Microbes and Infectious Diseases 2023; Article-In-Press, **DOI:** 10.21608/mid.2023.236659.1621

Microbes and Infectious Diseases

Journal homepage: https://mid.journals.ekb.eg/

Letter to the Editor

Bacteria biofilms: navigating the way forward

Ayodele Isaac Adedokun [1*], Samuel Eniola Gana [2], Blessing Opeyemi Adenrele [3]

1- Department of Chemical Pathology, School of Medical Laboratory Science, Usmanu Danfodiyo University Sokoto, Nigeria
2- Department of Immunology, School of Medical Laboratory Science, Usmanu Danfodiyo University Sokoto, Nigeria
3- Department of Medical Microbiology, School of Medical Laboratory Science, Achievers University Owo, Ondo State, Nigeria

LETTER INFO

Letter history:
Received 23 September 2023
Received in revised form 5 October 2023
Accepted 8 October 2023

To the Editor

People might not be conversant with the word "biofilm" but have experienced what it is on a daily basis. Considering the selective pressure exerted on microbial life, bacteria have evolved to adapt to several niches suitable for their growth and survival by producing substances such as biofilms, a uniqueness in nature. Their study has increased in recent decades due to its notable impact on animal and human health. The relationship between high tolerance to antimicrobial agents cannot be overemphasized and exploring novel therapeutic options looks promising.

The broad heterogeneity of phenotypes formed in the biofilm architecture allows them to release Quorum-sensing small signalling molecules that allow communication with their environment [1]. High cell density within the biofilm environment can initiate horizontal gene transfer process through conjugation [2].

To date, bacteria biofilm species are almost unculturable at an early stage showing culture-negative results as some are believed to be activated in the host system rather than on the culture media inducing in-vivo toxicity. Bacteria biofilms are implicated in many hospitals and community-acquired infections [3], the most common associated with carbapenem resistance. Biofilms can also induce or regulate local inflammation, and may also help other pathogens evade attacks by the host immune system [4].

Among all studied animal infections, Staphylococcus aureus strains isolated from different animal species produced biofilms with those from rabbits producing the highest percentage, cows and pigs with less biofilm formation [5]. Most biofilm studies on animal infections are not usually documented and poses a major setback to the one-health approach [5]. An association between biofilm formation in animals and antimicrobial resistance needs to be fully established.

In conclusion, understanding how several bacteria species survive and evade antimicrobial agents and host immune system attacks is crucial. Thus, characterization of the chemical composition of the extracellular polymeric substance (EPS) could proffer better solutions in the design and development of bioproducts for biofilm-related infections. A comprehensive understanding of biofilm structure and composition might help researchers elucidate a potent substance that can either degrade or interact with biofilms for a significant impact on human and animal health.

DOI: 10.21608/MID.2023.236659.1621
* *Corresponding author:* Ayodele Isaac Adedokun
E-mail address: ayodeleisaac95@gmail.com
© 2020 The author (s). Published by Zagazig University. This is an open access article under the CC BY 4.0 license ***https://creativecommons.org/licenses/by/4.0/.***

Conflicts of interest

There was no conflict of interest in this work.

Funding

None declared.

References

1- **Jaffar N.** Bacterial biofilm and the medical impact. Focus on bacterial biofilms. Intechopen, Rijeka 2022; chapter 2. doi:10.5772/intechopen.103171

2- **Umer AA.** Review on the role of biofilm formation in bacterial pathogenesis. Austin Journal of Veterinary services and animal husbandry 2023; 10(1):1110.

3- **Katongole P, Nalubega F, Florence NC, Asiimwe B, Andia I.** Biofilm formation, antimicrobial susceptibility and virulence genes of uropathogenic Escherichia coli isolated from clinical isolates in Uganda. BMC Infectious Diseases 2020; 20(1):1-6.

4- **Jacques M, Malouin F.** One Health-One Biofilm. Veterinary Research 2022; 53:51.

5- **Silva V, Correia E, Pereira JE, Gonzalez-Machado C, Capita R, Alonso-Calleja, et al.** Biofilm Formation in Staphylococcus aureus from pets, livestock and wild animals: Relationship with clonal lineages and Antimicrobial Resistance. Antibiotics 2022; 11(6):777.

Adedokun AI, Gana SE, Aden BO. Bacteria biofilms: navigating the way forward. Microbes Infect Dis 2023; Article-In-Press, **DOI:** 10.21608/mid.2023.236659.1621.