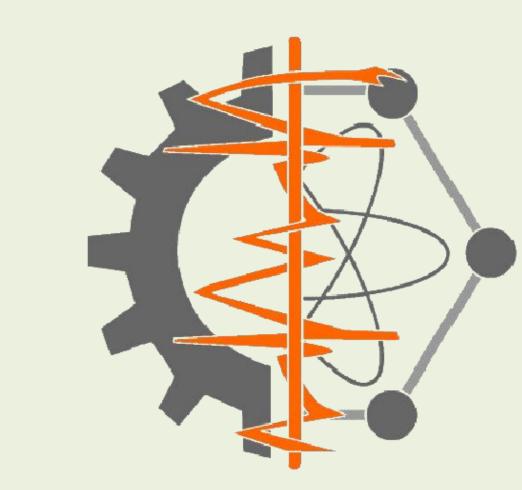


Carbon Nanotube Biopolymer based Biosensor for the Electrochemical Detection of Neurotransmitters

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25 µM norCLZ

- 25 µM CLZ

0.2 0.3 0.4 0.5 0.6 0.7

potential vs. Ag/AgCl (V)

Nanobioelectronics Laboratory (NBEL)

Introduction

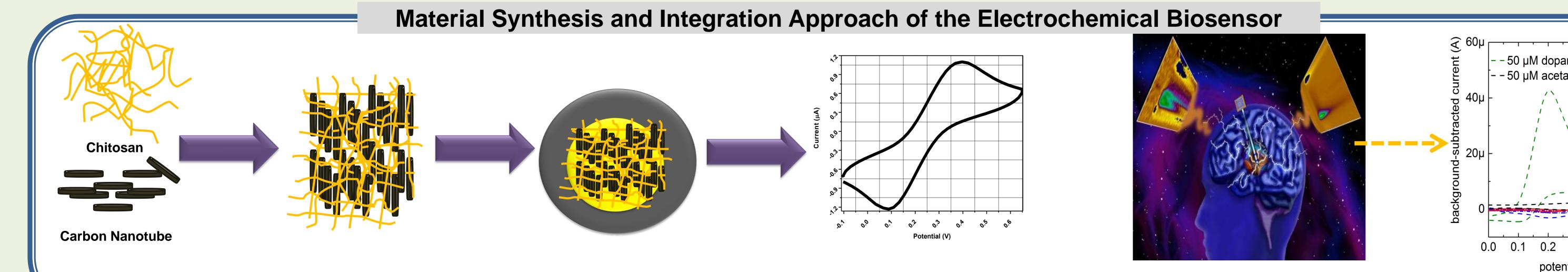
Motivation

 \checkmark Neurotransmitters (NTs), are the biochemical messengers that transfer biological signal from the brain to the whole body and govern their metabolic and physiological functions. Deficiency of neurotransmitters can cause severe brain disorder, such as Schizophrenia and Parkinson's disease with symptoms of coma, depression and sleepiness.

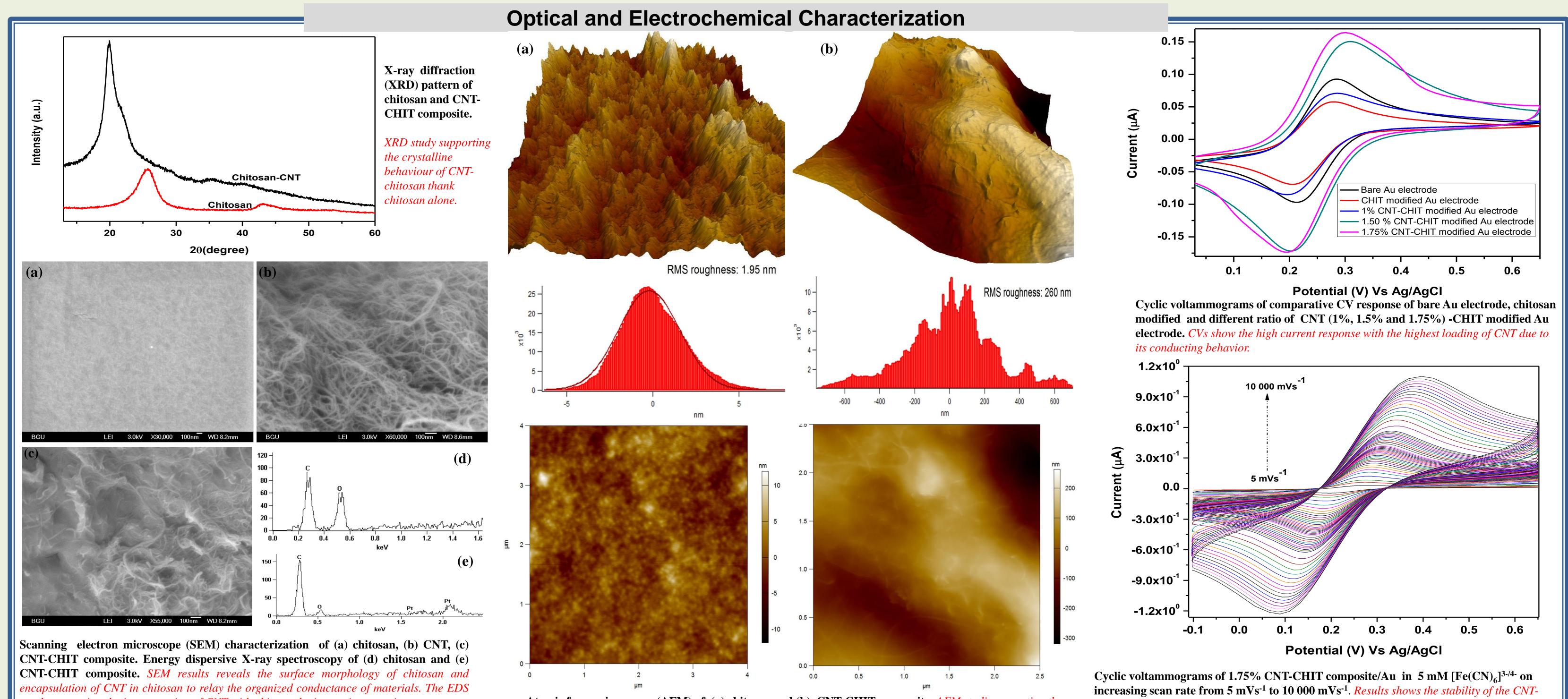
Challenge Accurate detection of NTs is by prevented co-exiting interfering species (e.g. uric acid).

Our Research Aim

Development carbon nanotubes-Of а its integration biopolymer and in microfabricated devices for the selective and sensitive detection of redox-active NTs.



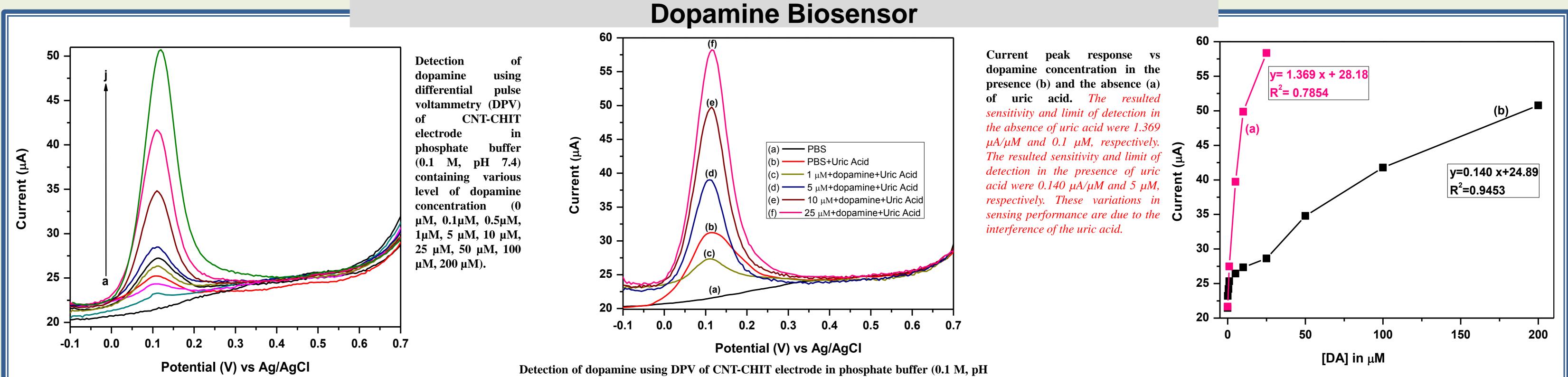
Scheme for the fabrication of electrochemical sensor approach based on carbon nanotube-chitosan (CNT-CHIT) composites for the detection of neurotransmitters.



result supporting the incorporation of CNT with chitosan by increasing counting percentages of element in CNT-CHIT composite than chitosan alone.

Atomic force microscopy (AFM) of (a) chitosan and (b) CNT-CHIT composite. *AFM studies reporting the* surface information, roughness and size distribution of the materials.

chitosan composite materials over the Au electrode. CNT-CHIT composite materials showed the promising electron transfer rate and diffusion coefficient.



7.4) containing various level of dopamine (c to f) the presence of respecting interference uric acid.

Conclusions and future work

- \succ Carbon nanotube (optimized %)-chitosan composites is a promising electrochemical interface for the neurotransmitter detection have 0.16 µA current with the electron transfer rate of 1.339 cm s⁻¹ and diffusion co-efficient of 1.18 x 10⁻¹⁴ cm²s⁻¹.
- Surface characterization validating the controlled distribution and encapsulation of optimized CNT ratio in chitosan matrix and enhancing the roughness of the CNT-CHIT composite and differentiating the potential of interfering species.
- > The result exploring the understanding of CNT-CHIT interface for its better utilization in electrochemical micro-systems for the molecular detection different analytes.
- Future work involves validating the developed NTs sensor in *in vitro* and *in vivo* settings with living cells and brain tissue.

References

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