

Methylglyoxal sensitizes *Bacillus oleronius* to topical antibiotics

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Rosacea

- Erythematotelangiectatic
- Ocular
- Phymatous
- Papulopustular



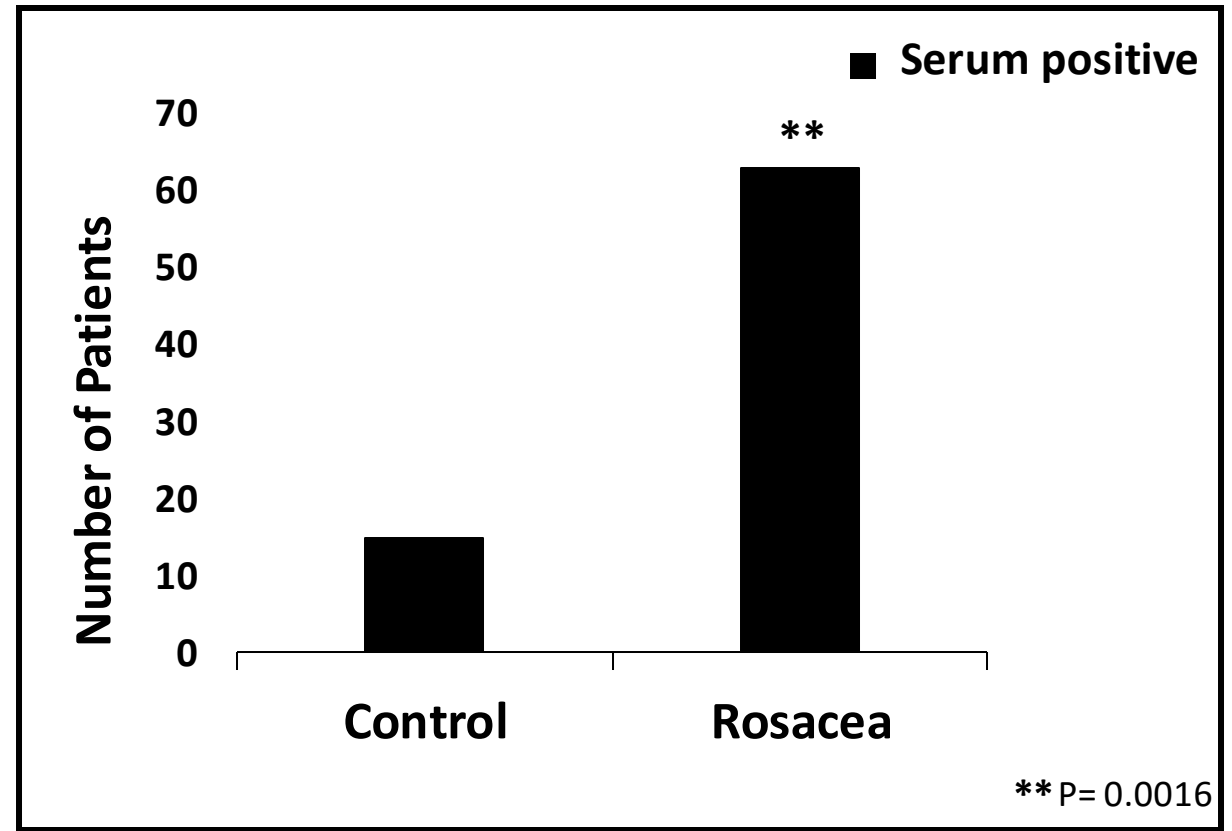
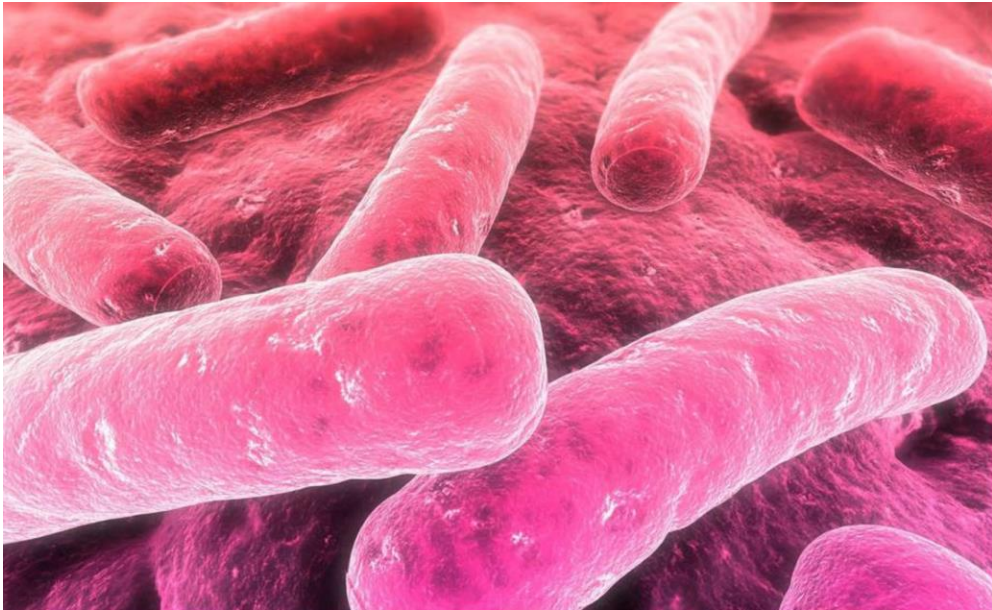
Demodex spp.

- Mites that live in human skin follicles



Bacillus oleronius

- Gram positive bacteria in the digestive system of *Demodex*

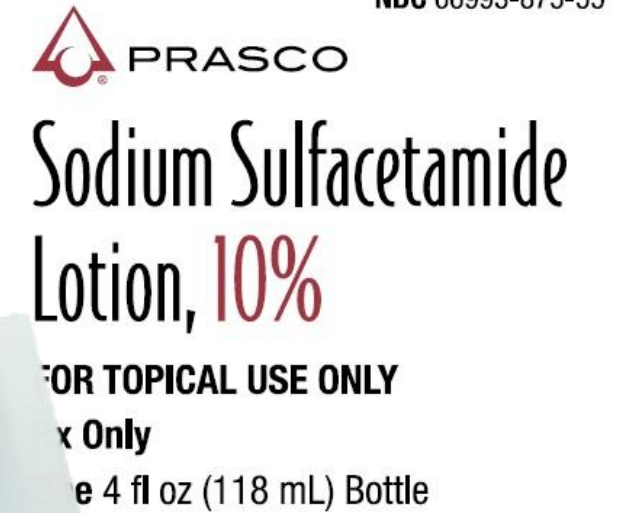


27%

83%



Rosacea Treatment



Manuka Honey

“ *I love Manuka Doctor
skincare, I use it every
day to enhance my
natural beauty* ”

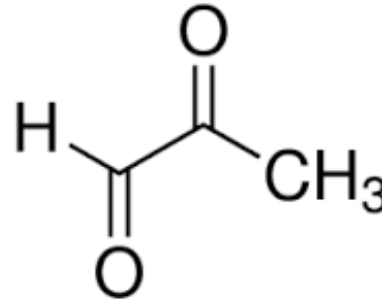
**Kourtney
Kardashian**
GLOBAL BRAND AMBASSADOR

On Back Panel
8 ADHESIVE PADS
1.8 in x 3 in (4.5 cm x 7.5 cm)





+



=



Bacillus oleronius

Neomycin
Polymixin B
Bacitracin
Clindamycin



Methylglyoxal and *Bacillus oleronius*

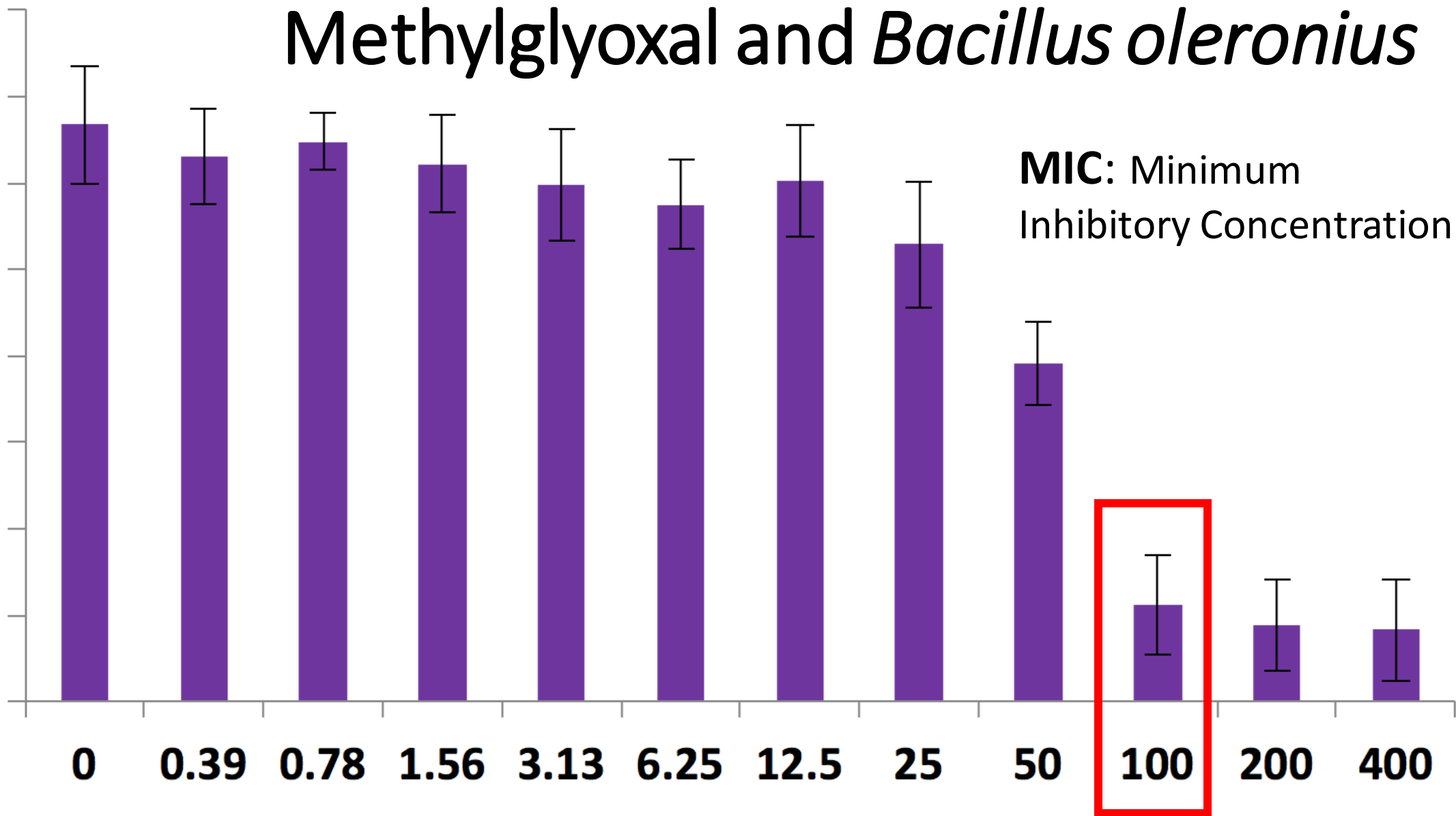
MIC: Minimum
Inhibitory Concentration

Culture Density (OD 600)

0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0

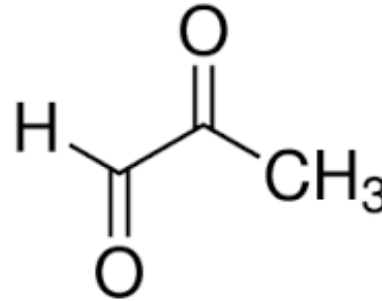
0 0.39 0.78 1.56 3.13 6.25 12.5 25 50 100 200 400

MGO Concentration ($\mu\text{g/ml}$)





+



=



Methylglyoxal
(MGO)

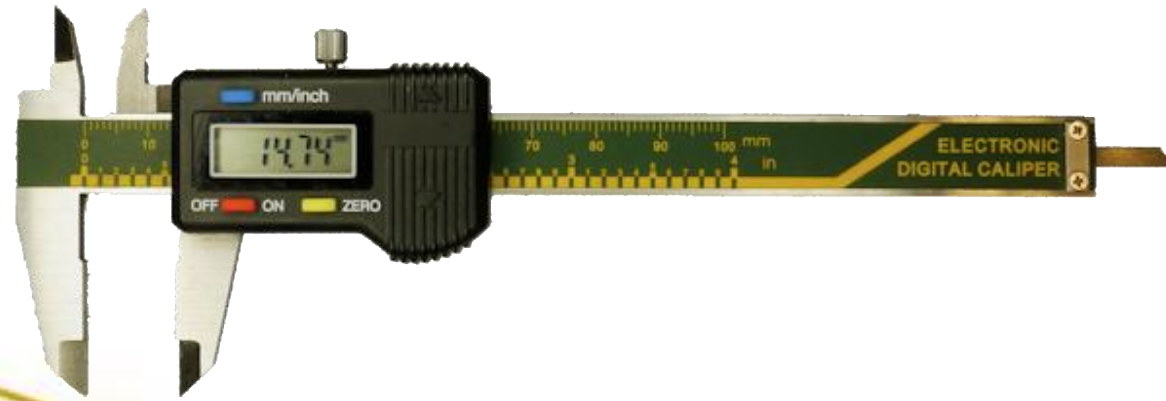
Bacillus oleronius



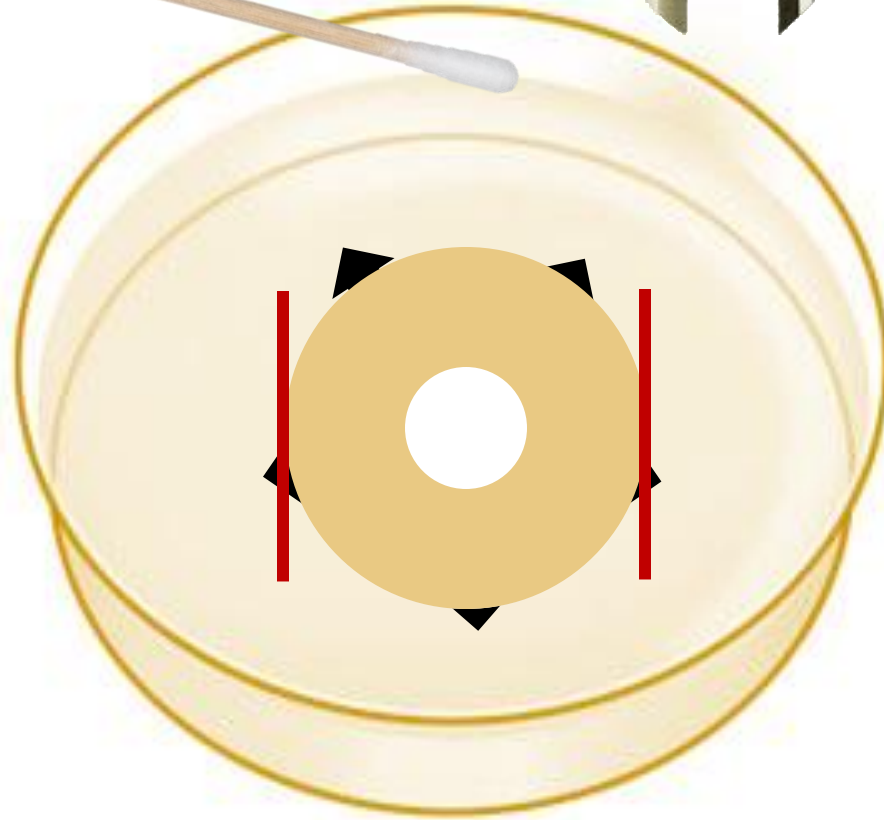
Neomycin
Polymixin B
Bacitracin
Clindamycin



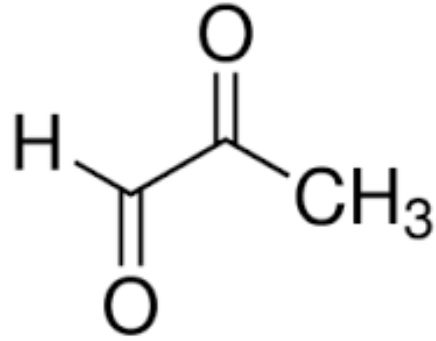
Disc Diffusion Method



Zone of Inhibition



Initial Screen for Interactions



MGO



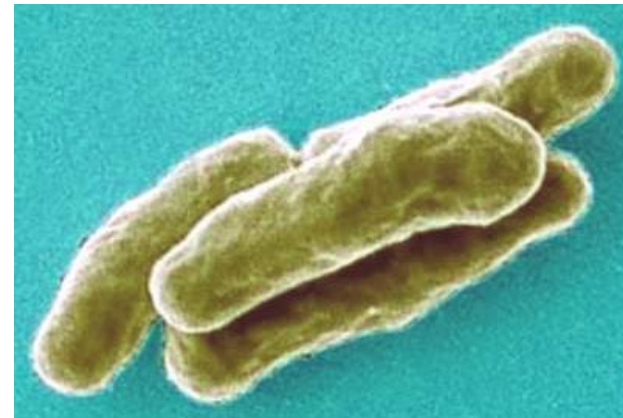
No MGO

0 $\mu\text{g/mL}$ MGO



MGO

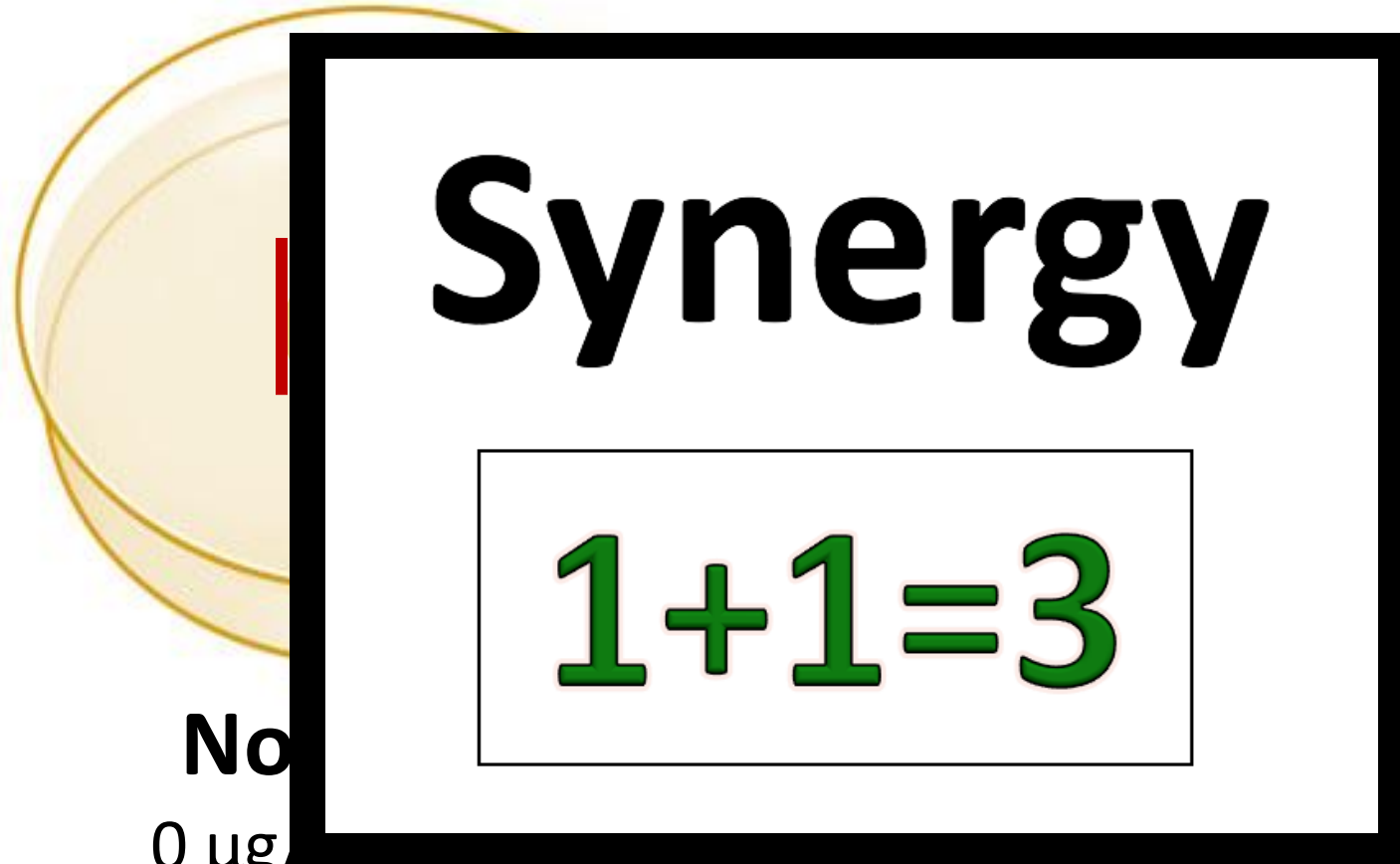
25 $\mu\text{g/mL}$ MGO



Bacillus oleronius



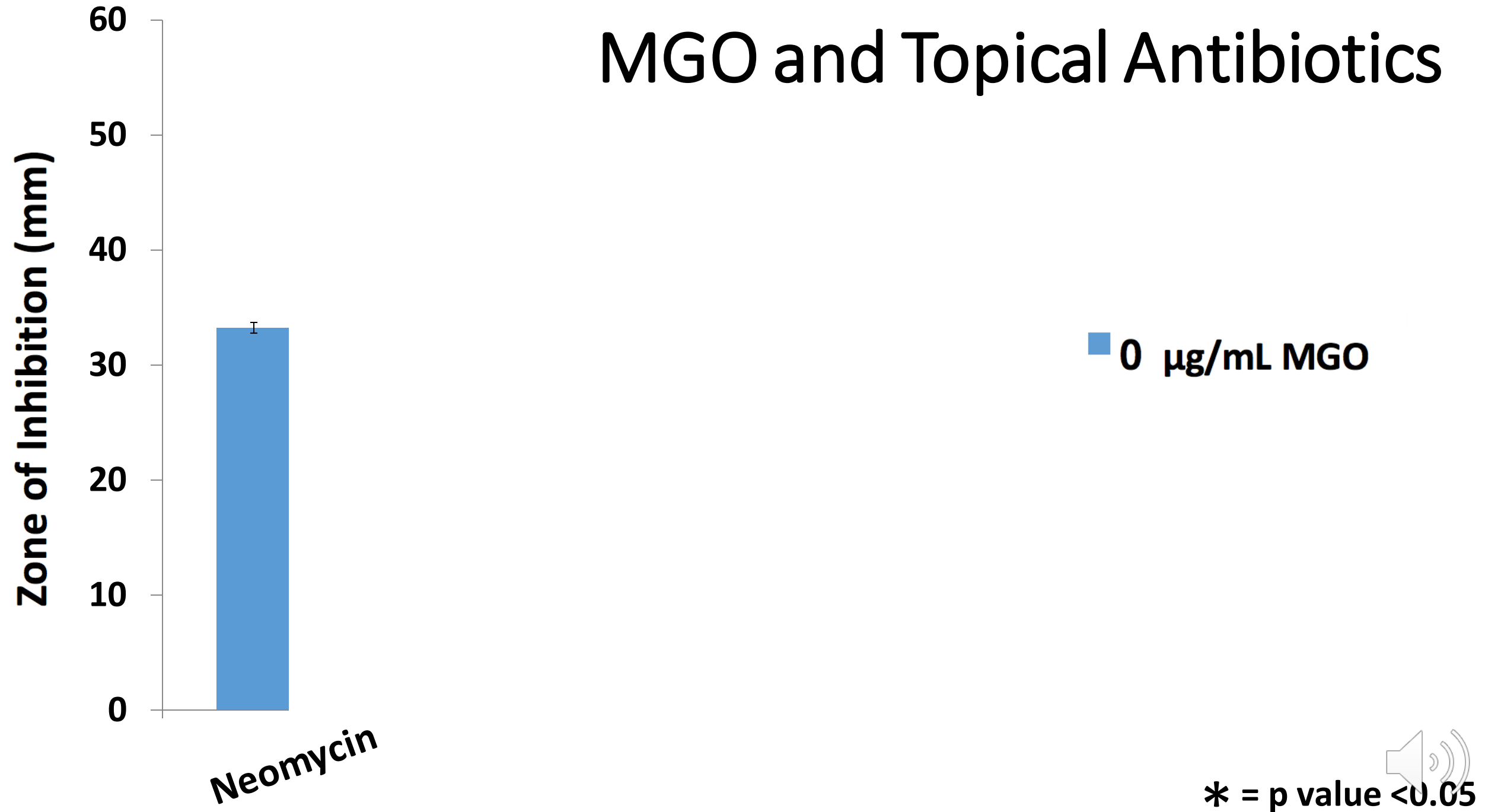
Zone of Inhibition



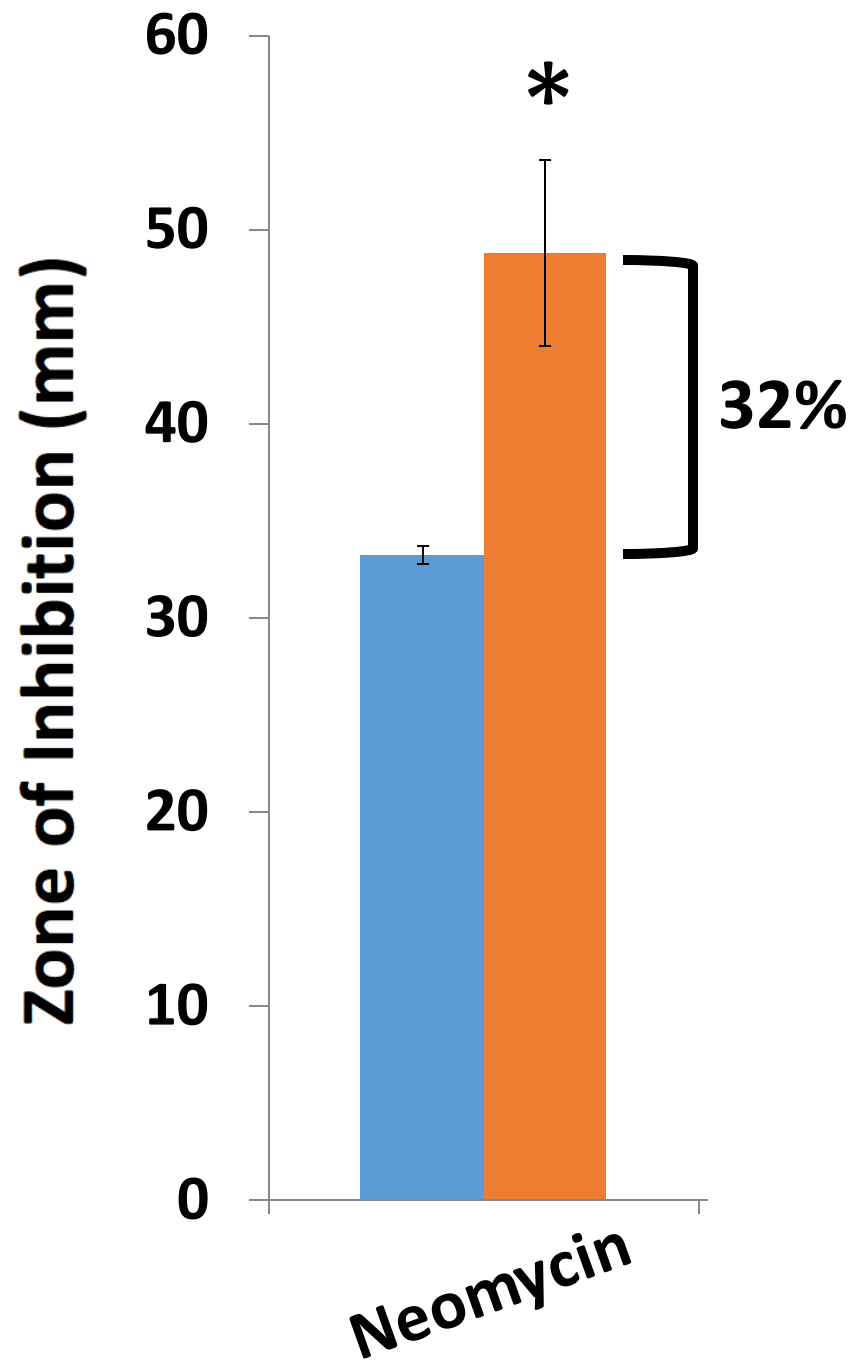
10_{mm}



MGO and Topical Antibiotics



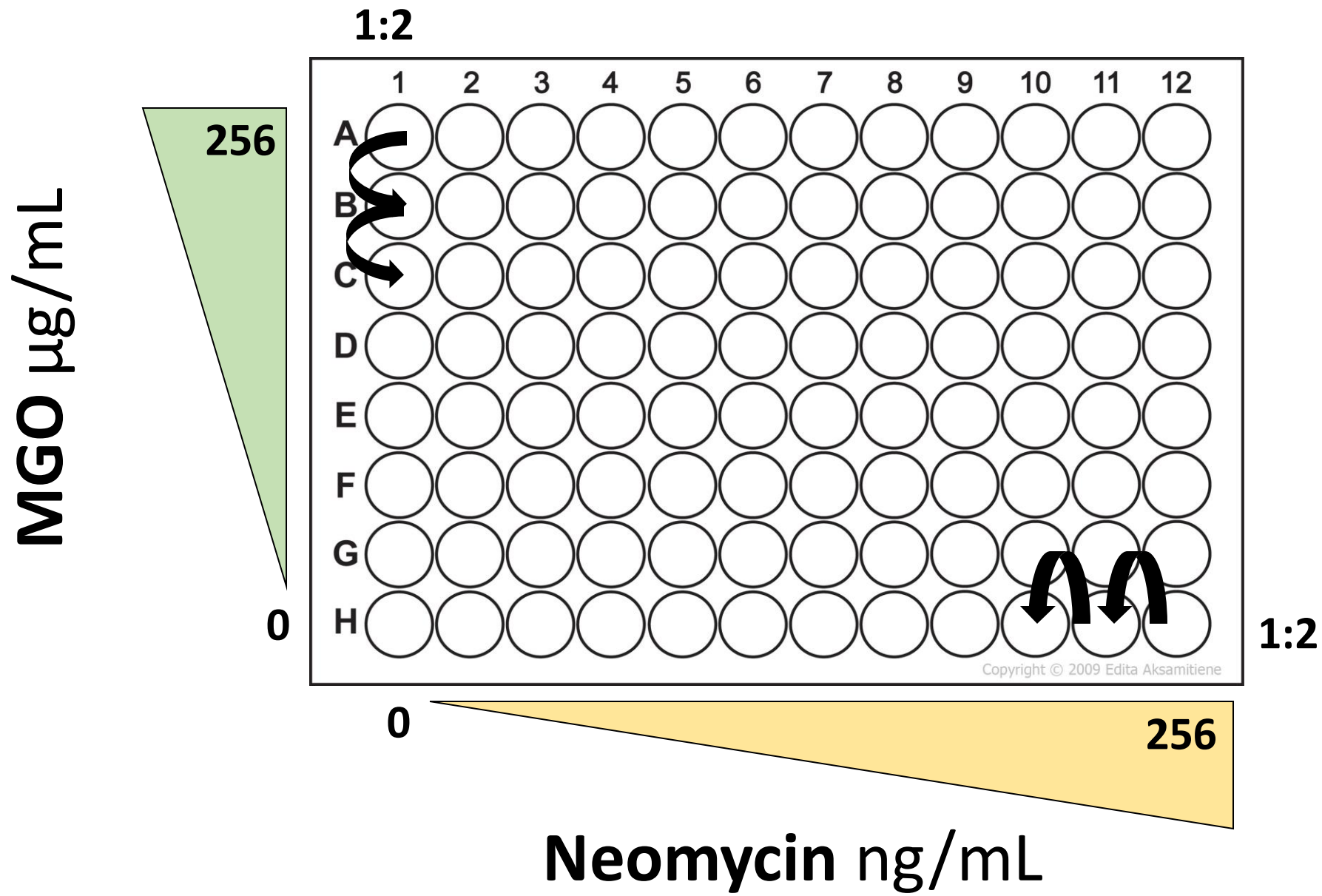
MGO and Topical Antibiotics



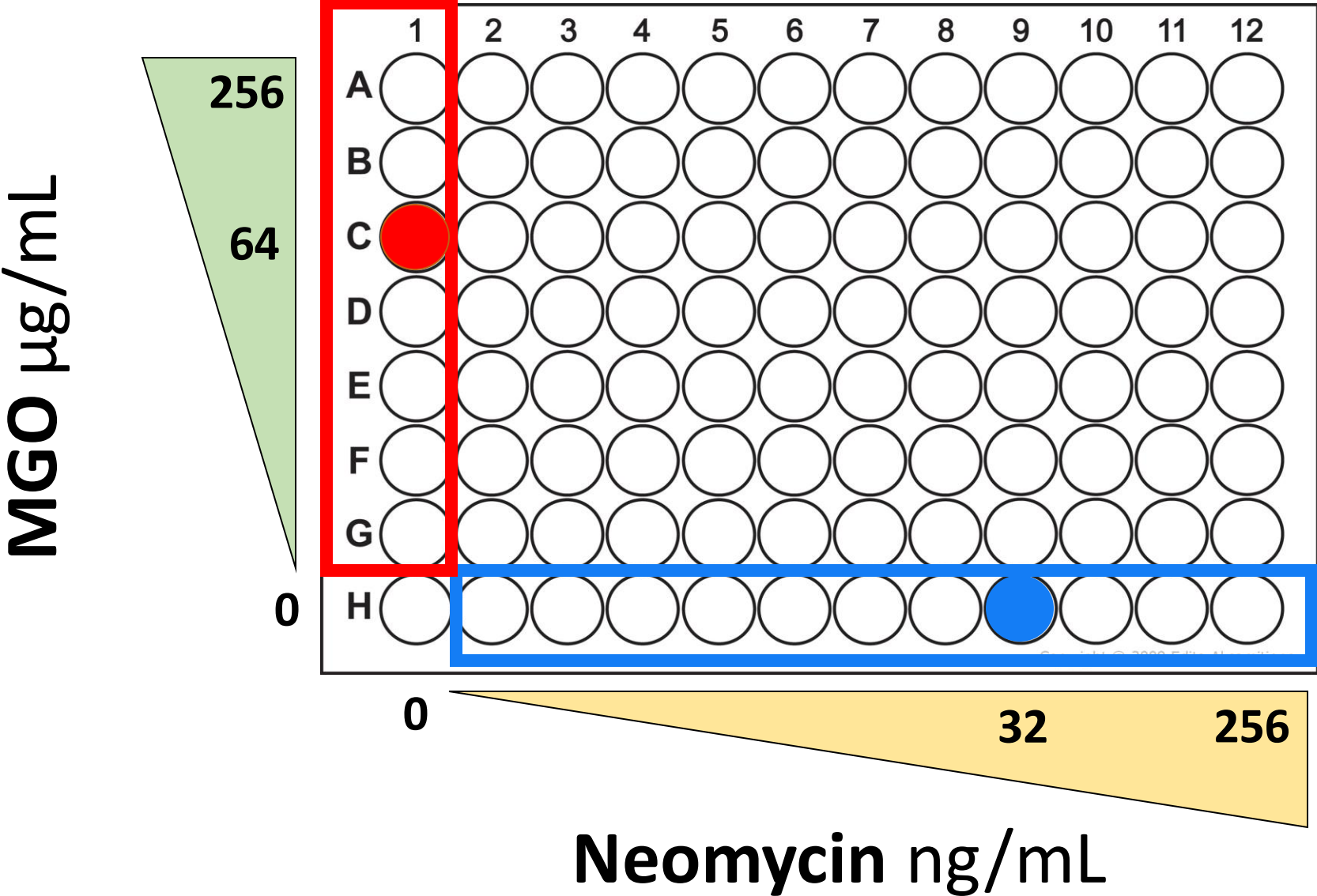
- 0 µg/mL MGO
- 25 µg/mL MGO

* = p value < 0.05

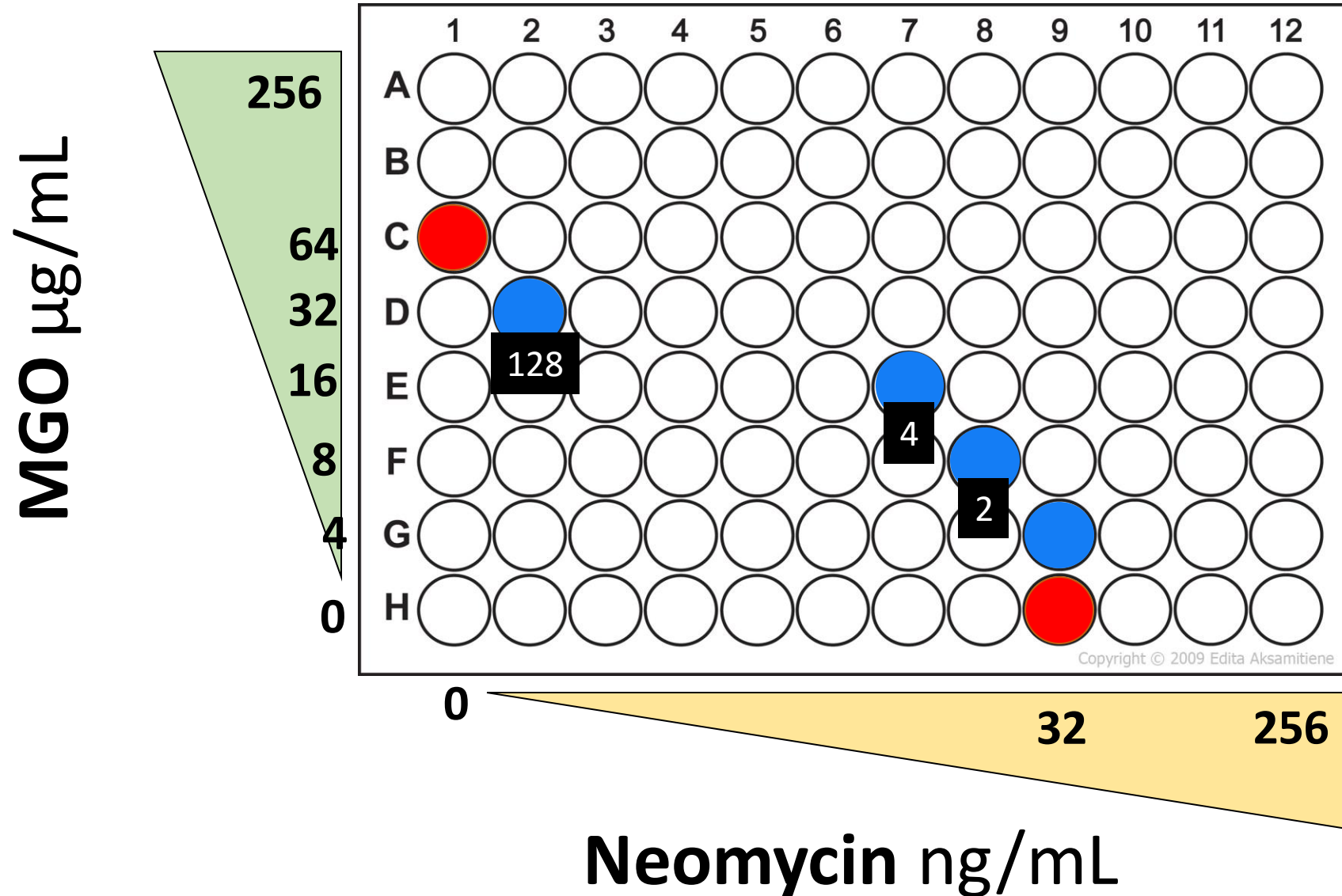
MGO decreases the MIC of Neomycin



MGO decreases the MIC of Neomycin



MGO decreases the MIC of Neomycin



Fractional Inhibitory Concentration Index

FICI Score < 0.5 Indicates Synergy

***Bacillus oleronius* FICI Score:**

Neomycin 0.63

Bacitracin 0.35

Polymixin B 0.75

Clindamycin 0.06



Broader Impact



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Acknowledgements



- HPU Department of Biology
- HPU Undergraduate Research Funds

Patrick Vigueira

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Lovely Lexi Lambros

