Staphyphage: Biorisk reduction in MRSA research

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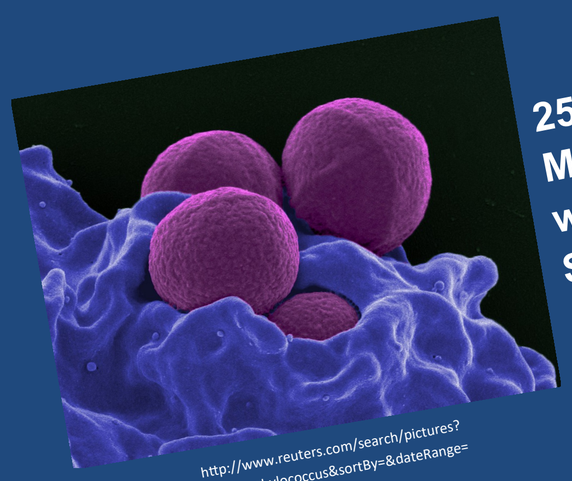
Introduction

Staphylococcus aureus is an opportunistic human pathogen that has the ability to cause both health care-associated and community-acquired infections [1]. It has been identified as one of the **'high priority pathogen'** by the World Health Organization (WHO) [5] The infections were once, easily treated with antibiotics before resistance against beta-lactams (eg. Methicillin) and glycopeptides (eg. Vancomycin) began to emerge over the years and caused an increase in mortality and morbidity rates in patients infected with S. aureus [2,3]. This has led to an increased interest in the exploration of the use of bacteriophage as an alternative approach way to combat MRSA because a bacteriophage has bacteriolytic mechanism independent from those of any known antibiotics [5]. The availability of a virulent and broad spectrum bacteriophage against MRSA may significantly reduce the overall biorisk as it acts as an effective treatment in case of exposure.

Objectives

To evaluate the antibacterial property of Staphyphage ϕNuSA-10 against Methicillin Resistant (MRSA) and Methicillin Sensitive (MSSA) *Staphylococcus aureus.*

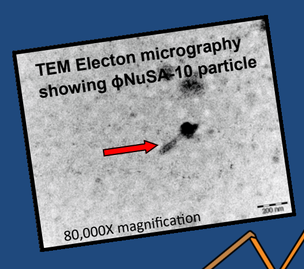
Methods



http://www.reuters.com/search/pictures?blob=staphylococcus&sortBy=&dateRange=

25 and 36 Clinical strains of MRSA and MSSA respectively were obtained from the Sarawak General Hospital

ϕNuSA-10, is a Myovirus-like Staphyphage isolated from the sewage against *Staphylococcus aureus* ATCC 25923.



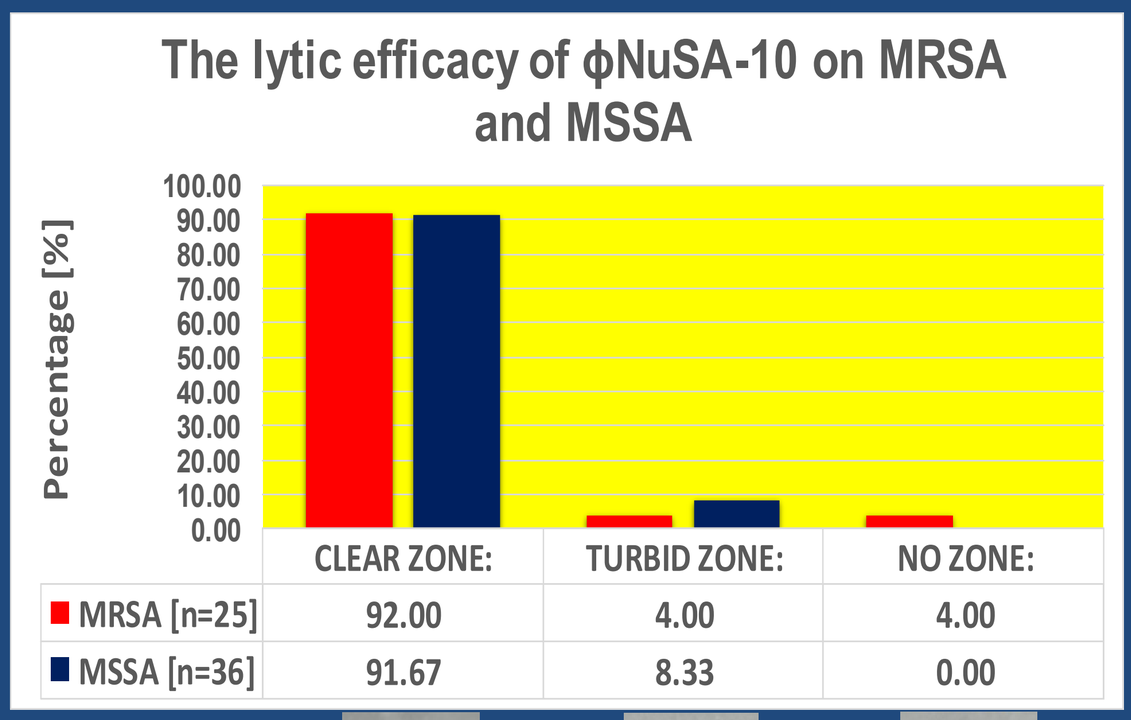
https://simple.wikipedia.org/wiki/Bacteriophage

Image courtesy Wikimedia Commons

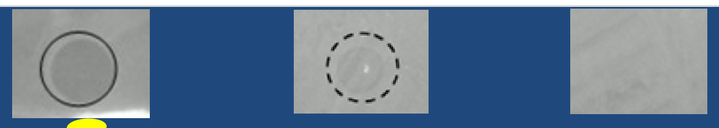
Infecting MRSA isolates with ϕNuSA-10 using the spot test assay

Scan QR code to watch the life cycle of a bacteriophage

Result



	CLEAR ZONE:	TURBID ZONE:	NO ZONE:
MRSA [n=25]	92.00	4.00	4.00
MSSA [n=36]	91.67	8.33	0.00



ϕNuSA-10 **kills** ~92% of both MRSA and MSSA

Conclusion

The effectiveness of ϕNuSA-10 against MRSA and MSSA reduces the biorisk of MRSA research as it acts as a potential alternative yet effective antimicrobial against MRSA and potentially VRSA in the absence of effective antibiotics. Nevertheless, complete characterization, risk assessment and purification of ϕNuSA-10 are required before being used for therapeutic purpose.

References

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