

# Zinc-oxide Nanoparticles Decrease *Klebsiella pneumoniae* Biofilm Formation

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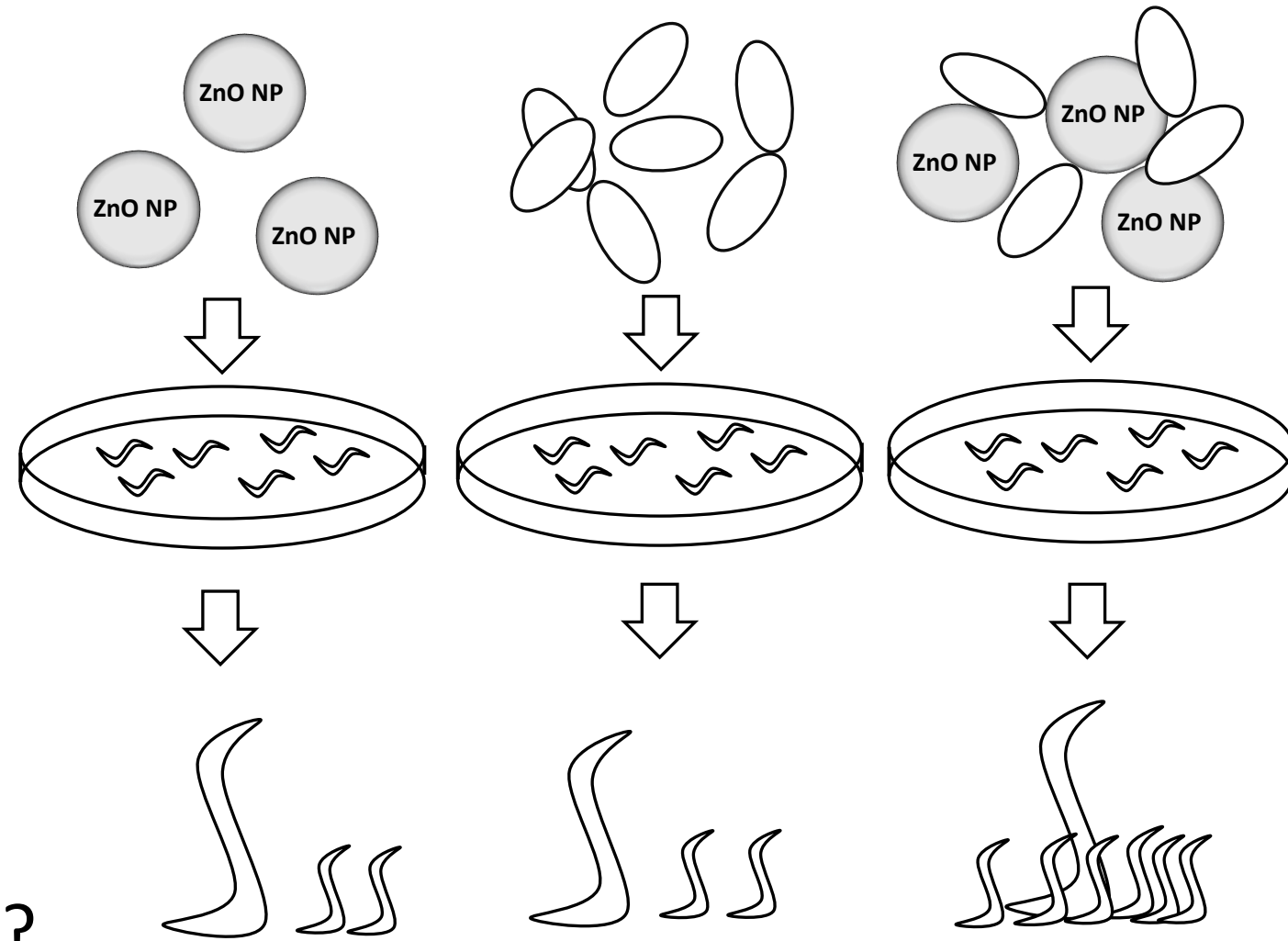
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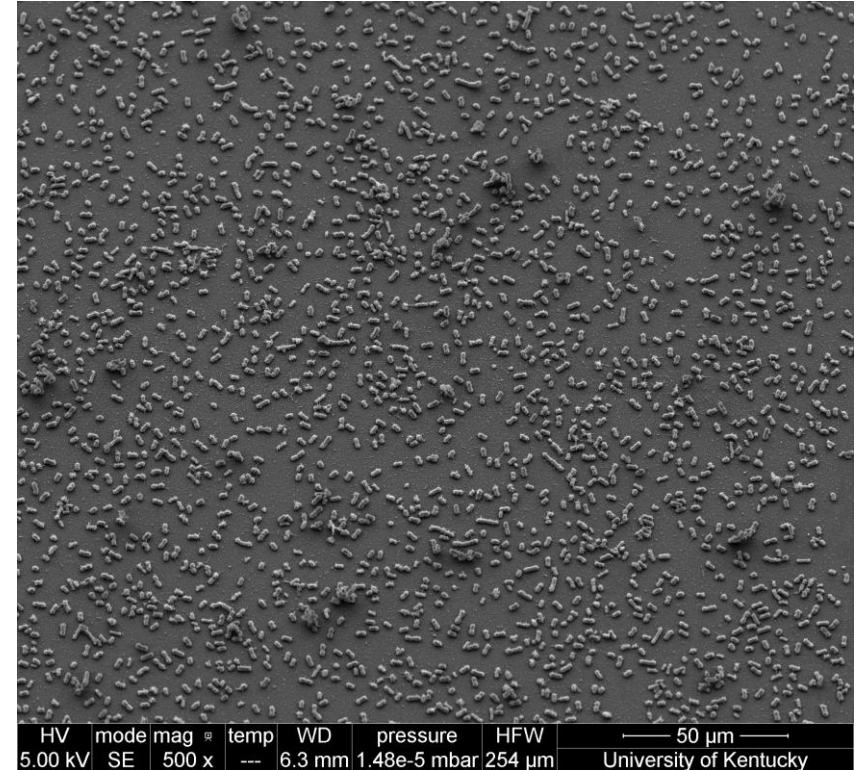
# Introduction:

- *Klebsiella pneumoniae* decreases reproduction in model soil nematode *Caenorhabditis elegans*
- ZnO NP reduces *K. pneumoniae* toxicity
- Is the reversal due to hindering biofilm formation?



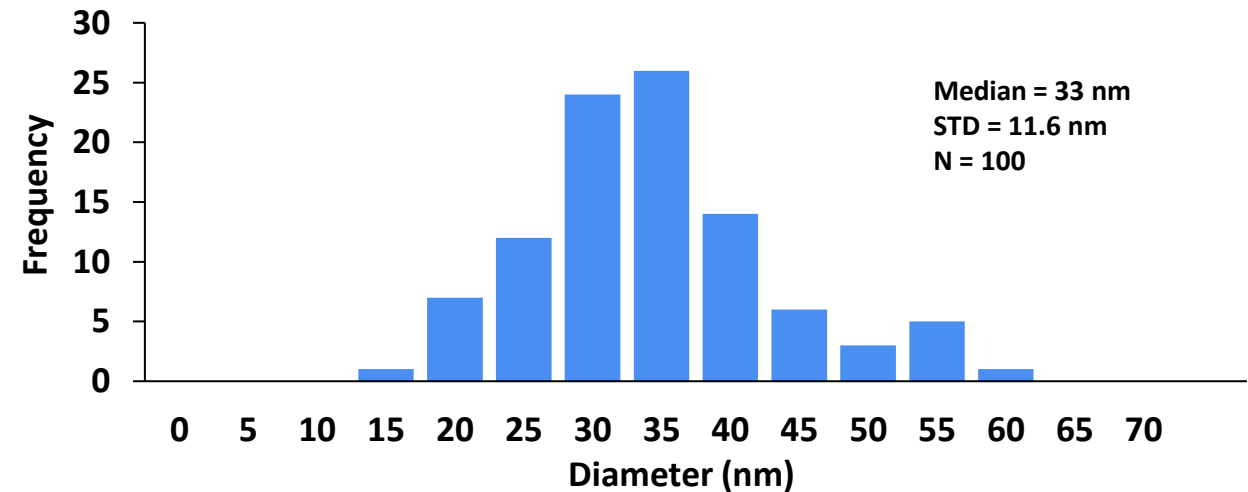
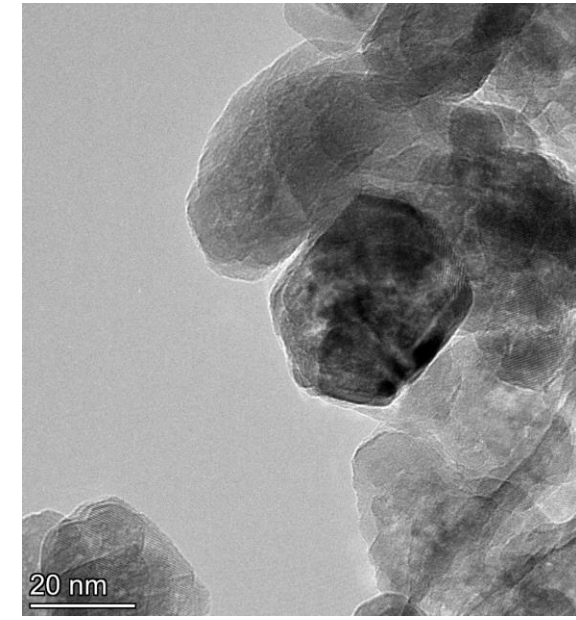
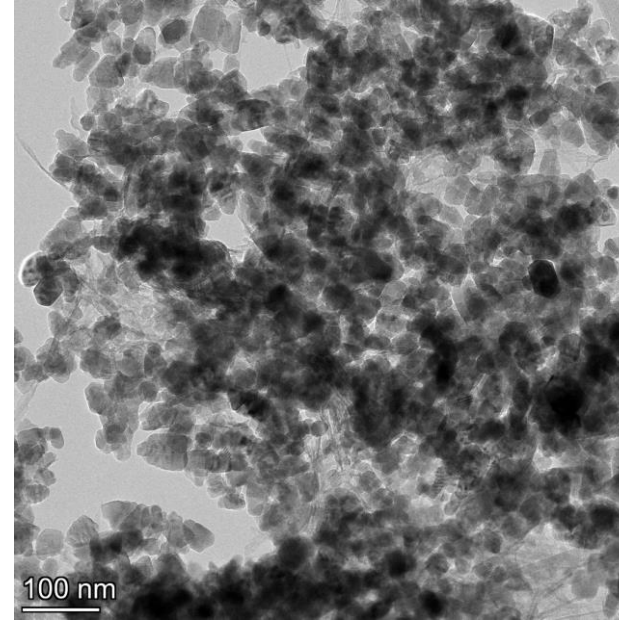
## EM Methods Used:

- ZnO NP:
  - Thermo Scientific Talos F200X TEM
- *K. pneumoniae* biofilms:
  - Grown on glass coverslips overnight
  - Critical point dryer: Leica CPD300
  - Sputter coater/glow discharge: Leica ACE600
  - FEI Quanta 250



# TEM images of ZnO NP:

- 6  $\mu\text{L}$  of NP (50 mg/L) were plated onto lacey carbon on copper grids
- Elemental mapping showed NP were Zn and O
- Diameter determined with imageJ





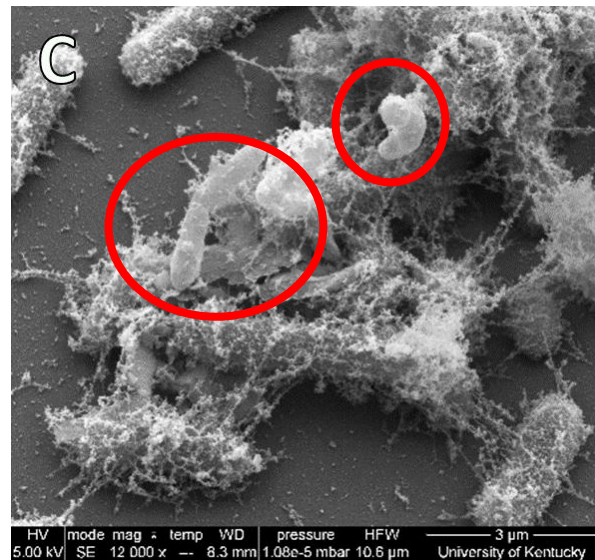
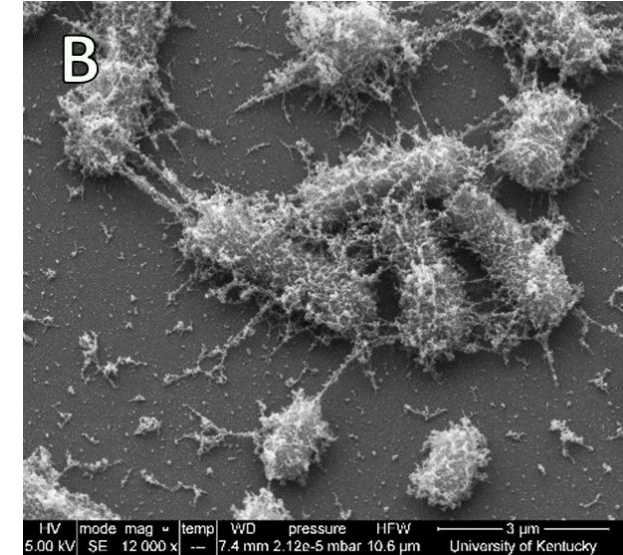
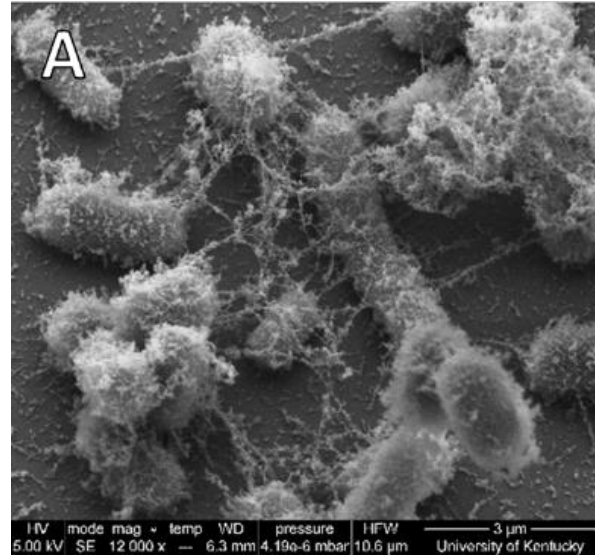
# SEM images of *K. pneumoniae* biofilm:

- Initial biofilm formation in:

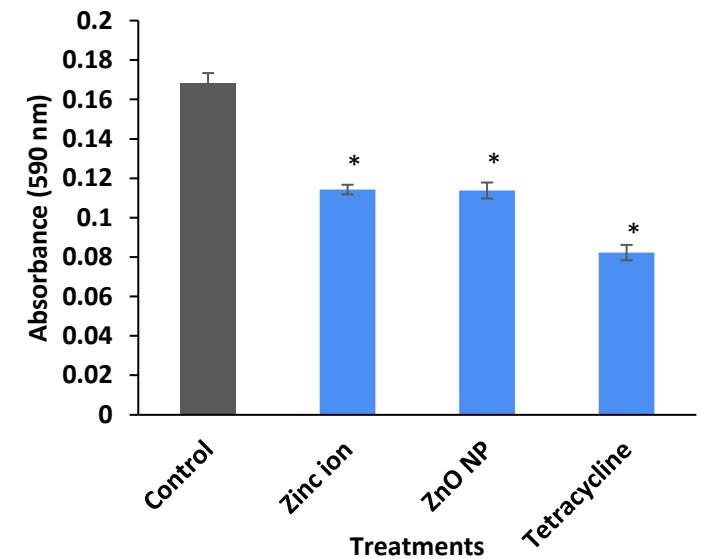
A. Untreated

B. Zinc-oxide Nanoparticles

C. Zinc ions



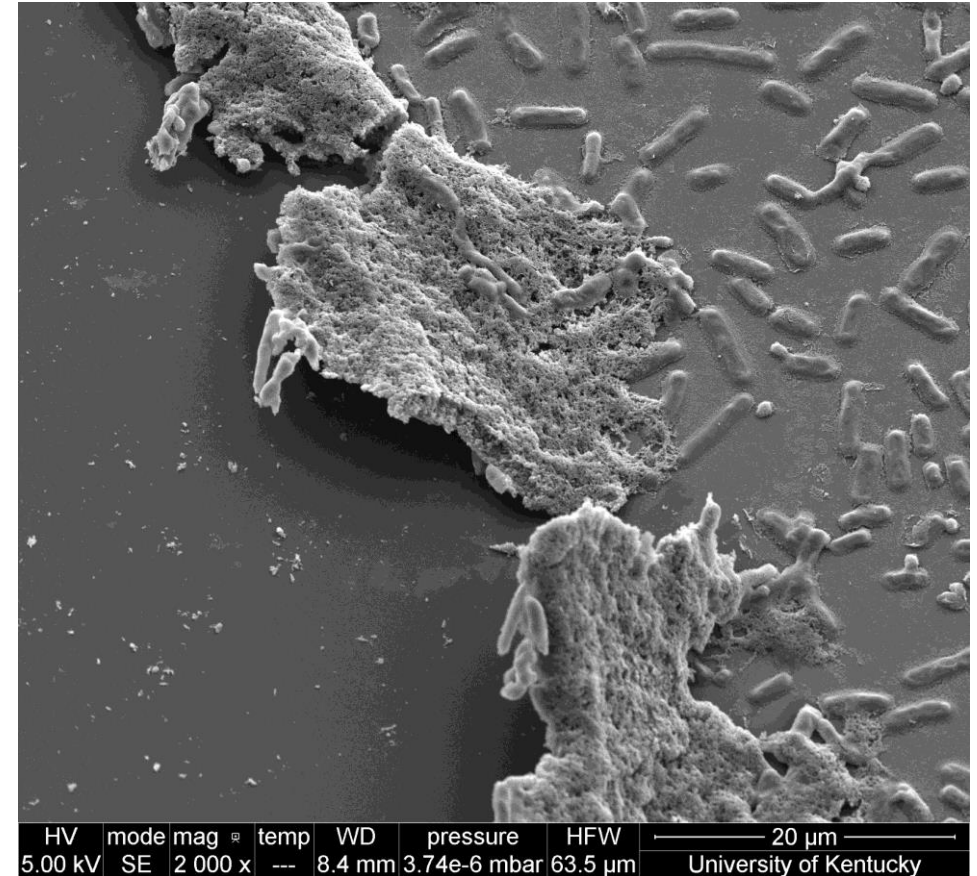
- Morphological effects (red circles)



## Issues encountered:

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- Uneven growth on coverslips
- Minimizing damage to biofilm during staining
- Difficulty sectioning nematodes



# Acknowledgements

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