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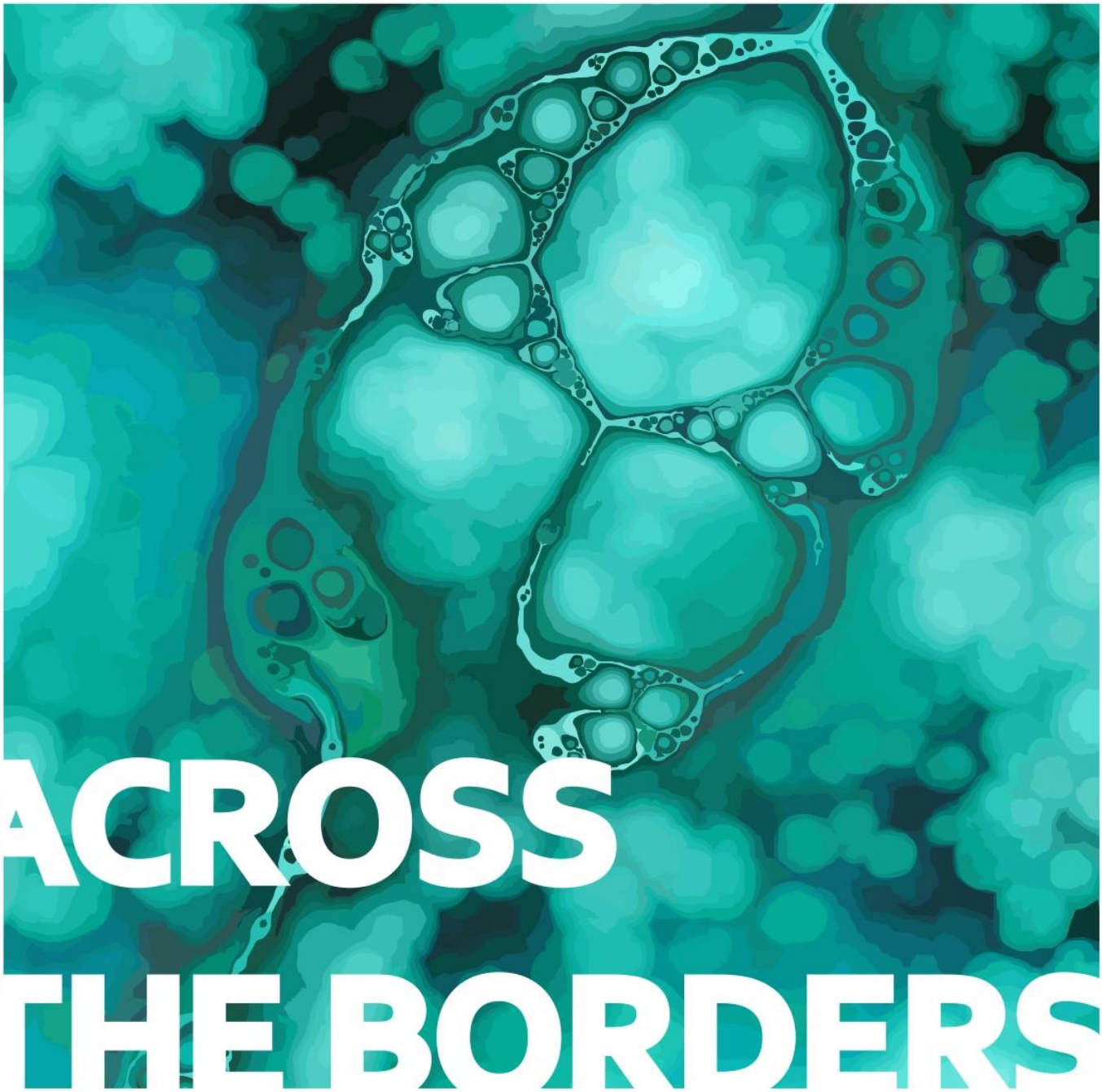

MEDICAL UNIVERSITY OF WARSAW

ABSTRACT BOOK

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Abstract No. PSP.28

Selection of optimal concentration of Doxycycline hyclate in a composition of Topical Foam Aerosol

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Objectives: Doxycycline hyclate, a synthetic derivative of tetracycline, serves as a broad-spectrum antibiotic, retaining its efficacy even after more than 40 years of clinical use [1]. Aerosol dosage forms offer several advantages over other pharmaceutical forms, including ease of use, purity, and cost- effectiveness in delivering potent efficacy [2].

Methods: Our research aims to justify the optimal concentration of doxycycline hyclate. The concentration of doxycycline in our model sample ranged from 0.25% to 1%, with a 2-fold increase in concentration. We introduced doxycycline into the concentrated solution in the form of a suspension with polyethylene glycol.

Results: The results of studies on the antimicrobial activity of the model sample are presented in Table 1.

Table 1. Growth inhibition zones of test microorganisms (n=5; P 95%).

Concentration of doxycycline, %	Diameter of growth inhibition zone of the test strain (mm) 10^7 CFU/ml in the upper layer of the culture medium	
	E. coli (SCA)	*S. aureus (SCA)*
0,25	19.1	23.3
	19.4	23.6
	18.9	24.3
	19.6	23.9
	19.3	24.2
X ±ΔX	19.26±0.75	23.86±0.52
0,5	20.1	24
	20.7	24.6
	20.9	25
	21.3	24.3
	21.5	24.7
X ±ΔX	20.9±0.68	24.5±0.46
1	24.1	28
	23.7	28.6
	23.9	28.3
	23.3	27.9
	23.5	28.2
X ±ΔX	23.7±0.88	28.2±0.34

Conclusions: The analysis of the data indicates that increasing the concentration of doxycycline from 0.25% to 1% results in a gradual increase in the zones of growth inhibition for the test cultures. At a doxycycline concentration of 0.25%, the inhibition zone diameters were measured at 19,26 mm ± 0.75 for *E. coli* and 23,86 mm ± 0.52 for *S. aureus*. A twofold increasing in concentration of doxycycline (from 0.25% to 0.5%) led to a 1.1-fold increase in the zones of growth inhibition for E. coli and a 1.03-fold increase for *S. aureus*.

Further increasing the doxycycline concentration from 0.5% to 1% resulted in enhanced antimicrobial activity, with inhibition zone diameters increasing from 20.9 mm ± 0.68 to 23.7 mm ± 0.88 for *E. coli* and from 24.5 mm ± 0.46 to 28.2 mm ± 0.34 for *S. aureus*. The zones of inhibition around the wells increased by 1.13 and 1.18 times for *E. coli* and *S. aureus*, respectively. Therefore, it is advisable to select a concentration of 1% doxycycline in the composition of the model sample.

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