

## Supporting information

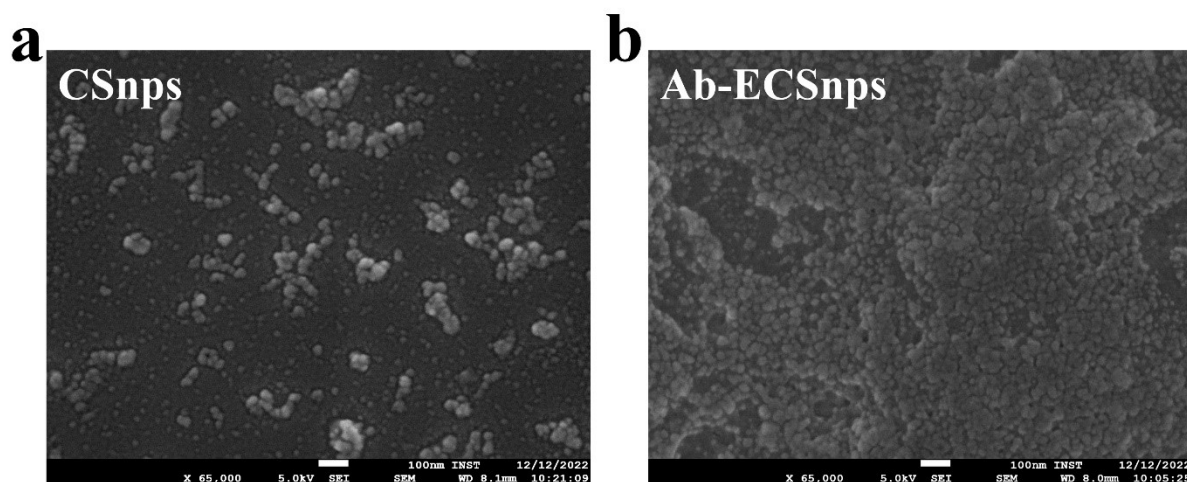
### Chitosan-Based Nanoparticles for Targeted Delivery of 17 $\beta$ -Estradiol to Enhance SIRT1-Mediated Autophagy and Mitigate Rotenone-Induced Parkinson's Disease

*Liku Biswal<sup>a</sup>, Mohd Ayoub<sup>a</sup>, Devangi Ghosh<sup>a</sup>, Vikas Kumar Sahu<sup>a</sup>, Subhasree Roy Choudhury<sup>a\*</sup>, Surajit Karmakar<sup>a\*</sup>*

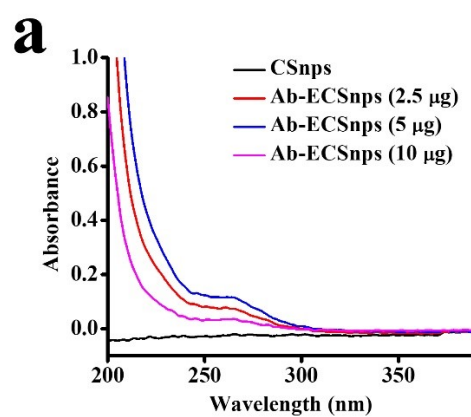
<sup>a</sup> Institute of Nano Science and Technology, Knowledge City, Sector 81, Mohali, 140306, Punjab, India

\*Corresponding author:

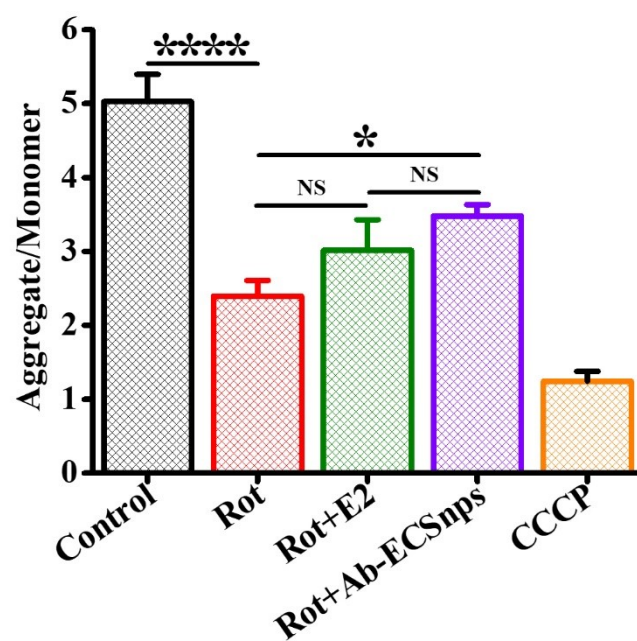
Surajit Karmakar, Email ID: [surajit@inst.ac.in](mailto:surajit@inst.ac.in), Tel: +91-172 2210075



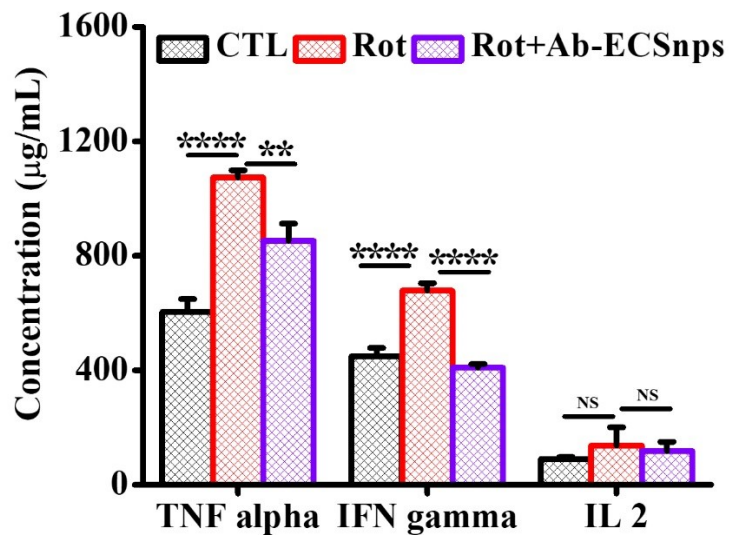
**Figure S1.** FESEM images of CSnps and Ab-ECSnps showing spherical morphology.



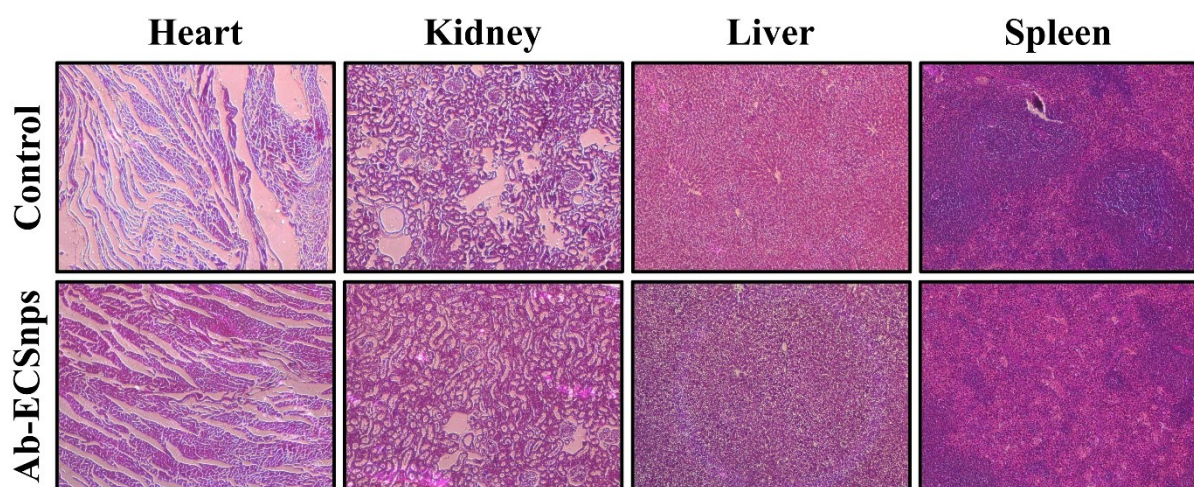
**Figure S2.** The absorbance of CSnps and Ab-CSnps (conjugated with 2.5, 5, and 10 µg D3 antibody) was recorded in a UV-visible spectrophotometer.



**Figure S3.** Quantitative plot of aggregate/monomer ratio from flow cytometric analysis of JC-1 assay.



**Figure S4.** Concentration of TNF alpha, IFN gamma, and IL-2 in the striatum of the brain was analysed through ELISA.



**Figure S5.** H&E staining of vital organs (heart, kidney, lungs, liver) after 30 days of Ab-ECSnps treatment.

**Table S1.** List of primers

Serial Number	Name of the gene	Sequences of primers
1.	Beclin1	Forward: GGTTGCGGTTTTCTGGGAC

		Reverse: TTGATGGAATAGGAGCCGCC
2.	Vps34	Forward: GCATCACGACGTATTGAAATGA
		Reverse: CCGAAACAATCCCAACACCA