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DEVELOPMENT OF GSH-RESPONSIVE NANOPROBE FOR FLUORESCENT BIOIMAGING IN LIVING CELLS

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AIBN-UQ

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Outline

- Background
- Aim of this study
- Methods
- Results
- Conclusion

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Background:

- Glutathione (GSH) is consisting of Glutamic acid, Cystine and Glycine(1).
- GSH concentrations in most cell cytosol have been found to be about 1-2 mM (2).
- Hepatocytes and certain cancer cells reaching up to 10 mM (3).
- GSH concentration in blood is about 0.8-1 mM, which is approximately 4-times higher than that of Cys (4).
- GSH levels are closely related to a variety of disorders, including cancer, Parkinson's, and Alzheimer's (5)

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Aim of this study:

- Design nanoprobe targeting GSH
- Nanoprobe: stable, selective and reliable.

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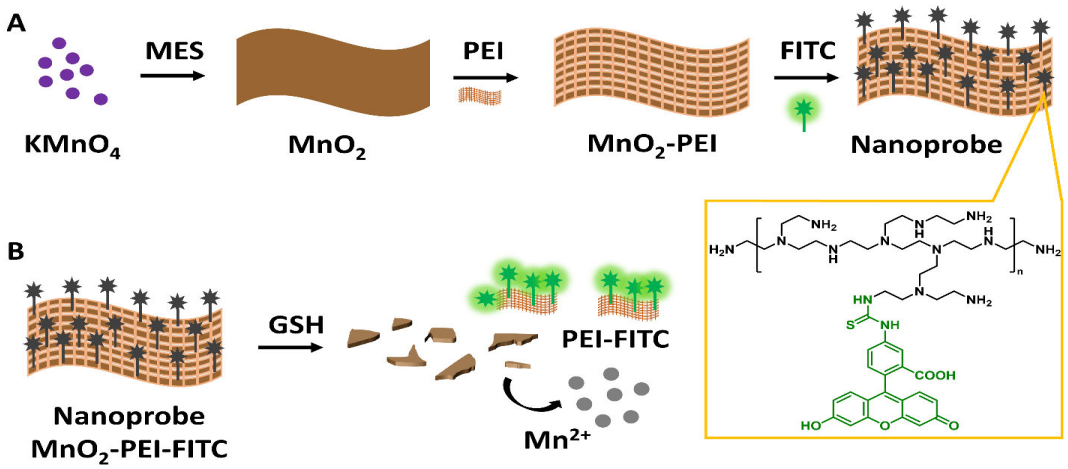
Methods & Final structure of probe:



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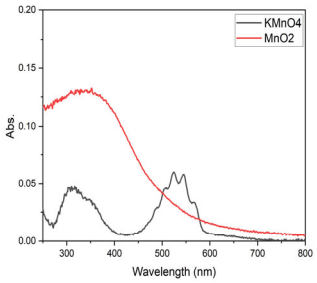
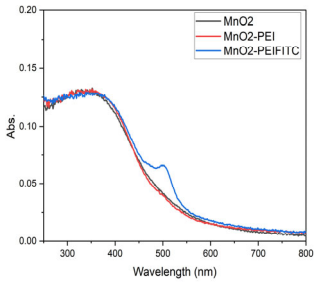
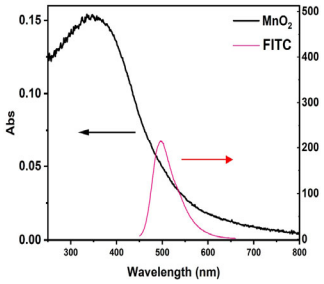
Results: UV-vis







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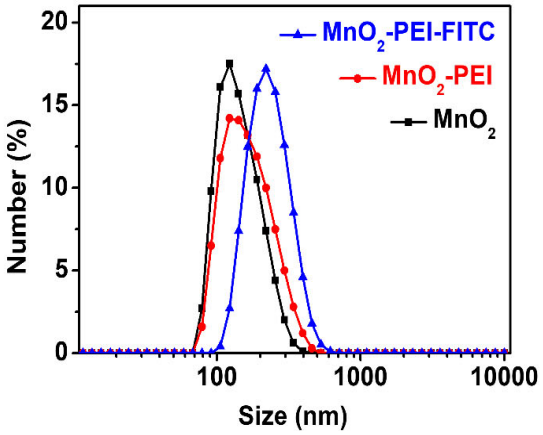
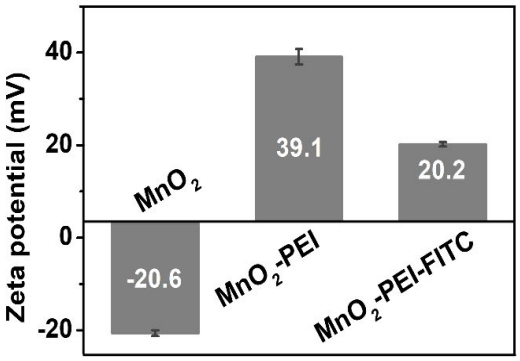
DLS: size & charge





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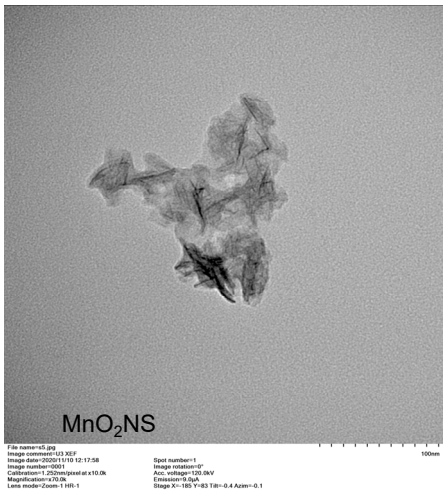
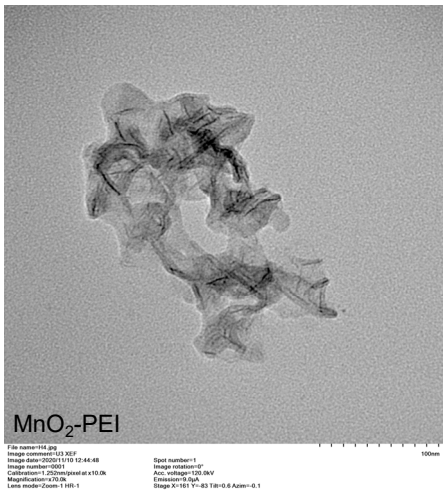
TEM:





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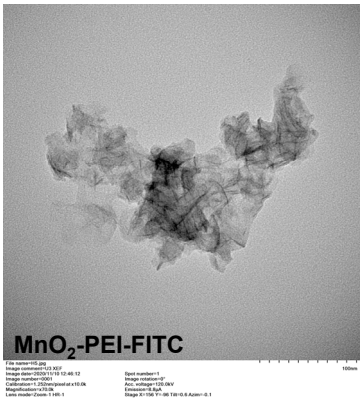

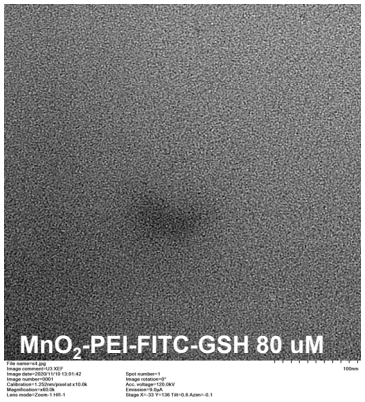

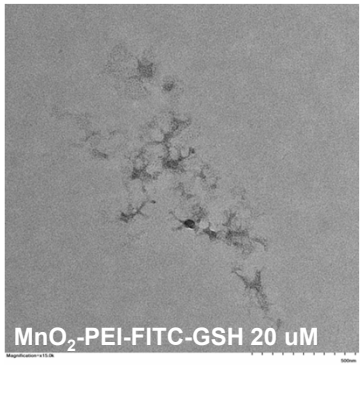

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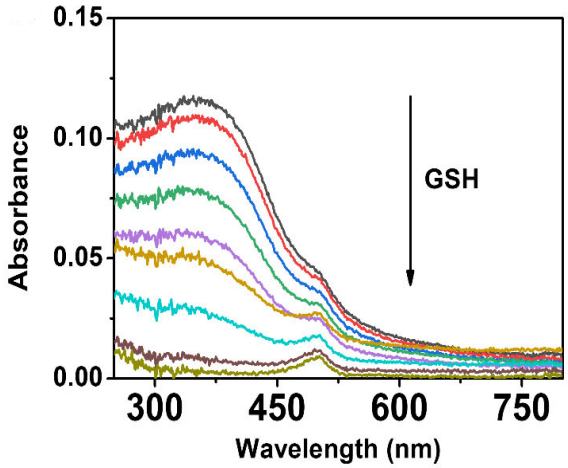
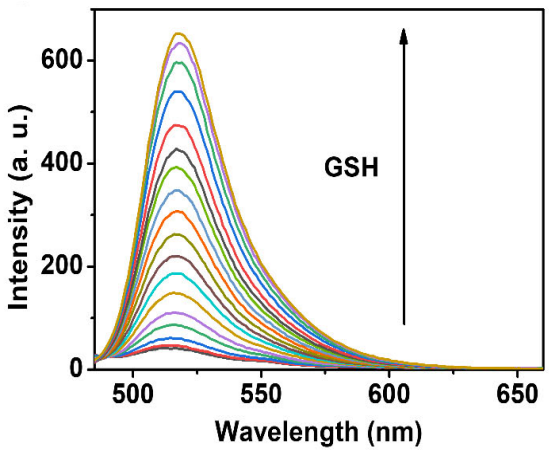
UV-vis and fluorescence responses of MnO2-PEI-FITC nanoprobe:





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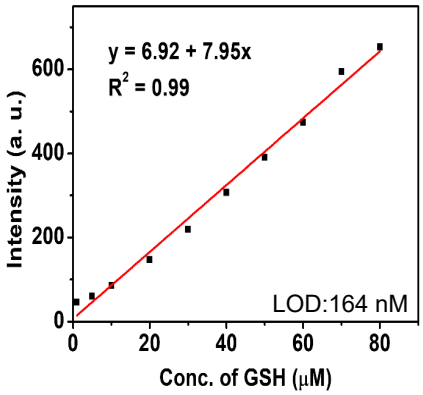
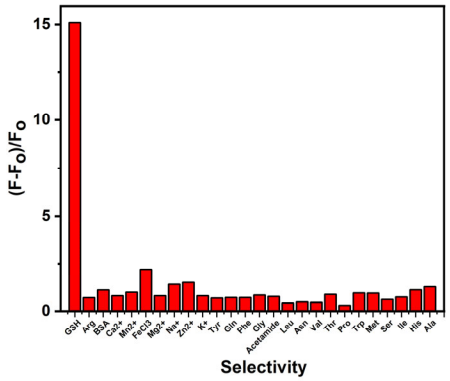
Calibration curve of MnO2-PEI-FITC nanoprobe for GSH detection & selectivity:





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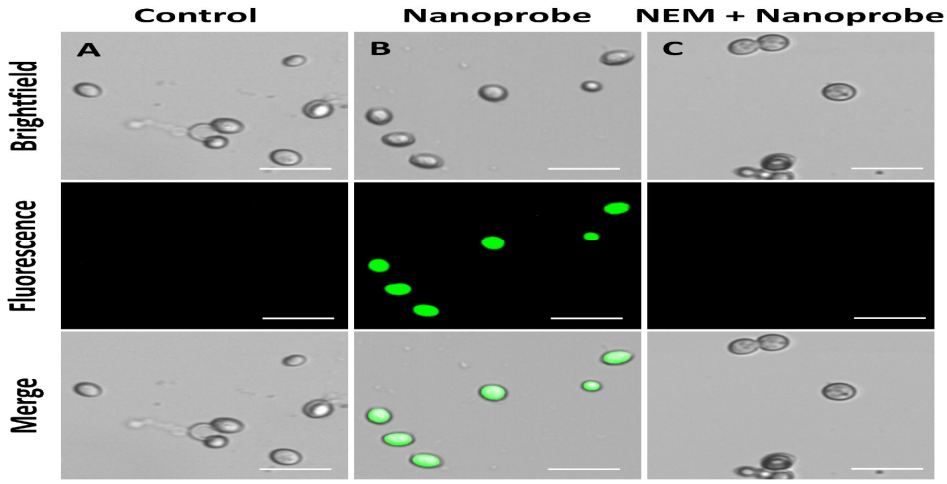
Yeast:



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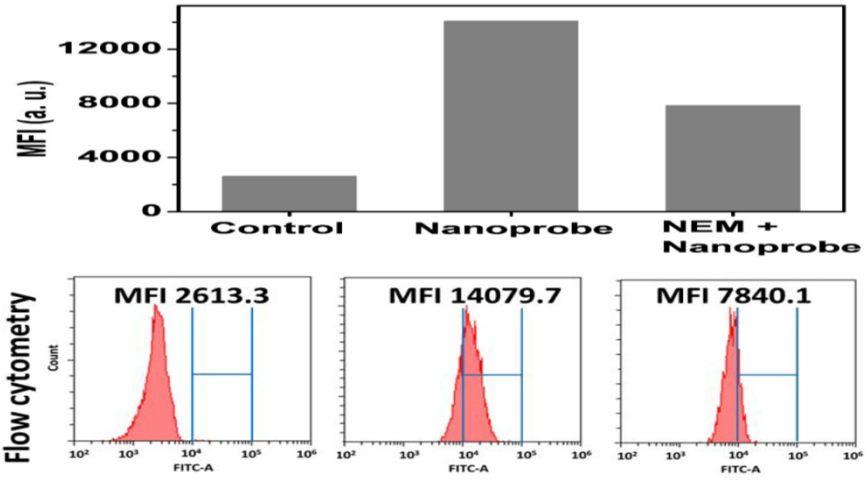
Yeast flow cytometry: Mean fluorescence intensity (MFI)



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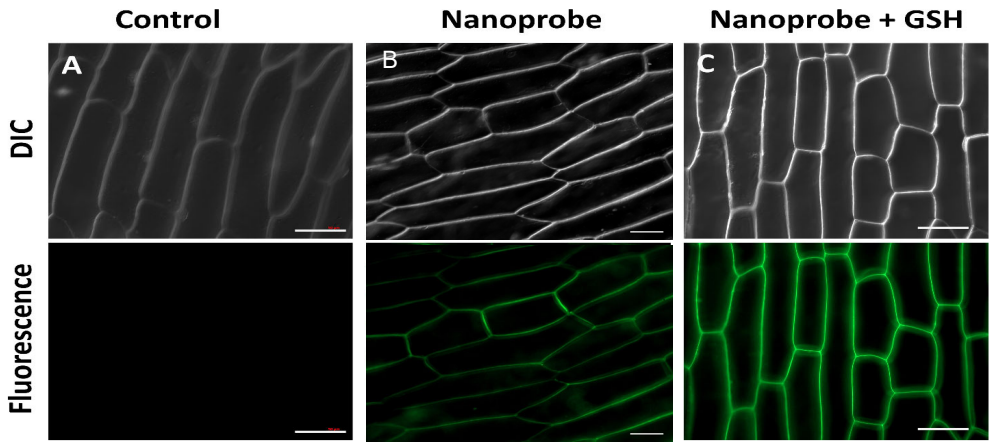
Onion:



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Conclusion:

- The MnO_2-PEI-FITC probe shows impressive result for detection of GSH.
- The probe gives good LOD, sensitivity and selectivity.
- The probe works well on Yeast cells and onion tissue.
- The probe is safe to used as the MTT assay shows cells viability more than 80% for 24 hrs incubation with 100 ug/mL probe.

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Thank you

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Reference:

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