

# The RNA-binding protein PNPase is a novel regulator of biofilm formation and virulence in *Listeria monocytogenes*

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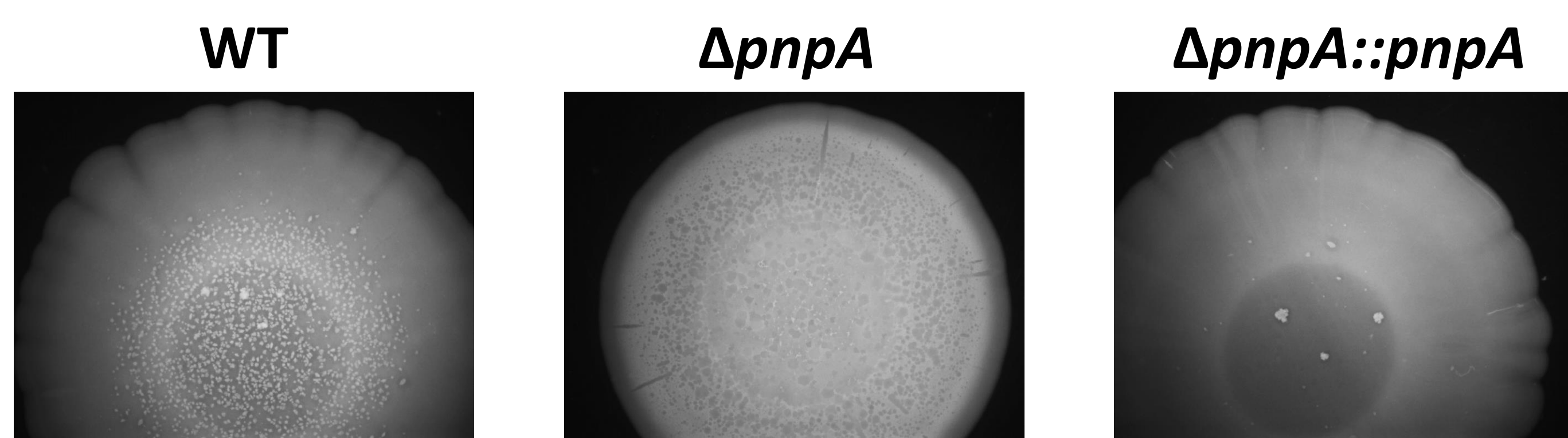
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## Background

- Polynucleotide phosphorylase (**PNPase**) is an important 3'-5' exoribonuclease involved in **RNA processing** and **degradation**
- Listeria monocytogenes* is a Gram positive **foodborne human pathogen**
- Biofilms** are aggregates of adherent microbial cells that are enclosed in a **matrix** of extracellular polymeric substances (**EPS**)
- During infection, **biofilms** allow bacteria to be **more resilient** to both the immune system and antibiotics
- Finding **novel biofilm and virulence regulators** may contribute to develop new strategies to fight infections

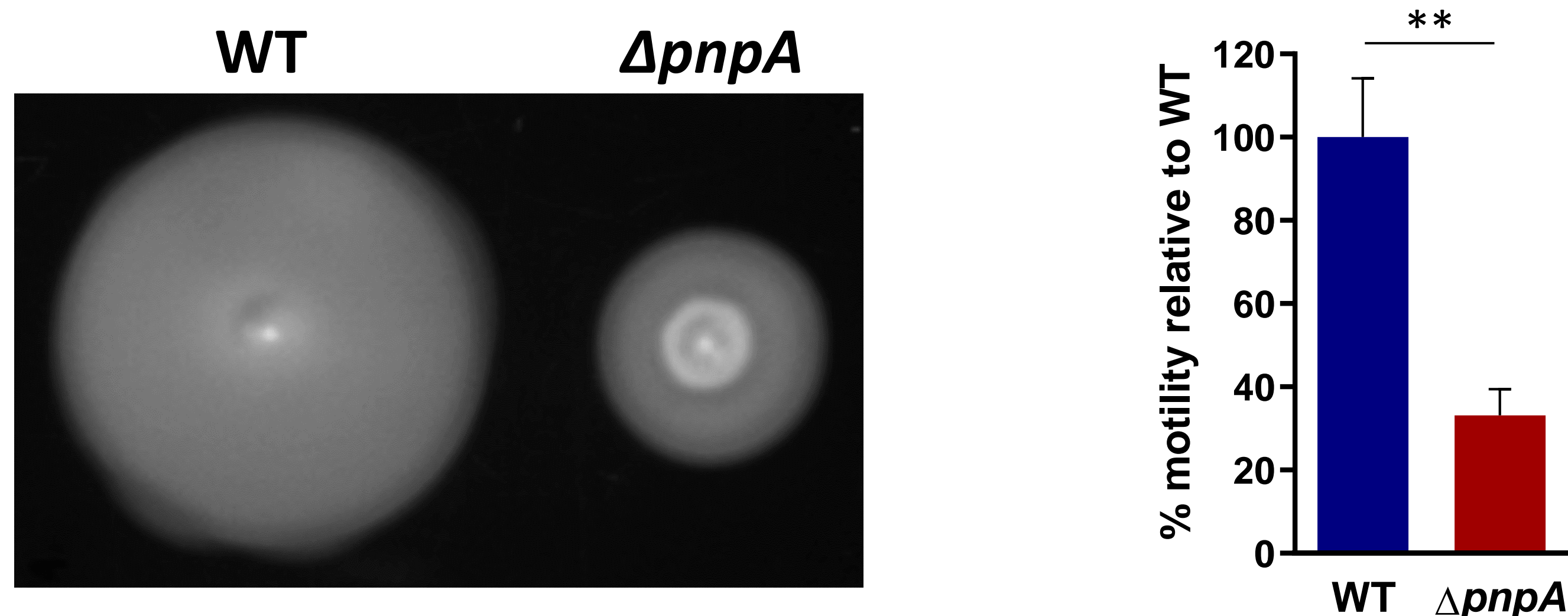
## Results

### 1. Macrocolonies



*ΔpnpA* has a regular rim and a different morphotype

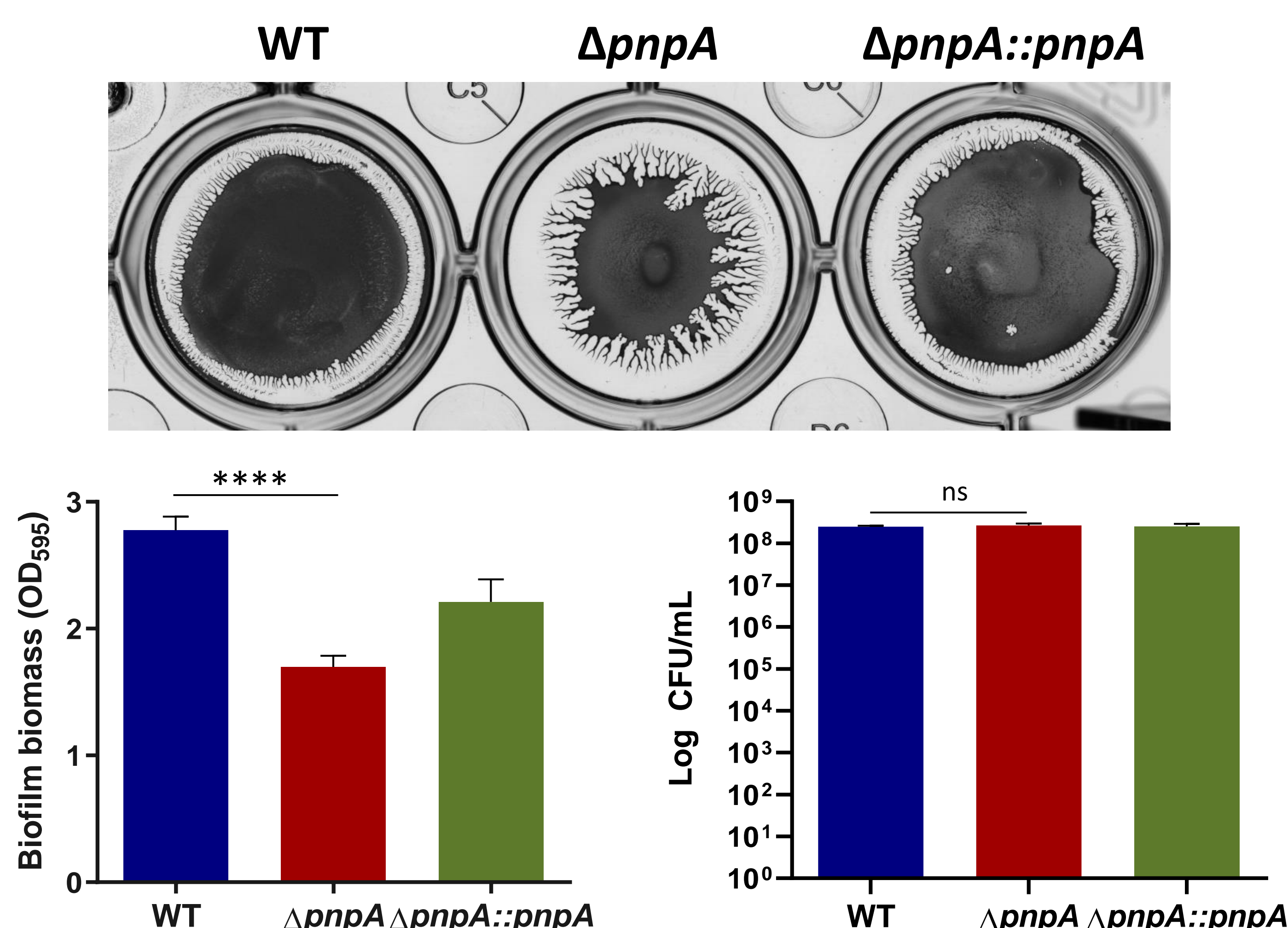
### 2. Motility



Swimming is impaired in PNPase mutant

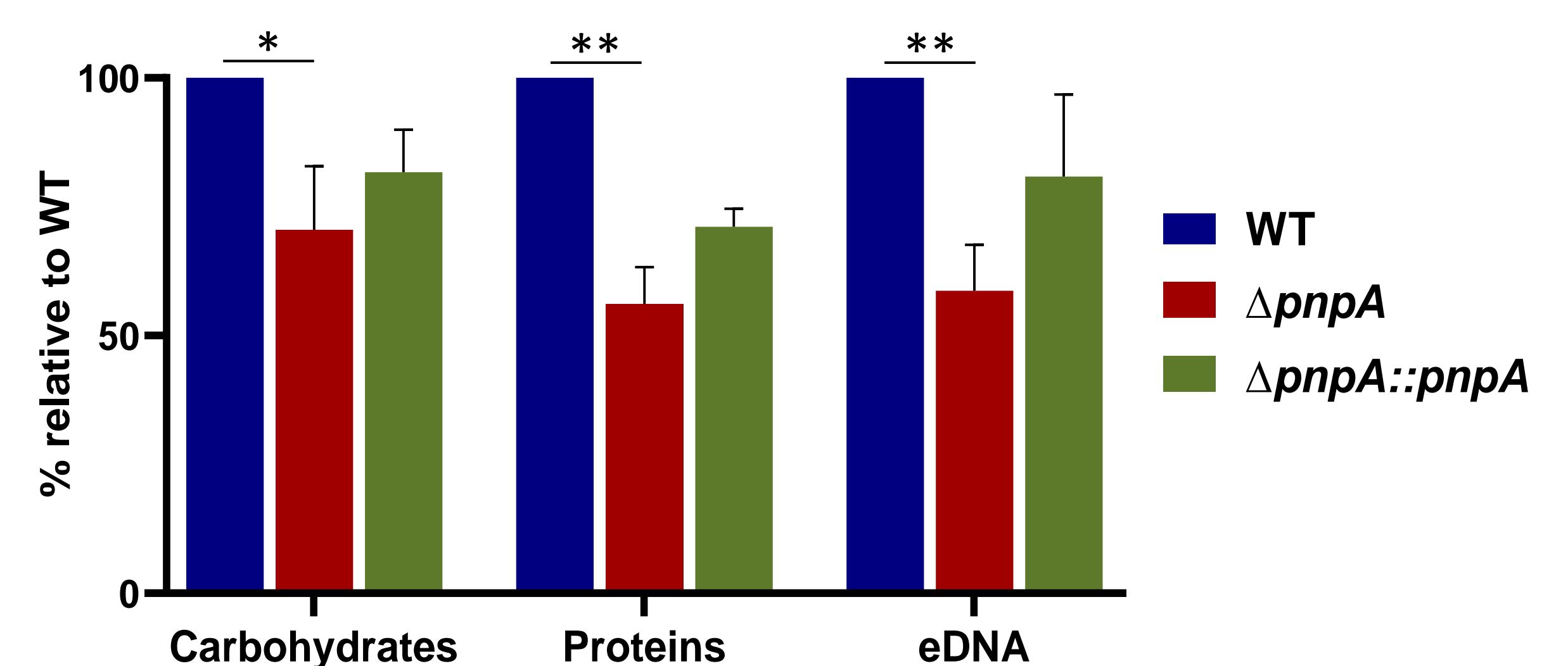
PNPase null mutant shows phenotypes commonly associated with defective biofilms

### 3. Biofilm formation



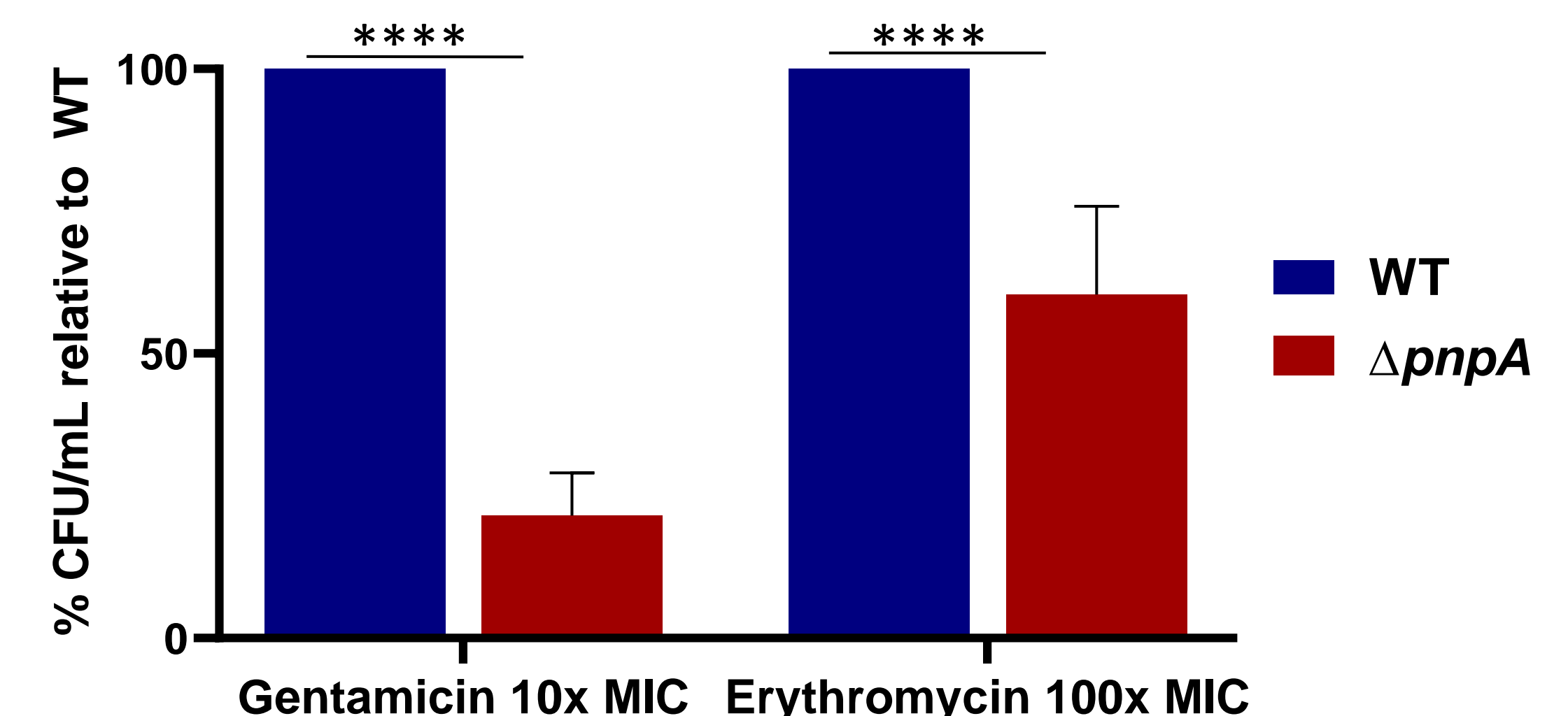
*ΔpnpA* is defective in biofilm formation and shows a distinctive morphology; no differences in viability

### 4. Matrix components



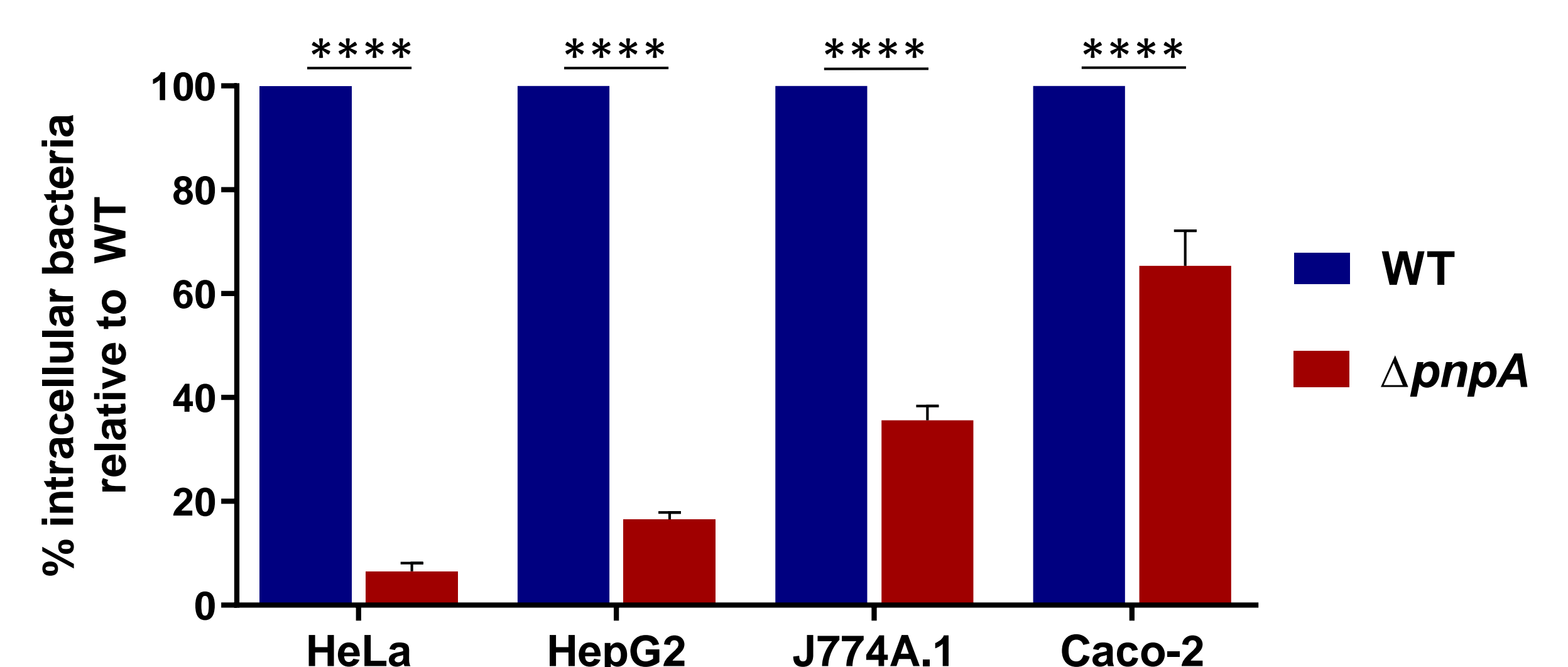
*ΔpnpA* has less 30-40% of the matrix constituents

### 5. Biofilm eradication by antibiotics



*ΔpnpA* biofilm is more susceptible than WT

### 6. Invasion of mammalian cells



Inactivation of PNPase impairs the invasion of epithelial and phagocytic cells

## Conclusions

PNPase from *Listeria monocytogenes* is important for:

- Motility
  - Biofilm formation
  - Cellular invasion
- Matrix appears to be defective, which could cause biofilms to be less resistant to antibiotics