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## Introduction

- Risperidone is an atypical antipsychotic that is used in the management schizophrenia and related disorders as it has antagonistic effect on the serotonin-5HT<sub>2</sub> and dopamine-D<sub>2</sub> receptors.
- Risperidone is practically insoluble in water and falls under class II according to the Biopharmaceutical Classification System (BCS).
- Nanocrystals (NCs) are an attractive alternative to overcome the poor solubility of hydrophobic drugs which in turn enhances the bioavailability by achieving desired concentration of drug in systemic circulation for desired pharmacological response.

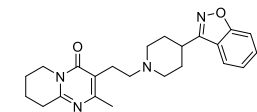


Figure 1: Structure of risperidone used in the management of Schizophrenia

## Methodology

### Nanocrystals preparation

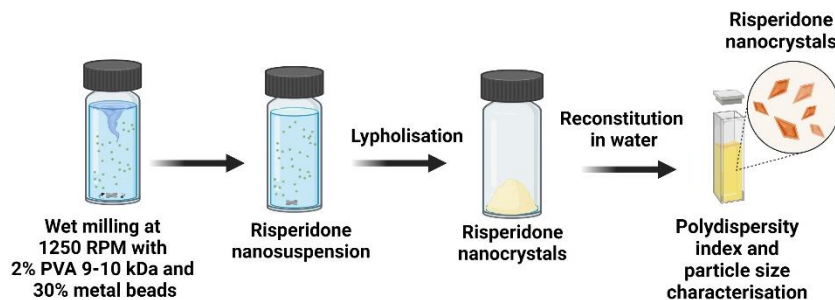


Figure 2: Schematic illustrating the preparation of risperidone nanocrystals prepared *via* wet micro-milling.

### Release Study

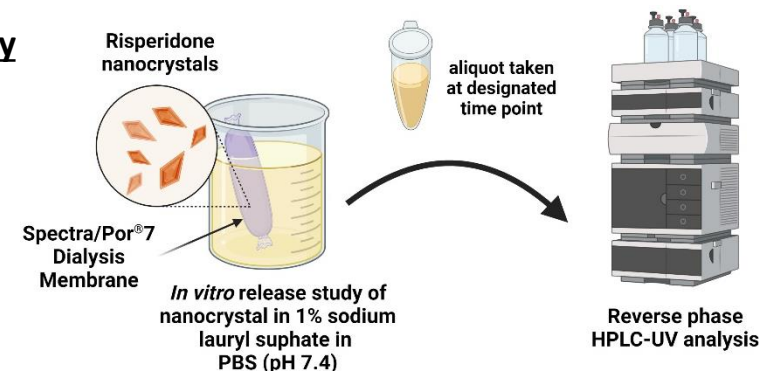


Figure 3: Schematic illustrating *in vitro* release study of risperidone nanocrystals

## Results and Discussion

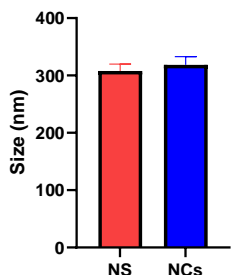


Figure 4: NCs' particle size before and after lyophilisation (mean  $\pm$  SD, N=3). NS: Nanosuspension after milling. NCs: nanocrystals after lyophilisation.

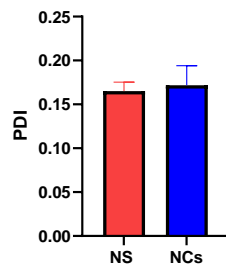


Figure 5: NCs' PDI before and after lyophilisation (mean  $\pm$  SD, N=3). NS: Nanosuspension after milling. NCs: nanocrystals after lyophilisation.

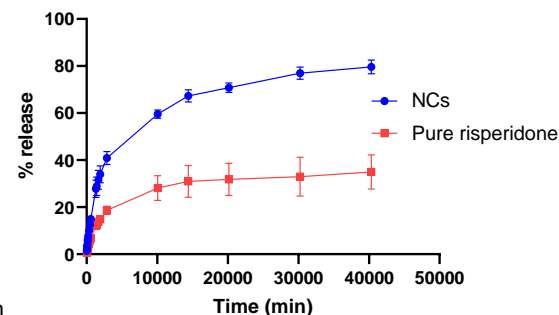


Figure 6: The release profile of NCs vs. pure risperidone (mean  $\pm$  SD, N=3).

- Preparation of drug nanocrystals has shown many successful results in improving the dissolution rate of several drugs.
- Drug nanocrystals have smaller particle size, larger specific surface area and higher overall solute transfer coefficient than their micron-sized counterparts.
- Overall, all these features exhibited by nanocrystals improve the dissolution rates according to the Noyes-Whiney equation; this in turn enhances bioavailability.

## Conclusion

The preparation of risperidone NCs showed an enhancement in the dissolution profile of the drug which may lead to enhancement in the overall bioavailability of risperidone.

## References

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