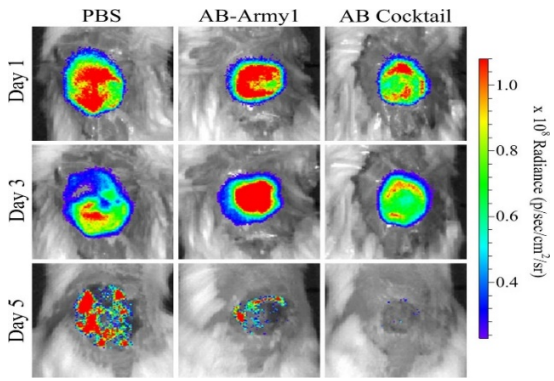
ntimicrobial Resistance (AMR) is a global health
ienomenon that has rendered microbes such as bacteria
sistant against antimicrobials, like antibiotics, which are
tended to fight it. AMR is a major problem and new
tibiotics are not being developed at a fast-enough rate to
mpete with the evolution of bacterium. There are many
cteria that are immune to antibiotics, however the *ESKAPE*
thogens are the most growing in cases, and among them is
cinetobacter Baumanni (*A. Baumannii*). This bacteria is
sponsible for numerous nosocomial infections, outbreaks,
d illnesses such as pneumonia. There have been many
terventions in place to stop the spread of A. Baumanni. One
lution includes furthering the study of the immune system
d its interactions with the bacteria. Other interventions
clude the use of "last resort" antibiotic, colistin both by itself
d in conjunction with other antibiotics. Another possible
lution to stop the advances of A. Baumannii in people is
cteriophage therapy. Bacteriophages are viruses that target
ecific bacteria in a microbiome. This review analyzes the
sults of bacteriophage therapy on A. Baumannii in different
vivo subjects. It first looks at how mice who have been
mpromised with the bacteria respond to the phage therapy.
ien, it looks at how patients who have been infected by the
thogen respond to the phage therapy in the few performed
inical studies published regarding the pathogen. This data
as acquired through extensive research of databases PubMed
d Google Scholar using keywords and phrases such as, '*A.*
umannii', 'bacteriophage therapy', and 'in vivo phage
erapy'. The data found regarding mice models were
alyzed based on the success of their respective
cteriophage regiments in combating A. Baumannii. The
ccess was determined by the bacteriophage intervention

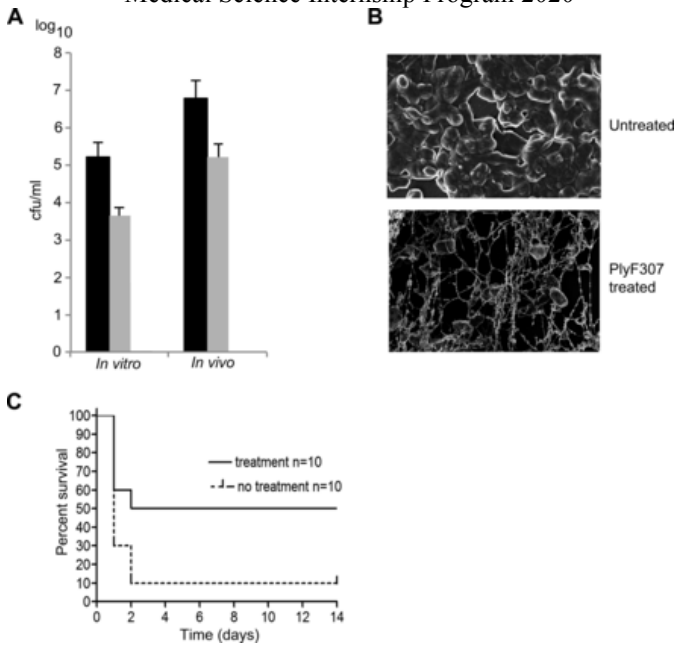


Bioluminescence of the infected wound bed. The
oluminescence of *A. baumannii* AB5075::lux was measured (in
otons/s/cm2/steradian) for each mouse wound by using an IVIS *in*
vo imaging system. Pictured are exemplar images of wound
oluminescence of mice from each group on days 1, 3, and 5
stinfection. Figure S2 in the supplemental material shows all IVIS
ages for every mouse used in this study.

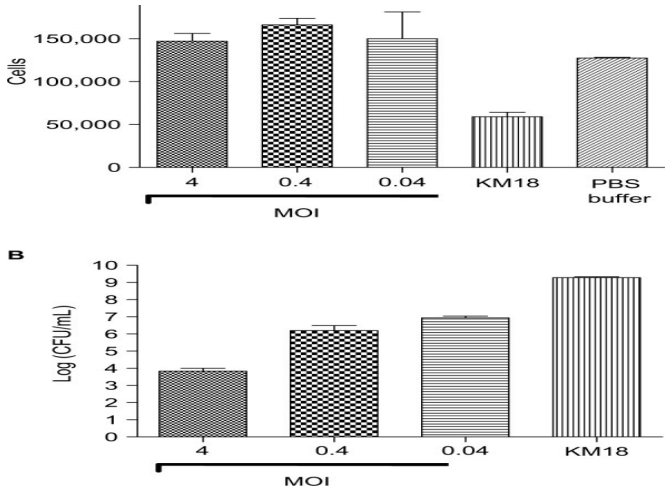
Aissatou Barry

The efficacy of bacteriophage therapy as an alternative treatment for multi-drug resistant bacteria, Acinetobacter Baumannii

Medical Science Internship Program 2020



Ability of PlyF307 to degrade *A. baumannii* biofilms *in vitro* and *in vivo* and to rescue mice from lethal bacteremia. (A) *A. baumannii* biofilms were formed *in vitro* on catheters for 24 h before being treated *in vitro* with PlyF307 for 2 h. For the *in vivo* samples, whole catheter pieces with 2-day-old biofilms were implanted subcutaneously in the backs of mice. After 24 h, two doses of 1 mg of PlyF307 or buffer were administered subcutaneously, 4 h apart, at the implanted site. Two hours after the last dose, the catheter was removed and sonicated, and the dislodged *A. baumannii* organisms were plated for CFU enumeration. Black bars, controls; light gray bars, samples treated with PlyF307. (B) A 3-day-old *A. baumannii* biofilm was established on a catheter and treated for 30 min with 250 µg PlyF307 before being analyzed using scanning electron microscopy. Magnification, ×20,000. (C) Mice were infected i.p. with 108 CFU of *A. baumannii*. They received a single dose of PlyF307 (1 mg) or buffer i.p. 2 hours later, and they were monitored for survival for 14 days.



Murine RAW 264.7 macrophage cell line survival test. **Notes:** (**A**) Numbers of surviving RAW 264.7 cells after infections with KM18 and different MOIs of φkm18p. (**B**) Bacterial clearance (CFU/mL) in cells infected with different MOIs of φkm18p. **Abbreviations:** CFU, colony-forming units; MOIs, multiplicities of infection.

Conclusion

- Bacteriophage therapy against A. Baumannii in murine models are more successful than the control groups
- When implemented clinically, A. Baumannii-killing bacteriophages are successful.

Future directions include more clinical trials need to be conducted for more knowledge on the human application of bacteriophage therapy.

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