



Antibacterial Efficacies and Effects on Human Gingival Fibroblasts of Four Antibacterial Agents

Chandni Batra*¹, Marwa Alalshaikh¹, Richard L. Gregory³, L. Jack Windsor², Steven B. Blanchard¹, Yusuke Hamada¹

1-Department of Periodontology, 2- Department of Biomedical and Applied Sciences 3- Department of Biomedical Sciences and Comprehensive Care
Indiana University School of Dentistry



BACKGROUND AND METHODS:



Prevalence of Post-surgical Infections

2.08%

Smokers → Delayed wound healing



Chlorhexidine
(0.12% CHX)



Bacterial cell
wall lysis



Reduced HGF
Proliferation



Povidone Iodine
(10% PVD)



Inhibits cellular
actions



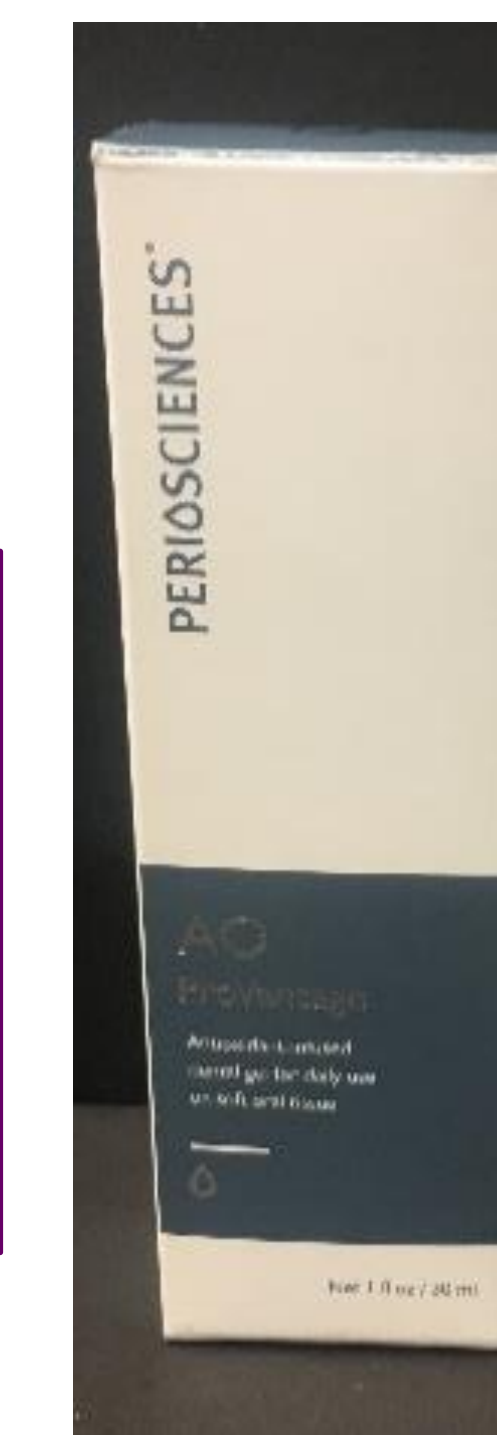
Reduced HGF
Proliferation



Stella Life VEGA
Oral Care Gel



Anti-inflammatory
Analgesic
Prevents bruising
Antibacterial
Antioxidant



PerioSciences AO
ProVantage Gel

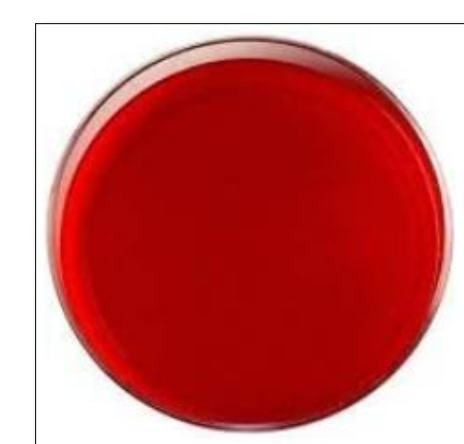


Antioxidant
Antibacterial
Promotes Angiogenesis
Wound Healing

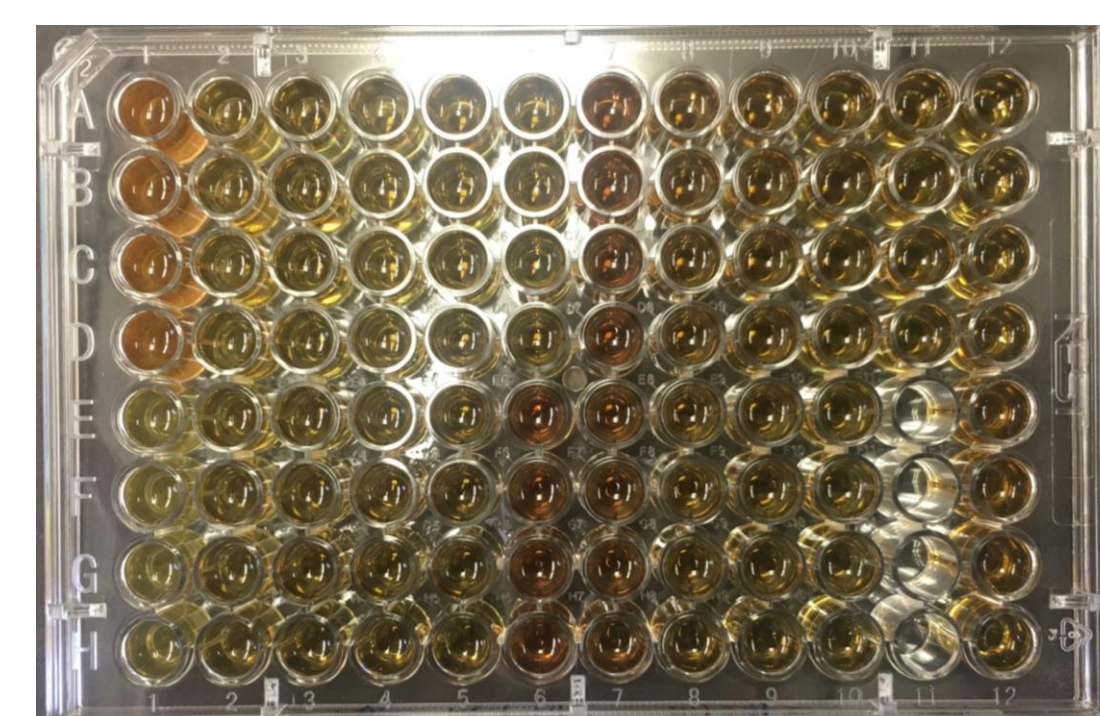
OBJECTIVE: To compare the anti-bacterial efficacies of 0.12% CHX, 10% PVD, herbal gel (VEGA) and an antioxidant gel (AO) on *Streptococcus mutans* (S.m), *Streptococcus sanguis* (S.s), *Fusobacterium nucleatum* (F.n) and *Porphyromonas gingivalis* (P.g) with and without the effect of nicotine. The secondary objective was to evaluate the effects of these agents on human gingival fibroblasts (HGFs) proliferation and cytotoxicity.



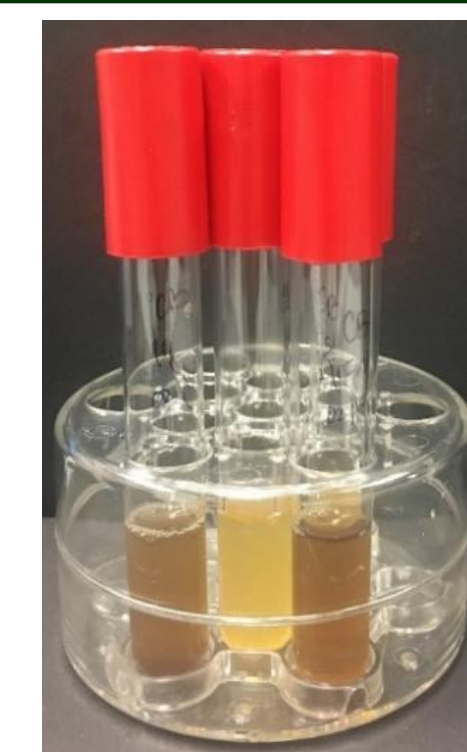
Minimal Inhibitory
Concentration (595nm)



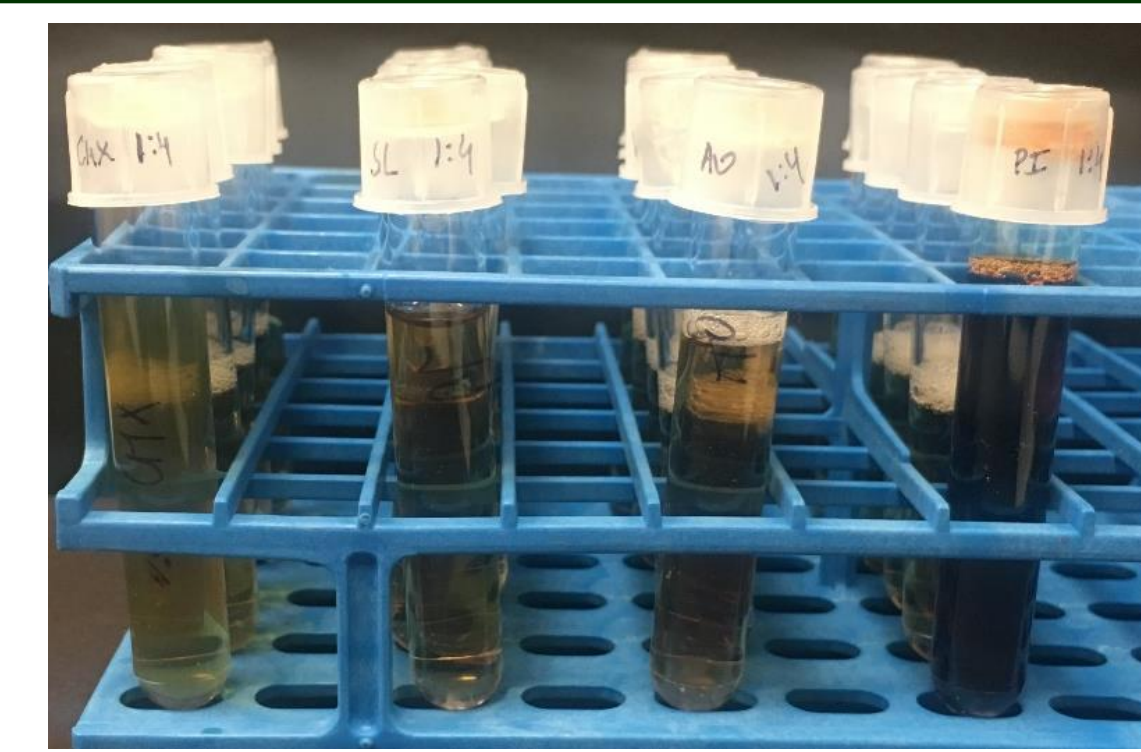
Minimal Bactericidal
Concentration (Blood Agar)



Placed into 96 well
plates (duplicated with 2
mg/ml Nicotine)



10 μ L bacterial
culture



Prepared as 1/4, 1/8, 1/16, 1/32
and 1/64 dilutions with respective
media (TSBS or BHI-YE with
Vitamin K/ Hemin)



1-Chlorhexidine (0.12% CHX)
2-Povidone Iodine (10% PVD)
3-StellaLife® VEGA Oral Care Gel (HG)
4-PerioSciences® AO ProVantage Gel (AO)

Prepared as 1/10, 1/100, 1/1000,
and 1/10,000 dilutions with serum-
free DMEM added with HGFs

WST-1 Assay-
Proliferation of HGFs



LDH Assay- Cytotoxicity
towards HGFs



Confocal
Microscopy





Antibacterial Efficacies and Effects on Human Gingival Fibroblasts of Four Antibacterial Agents

Chandni Batra*¹, Marwa Alalshaikh¹, Richard L. Gregory³, L. Jack Windsor², Steven B. Blanchard¹, Yusuke Hamada¹

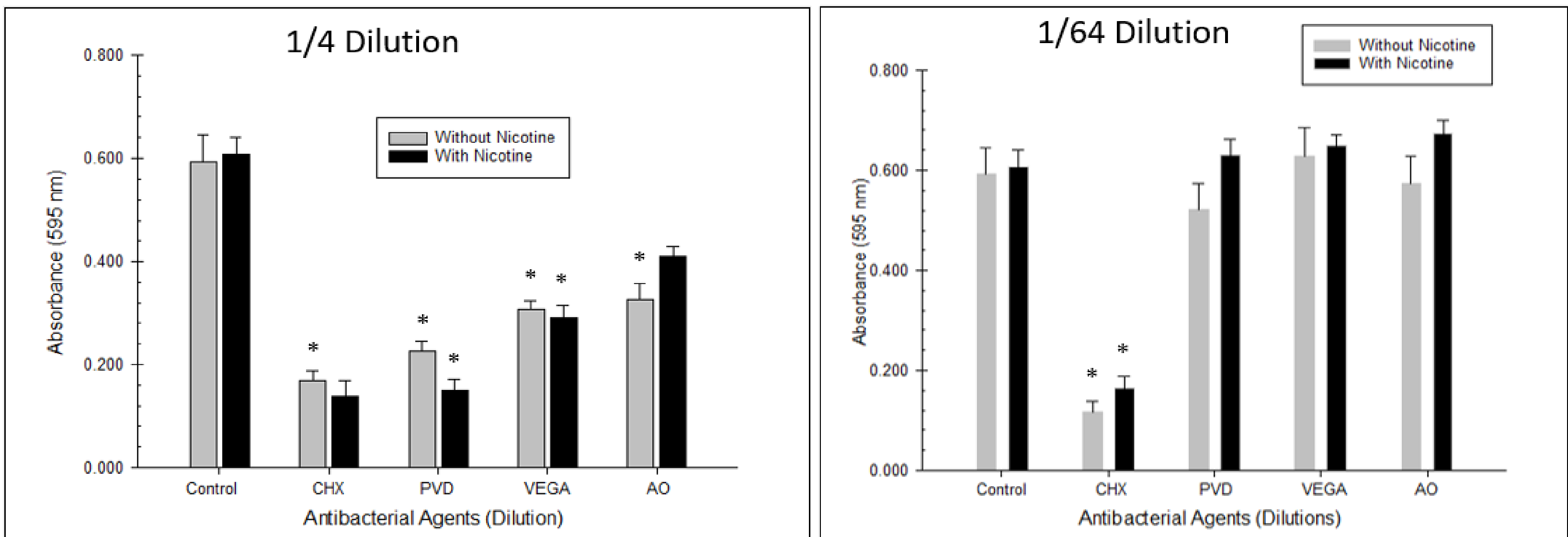
1-Department of Periodontology, 2- Department of Biomedical and Applied Sciences 3- Department of Biomedical Sciences and Comprehensive Care
Indiana University School of Dentistry



Academy of
Osseointegration

RESULTS:

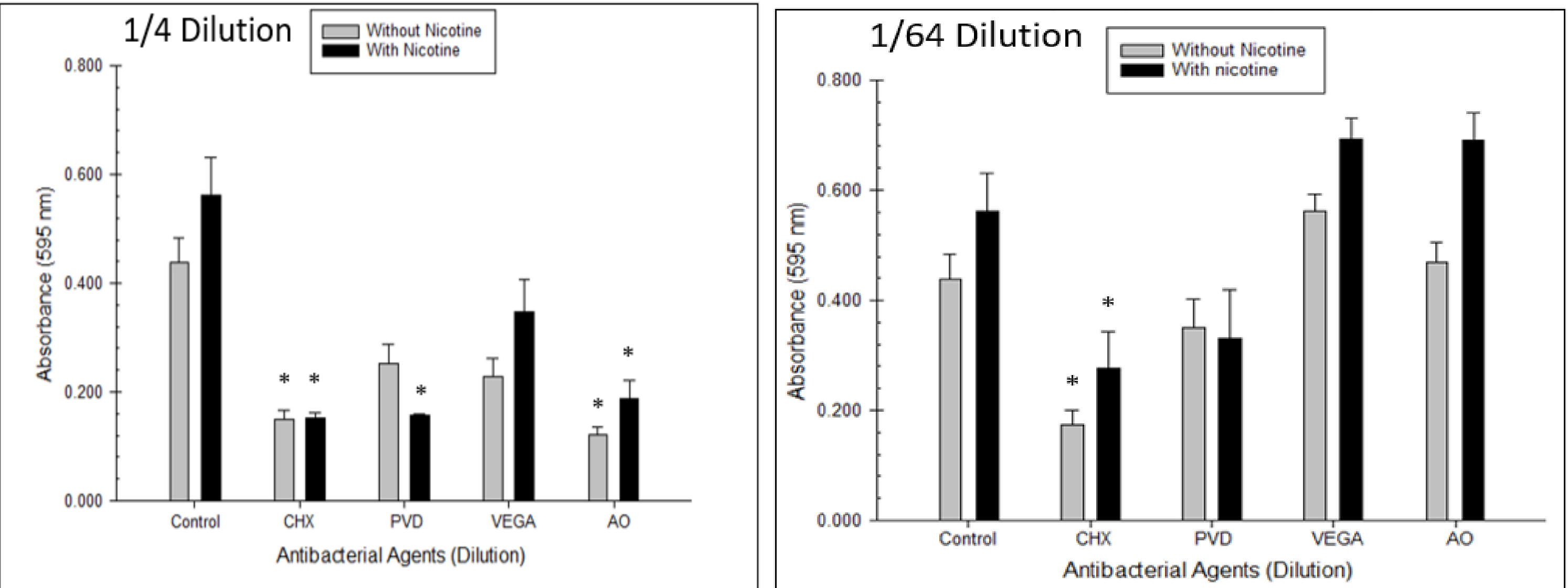
Effect of Antibacterial Agents on *S. mutans*



All agents significantly inhibited *S. mutans* growth at 1/4 dilution.

At 1/64 dilution only CHX inhibited growth significantly (p<0.001)

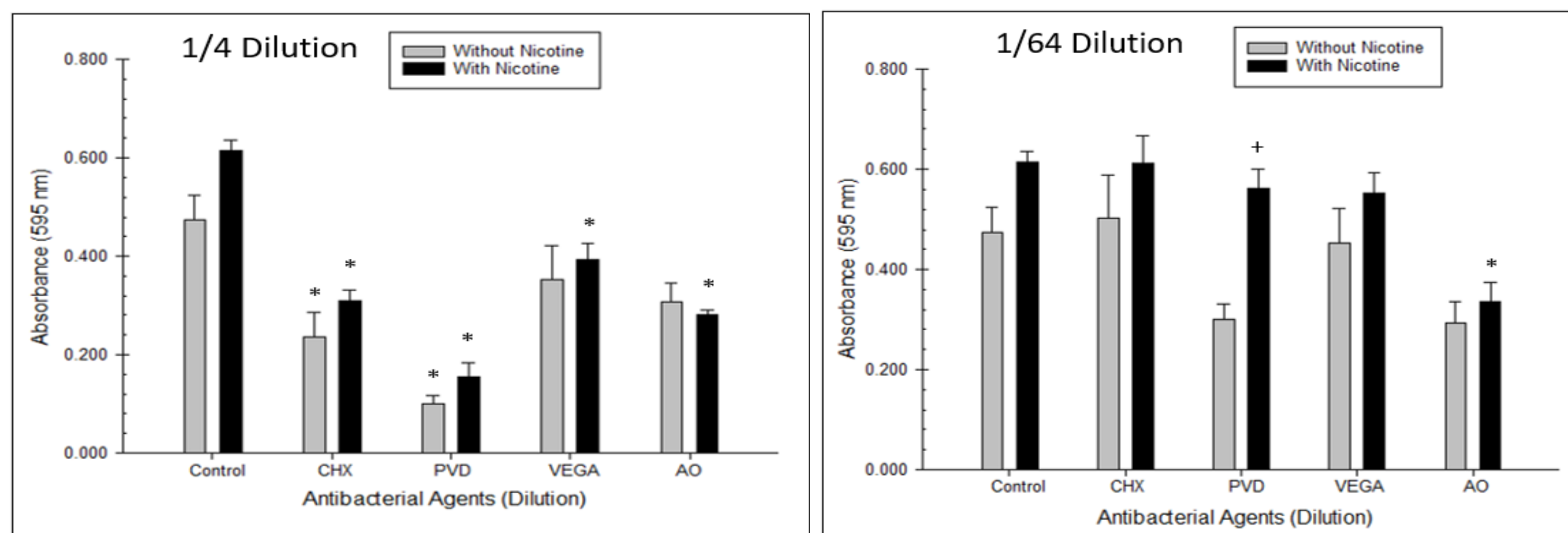
Effect of Antibacterial Agents on *S. sanguis*



All agents significantly inhibited *S. sanguis* growth at 1/4 dilution.

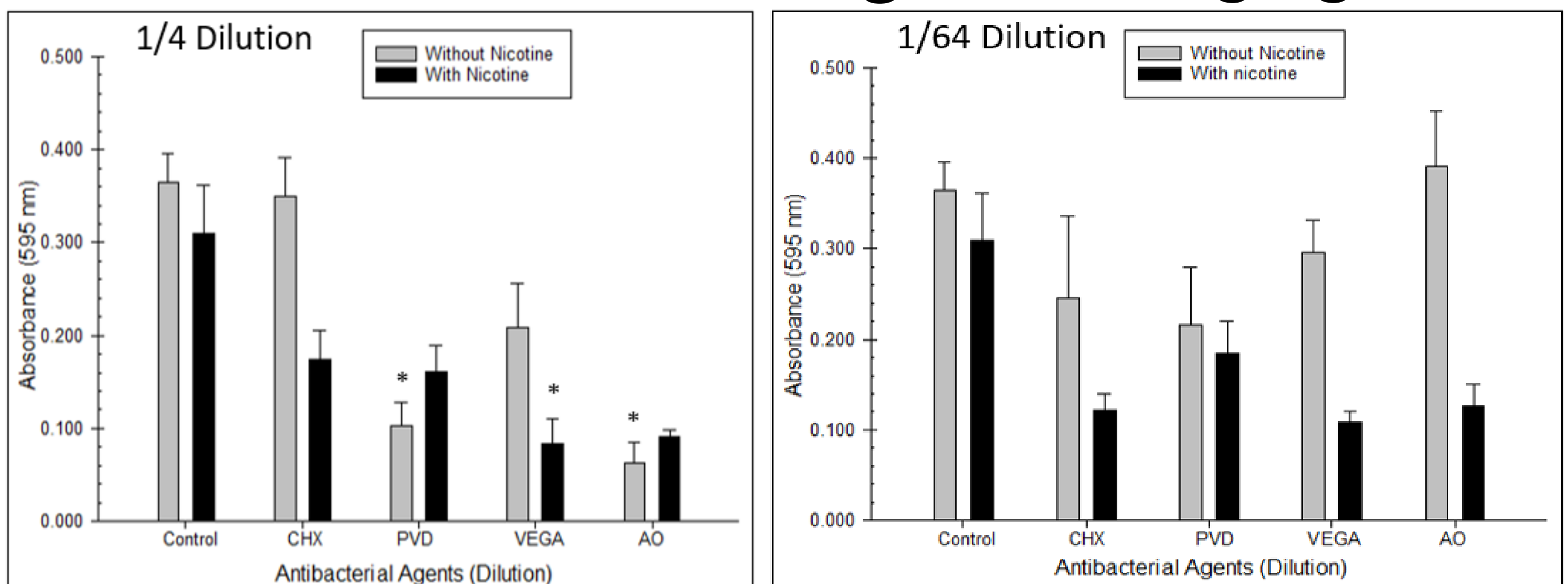
At 1/64 dilution only CHX inhibited growth significantly (p<0.001)

Effect of Antibacterial Agents on *F. nucleatum*



All agents significantly inhibited *F. nucleatum* growth at 1/4 dilution except VEGA and AO without nicotine (p<0.001)

Effect of Antibacterial Agents on *P. gingivalis*

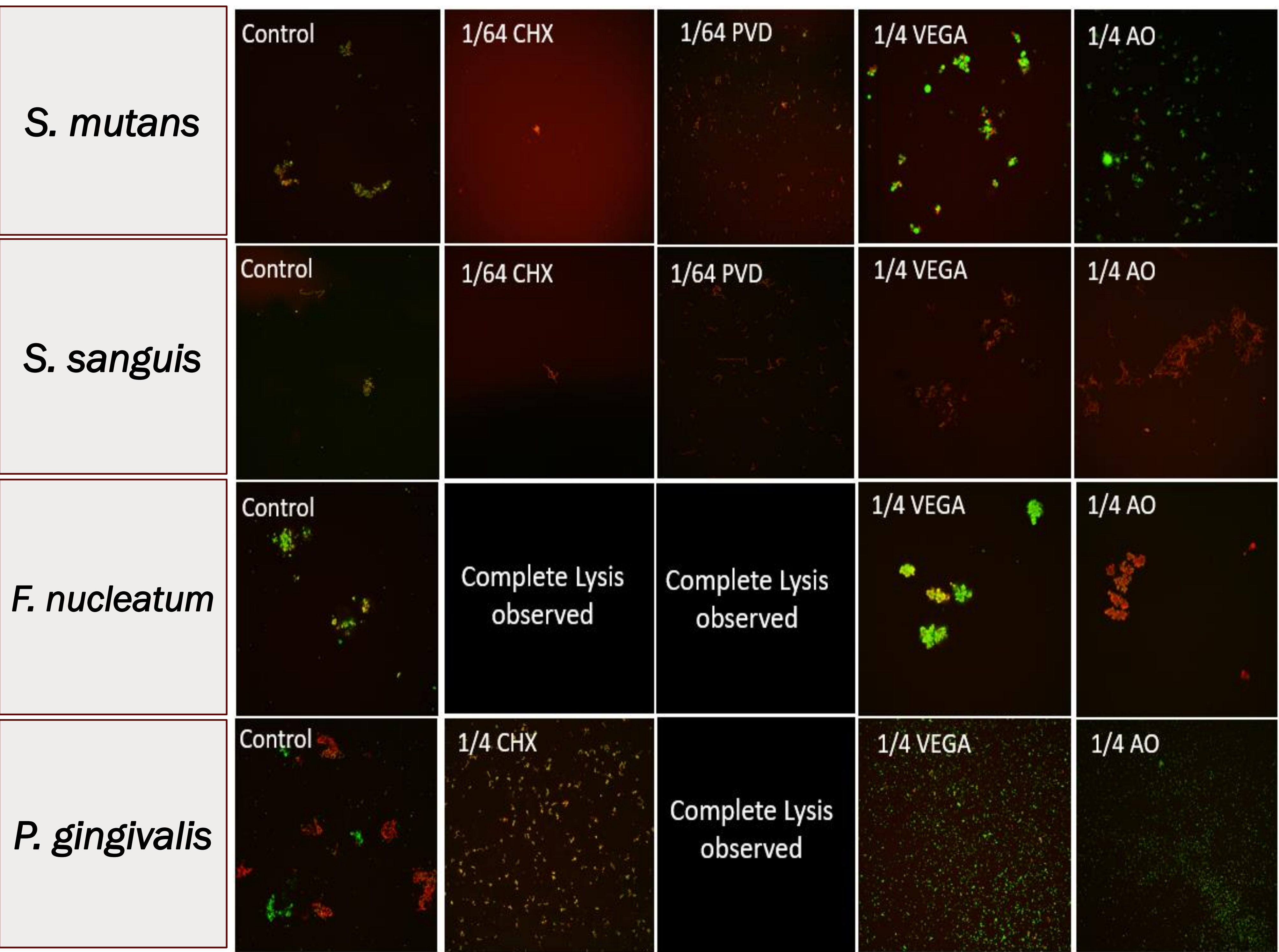


PVD and AO without nicotine and VEGA with nicotine significantly inhibited *P. gingivalis* growth at 1/ 4 dilution (p<0.001).

No differences noted for 1/64 dilution.

Confocal Microscopy:

CHX and PVD demonstrated high degree of bacterial cell lysis up to 1/ 64 dilution.





Antibacterial Efficacies and Effects on Human Gingival Fibroblasts of Four Antibacterial Agents

Chandni Batra*¹, Marwa Alalshaikh¹, Richard L. Gregory³, L. Jack Windsor², Steven B. Blanchard¹, Yusuke Hamada¹

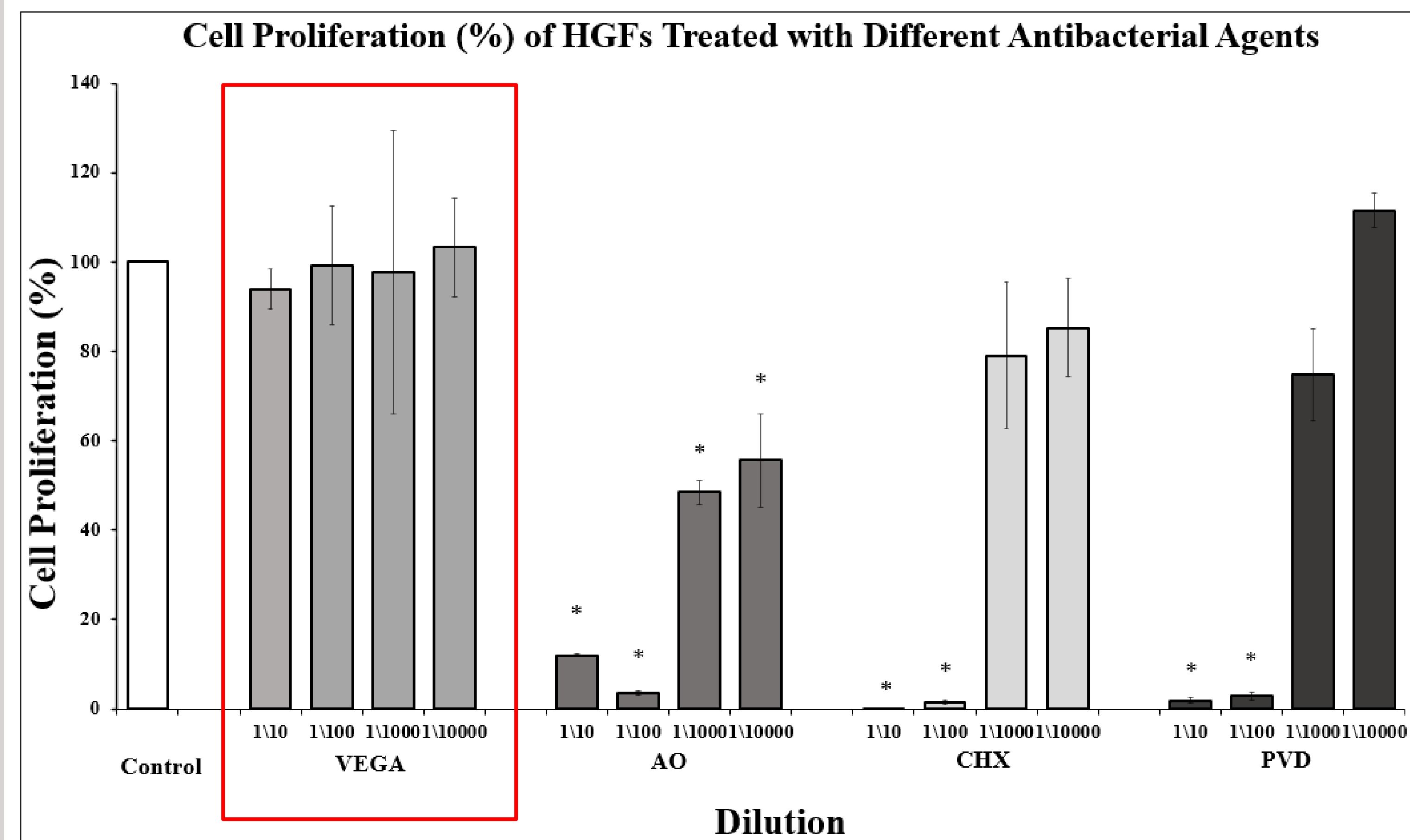
1-Department of Periodontology, 2- Department of Biomedical and Applied Sciences 3- Department of Biomedical Sciences and Comprehensive Care
Indiana University School of Dentistry



Academy of
Osseointegration

RESULTS:

Effect of Antibacterial Agents on HGF Proliferation (WST-1 Assay)

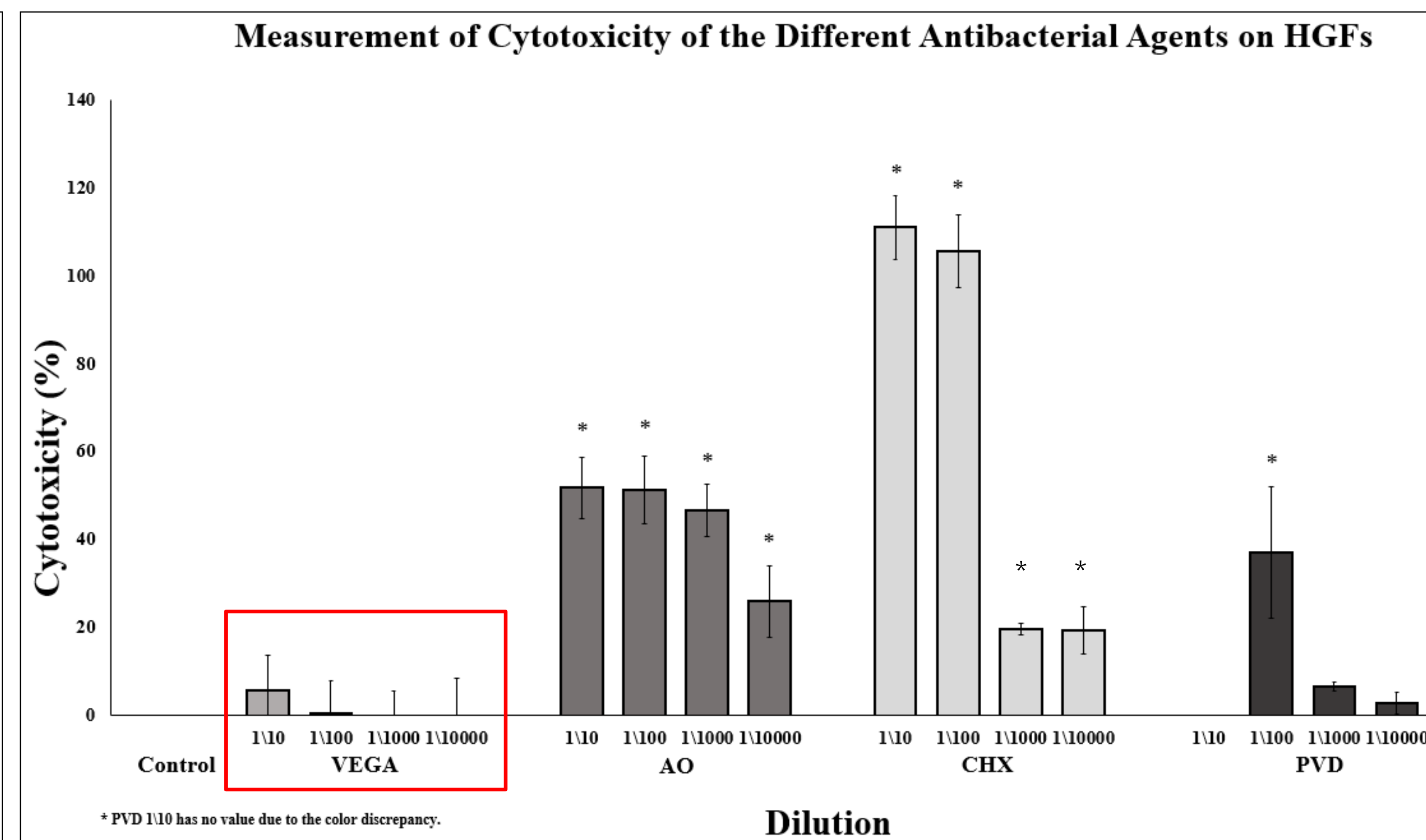


CHX and PVD significantly affected HGF proliferation at 1/10 and 1/100 dilutions ($p < 0.05$).

AO affected HGF proliferation at all dilutions ($p < 0.05$).

VEGA did not affect HGF proliferation at any dilution ($p > 0.05$).

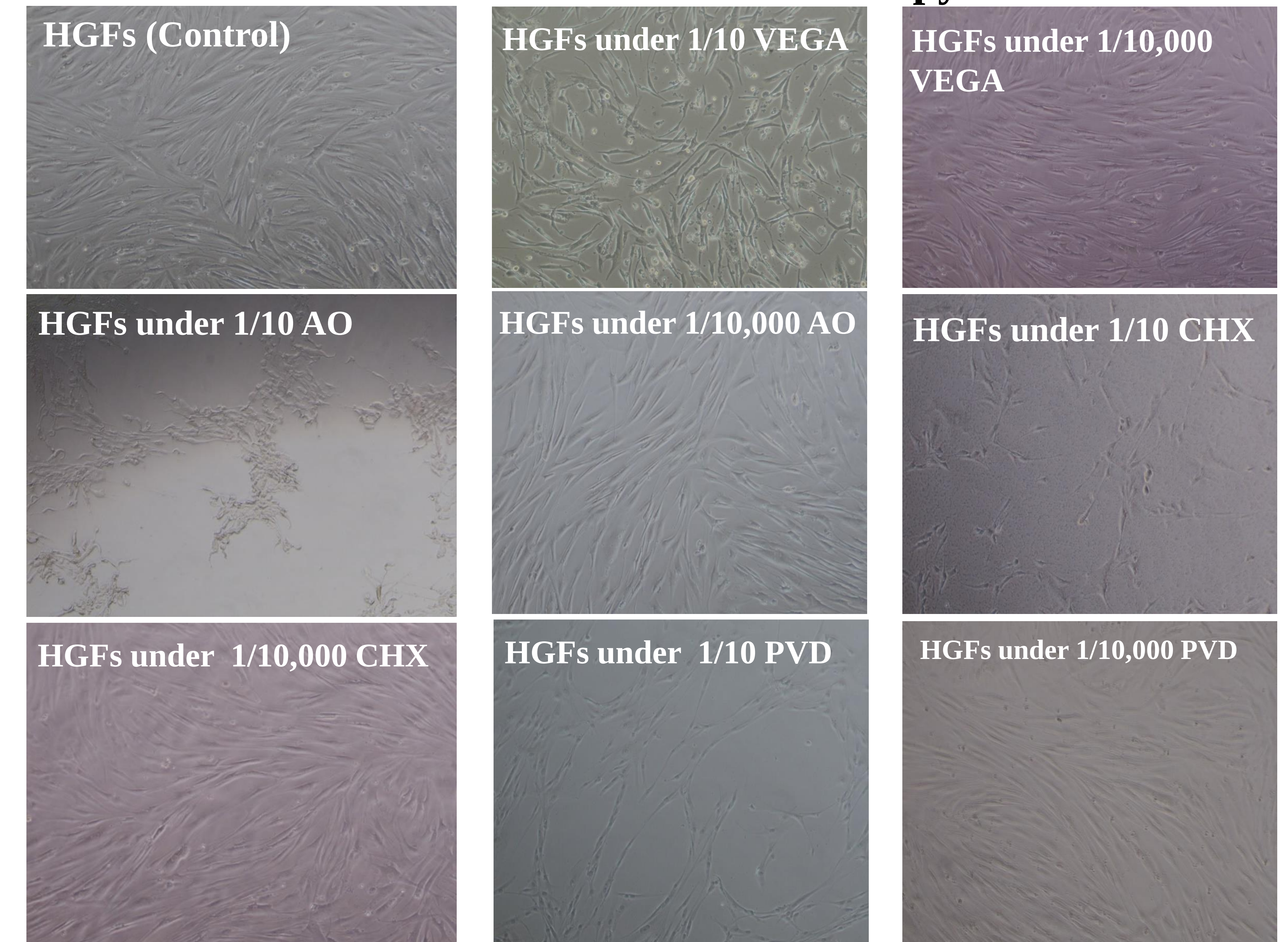
Effect of Antibacterial Agents towards HGF Cytotoxicity (LDH Assay)



CHX and AO were cytotoxic at all dilutions while PVD was cytotoxic at 1/10 and 1/100 dilution ($p < 0.05$).

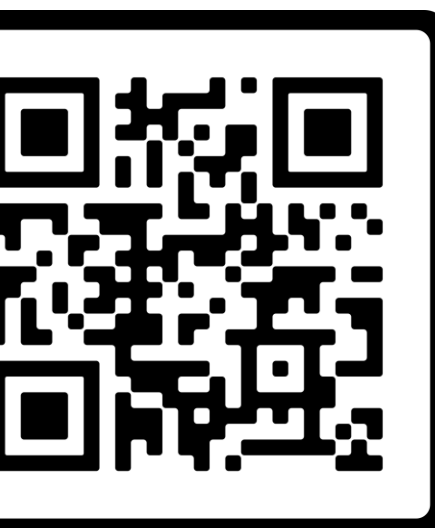
VEGA did not show cytotoxicity at any dilution ($p > 0.05$).

HGFs under 20x Microscopy:



CONCLUSION: CHX and PDV have superior antibacterial properties, but significantly reduced HGF proliferation at the higher concentrations. AO was bacteriostatic at lower dilution but was highly toxic to HGFs. VEGA revealed significant bacteriostatic activity at lower dilution and demonstrated no detrimental effects on the HGF's. This favorable property of VEGA towards fibroblasts may enhance healing outcomes. The results of our study may be extrapolated for developing a post-surgical protocol for periodontal and peri-implant soft and hard tissue deficiencies

References



SCAN ME

