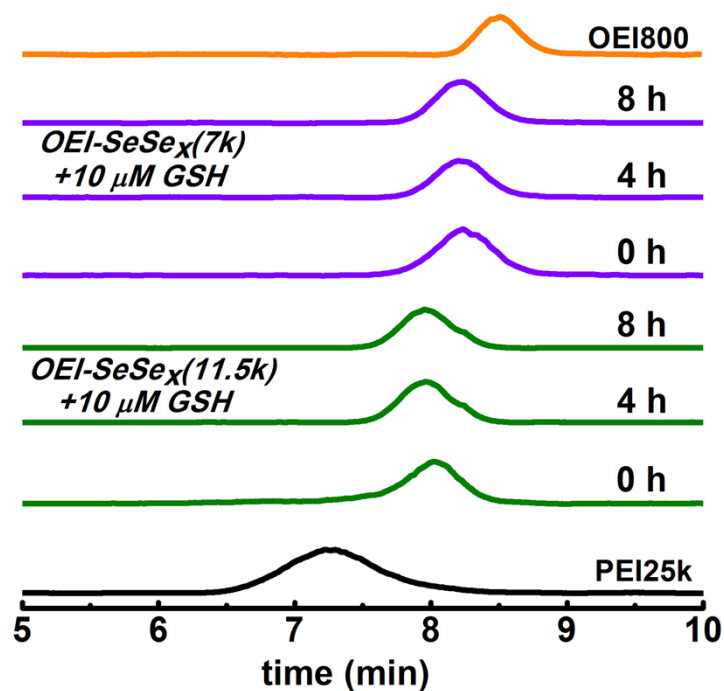


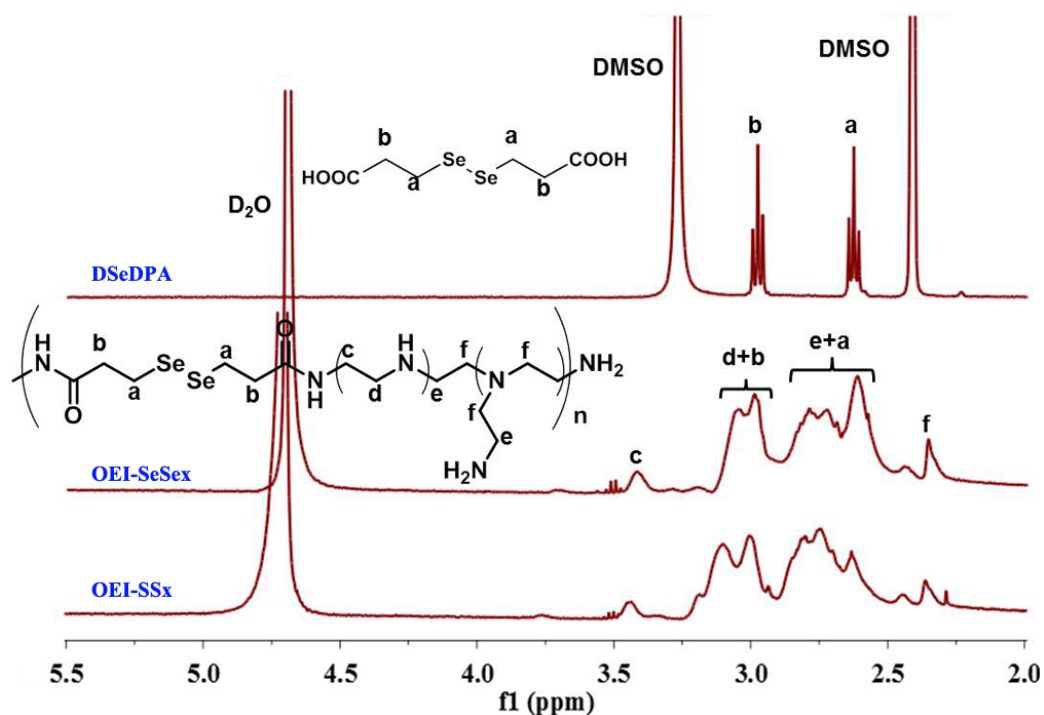
## Supporting Information

### Influence of reduction-sensitive diselenide bonds and disulfide bonds on oligoethylenimine conjugates for gene delivery

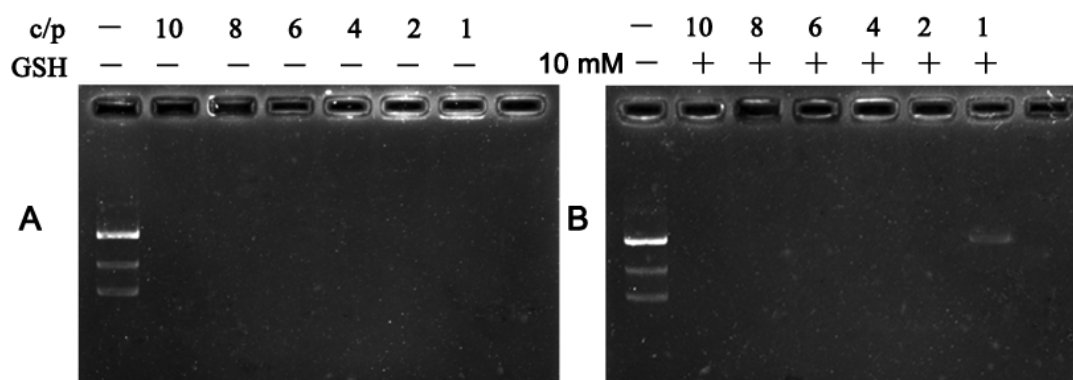
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**Fig. S1** GPC diagrams of OEI-SeSe<sub>x</sub>(11.5k) and OEI-SS<sub>x</sub>(7k) before and after degradation in response to redox stimuli (10 μM GSH) for 4 h or 8 h.



**Fig. S2**  $^1\text{H}$  NMR spectra of DSeDPA, OEI-SeSe<sub>x</sub> and OEI-SS<sub>x</sub>.



**Fig. S3** Gel retardation assay of OEI-SS<sub>x</sub>(17k) complexed with pDNA with cationer/pDNA ratio ranging from 1 to 10, in the absence (A) or presence of 10 mM GSH.

This picture shows only small amount of DNA was dissociated from the OEI-SS<sub>x</sub>(17k) complexes after incubation with 10 mM GSH for 30 minutes. The possible reasons are as follows, the intracellular DNA dissociation is a consequence of multiple factor's synergistic interaction, which can not be efficiently accomplished by GSH only, especially for only 30 minutes treatment.

## Table of Contents:

Diselenide bonds as a new reduction-sensitive linkage is proposed for developing bio-reducible polycation for non-viral gene delivery system. Compared with the golden standard disulfide bonds, diselenide bonds can also timely release DNA inside the tumor cells, while remain constant outside the cells, implying its higher stability during the circulation process and great potential for *in vivo* gene delivery system's design.

