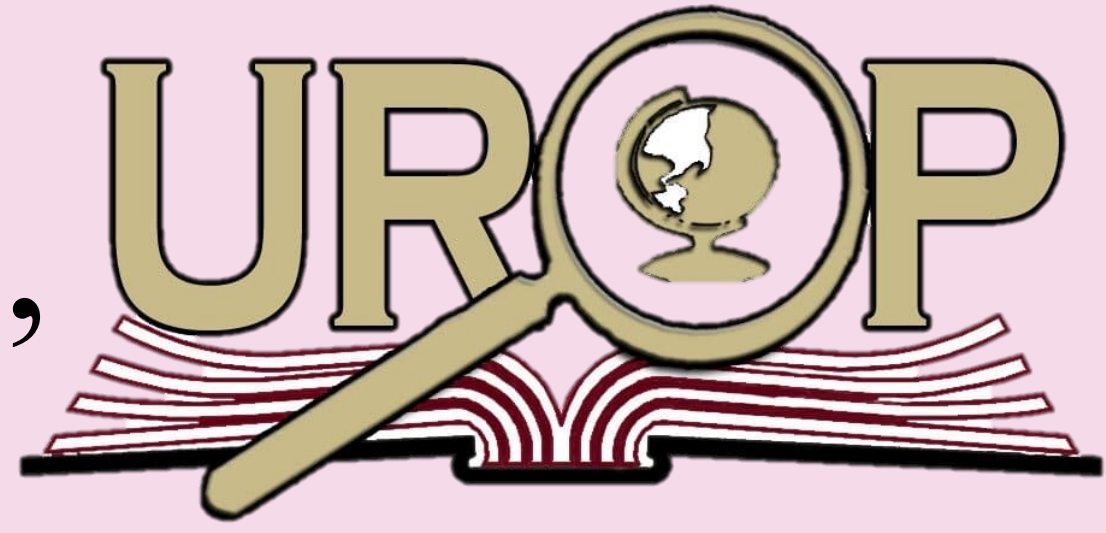




# Identifying Erythromycin Resistance

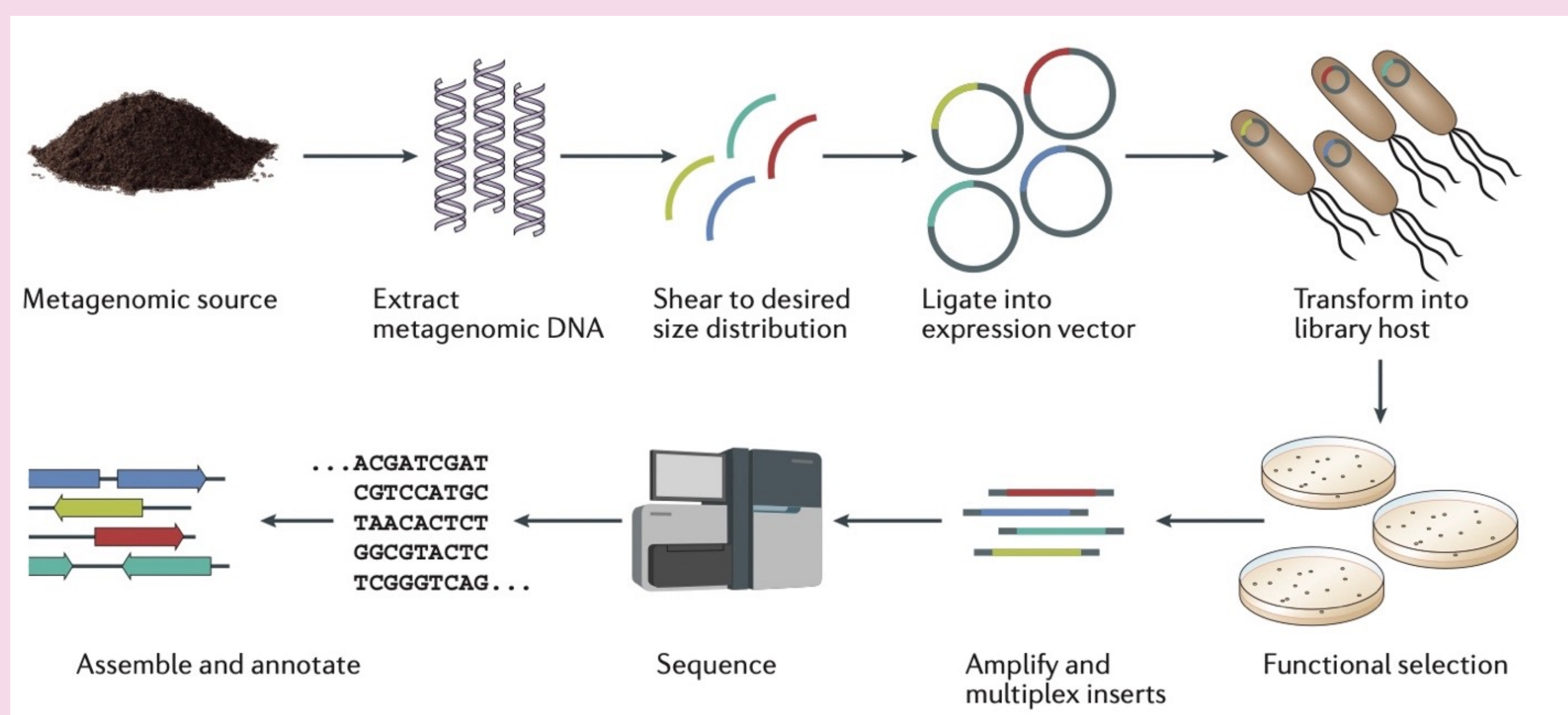
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Dr. Terence Crofts<sup>b</sup>



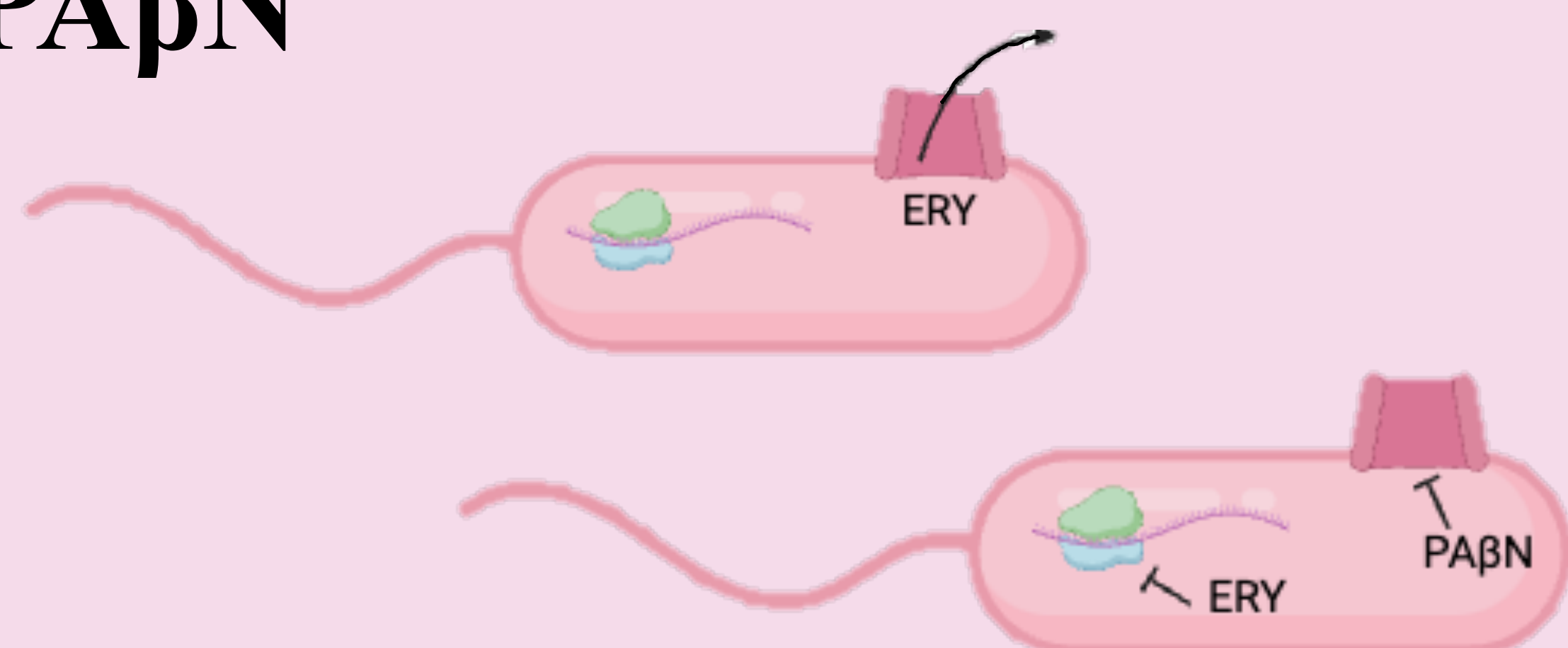
Department of Mathematics<sup>a</sup>, Department of Biomedical Sciences<sup>b</sup>, Department of Neuroscience<sup>c</sup>

## Introduction

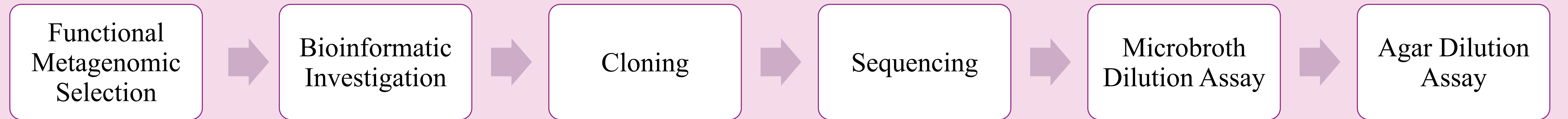
- Antibiotic resistance has been growing for decades.
- Research is often limited to antibiotics that treat gram negative bacteria. The antibiotic of this research, erythromycin, treats gram-positive bacteria.
- To study erythromycin resistance through functional metagenomics (which are based in *E. coli*), we must keep *E. coli* from pumping the antibiotic out. We do this through PAβN, an efflux pump inhibitor.
- A functional metagenomic selection was performed to find potentially interesting DNA targets that could confer resistance.
- We hypothesize that with the introduction of PAβN in *E. coli*, the efflux pumps in the bacteria will no longer be able to pump out the antibiotic, making it more effective.
- We hypothesize that these targets will provide resistance to erythromycin.



## PAβN

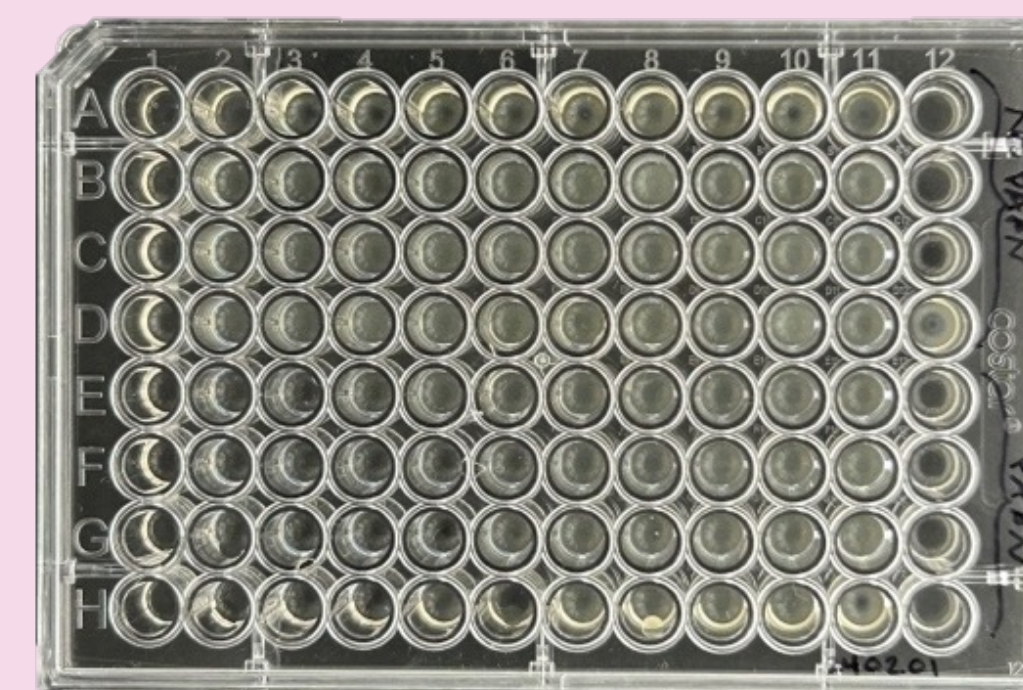


## Methods

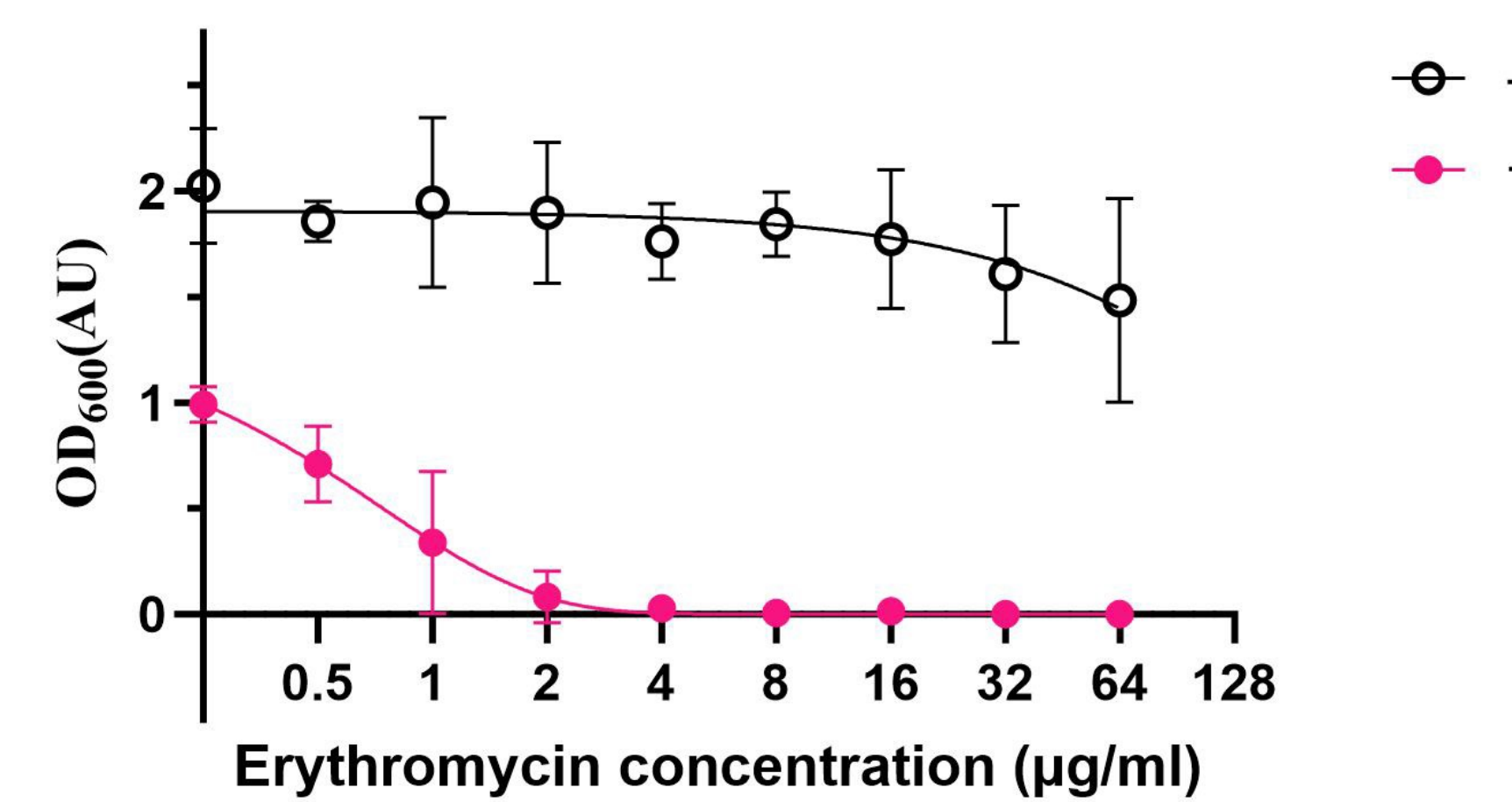


## Results

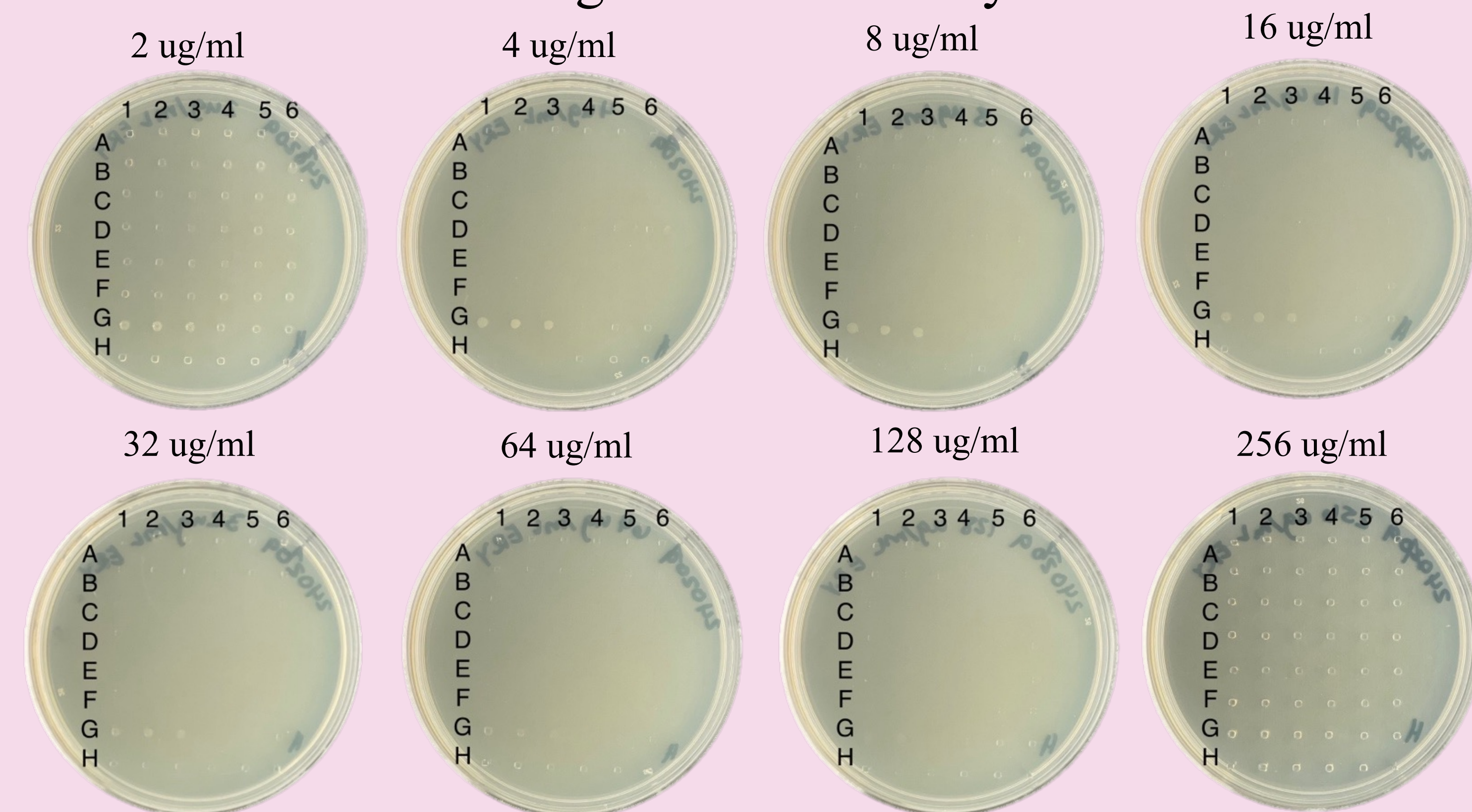
### Microbroth Dilution Assay with PAβN



Growth of *E. coli* with and without PAβN



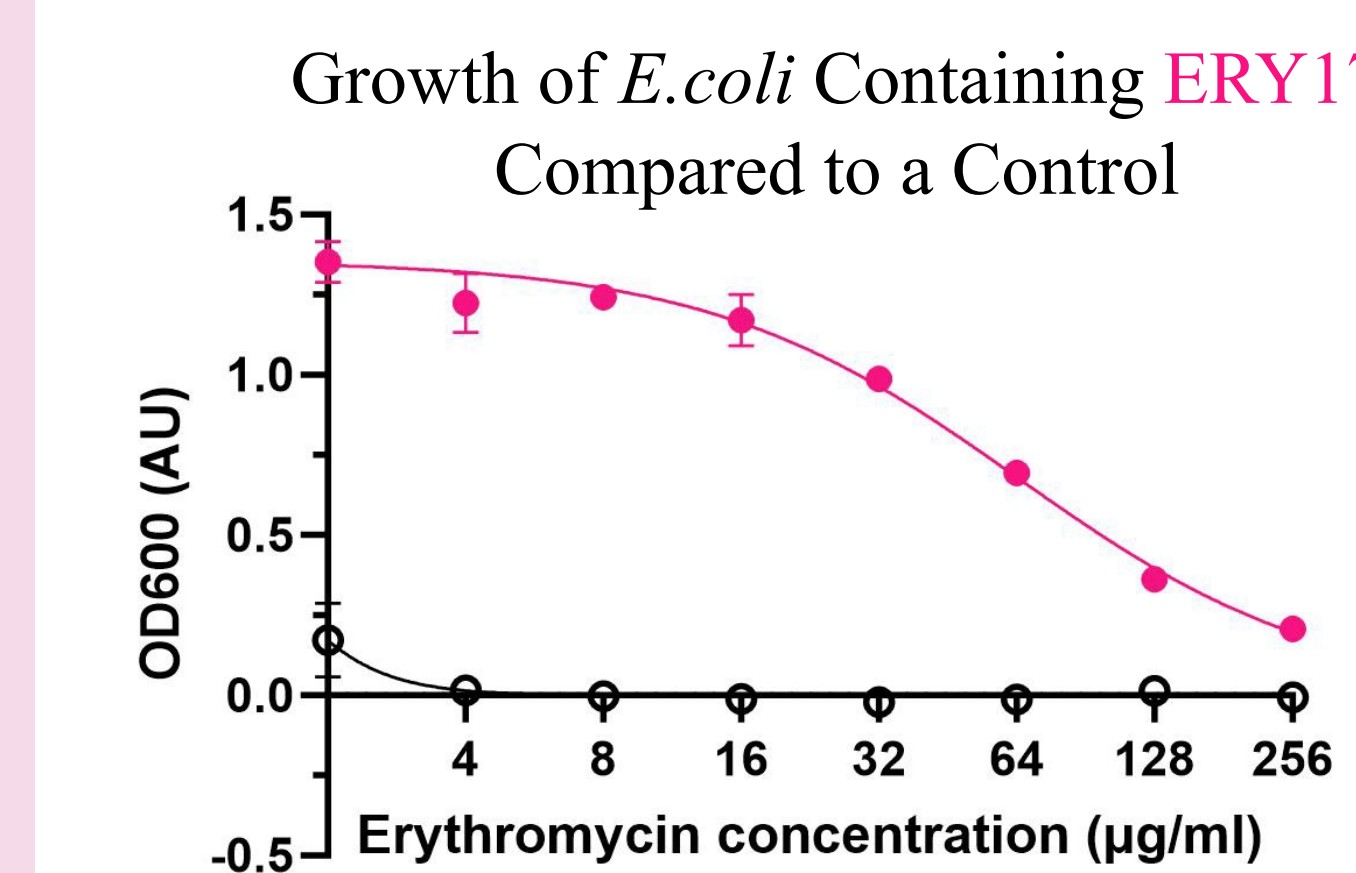
### Agar Dilution Assay



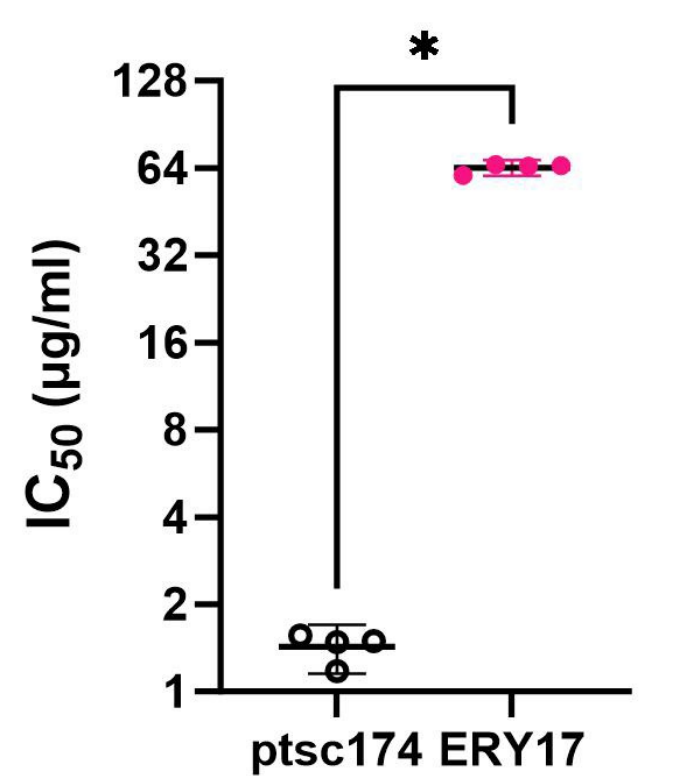
Key:

A1-3: ERY1	D4-6: ERY12
A4-6: ERY2	E1-3: ERY13
B1-3: ERY4	E4-6: ERY14
B4-6: ERY5	F1-3: ERY15
C1-3: ERY7	F4-6: ERY16
C4-6: ERY9	G1-3: <b>ERY17</b>
D1-3: ERY11	G4-6: Control

### Microbroth Dilution Assay with ERY17



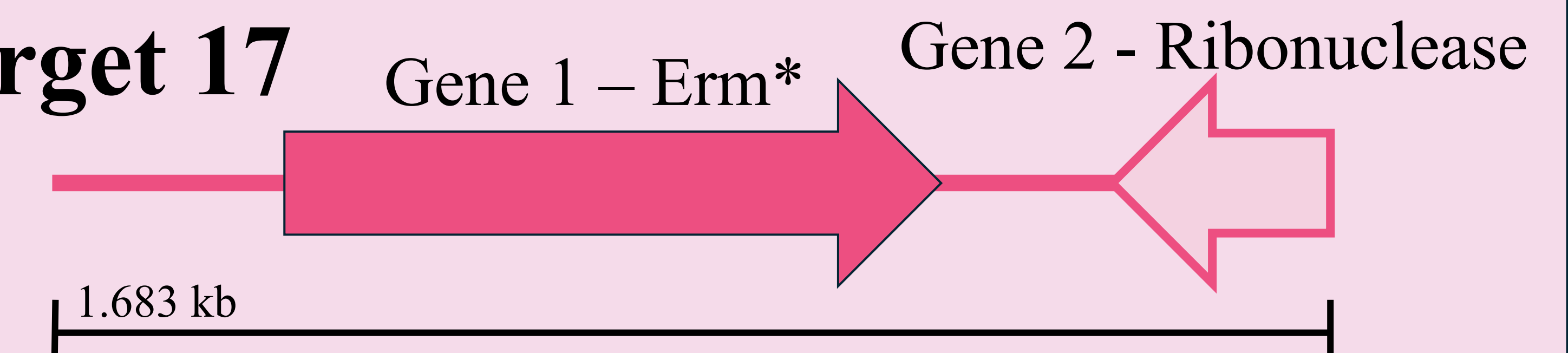
### Significance of ERY17 Growth



## Conclusions

- PAβN does in fact aid in making *E. coli* susceptible to Erythromycin.
- Target 17, a fragment containing a resistance methylase gene, is resistant to erythromycin.
- Next steps include trouble shooting, further work with Target 17, and work with azithromycin.

## Target 17



\*51% identity with known Erm

## Reference

→ Crofts TS\* (2017). *Nature Reviews Microbiology*, 15 (7), 422-34.