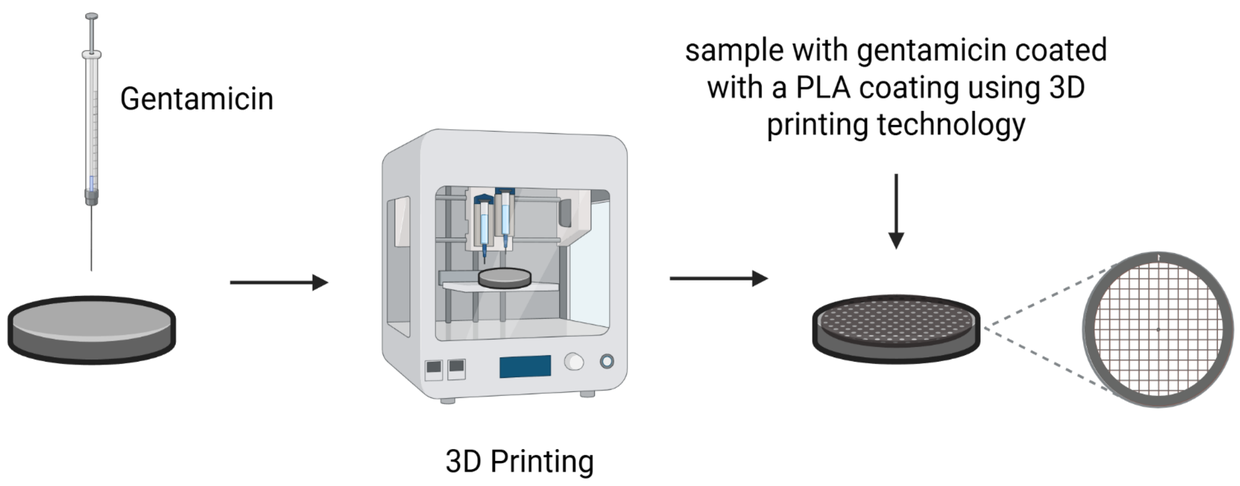
IOCM 2025 Conference
The 4th International Online Conference on Materials
3–6 November 2025 | Online
MDPI

Effect of Surface Printing on the Release Kinetics of Gentamicin from Gradient Samples for Bone Applications

Dominika Julia Wanat 1, Julia Sadlik 1, Katarzyna Haraźna, Agnieszka Tomala
1 Department of Materials Engineering, Faculty of Materials Engineering and Physics, CUT Doctoral School, Cracow University of Technology, 37 Jana Pawła II Av., 31-864 Kraków, Poland

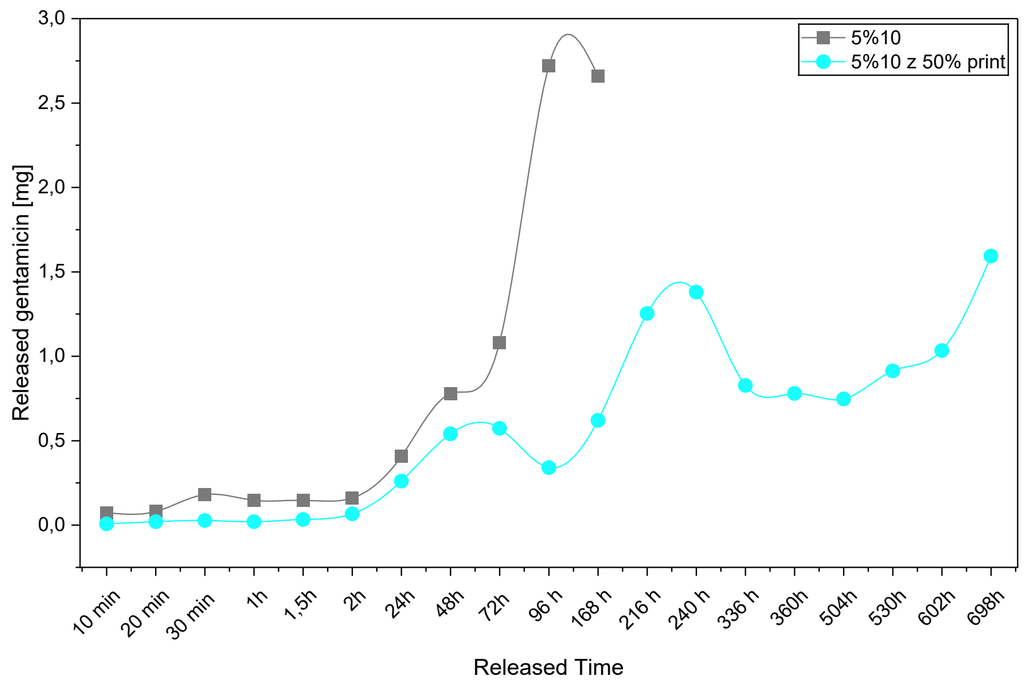
INTRODUCTION & AIM

The study aimed to investigate the release kinetics of gentamicin from a gradient-structured sample designed for bone applications and to assess the effect of surface printing on drug release. The gradient porosity enabled controlled fluid penetration and gradual release, while the surface-printed layer was expected to prolong the release by forming an additional diffusion barrier.



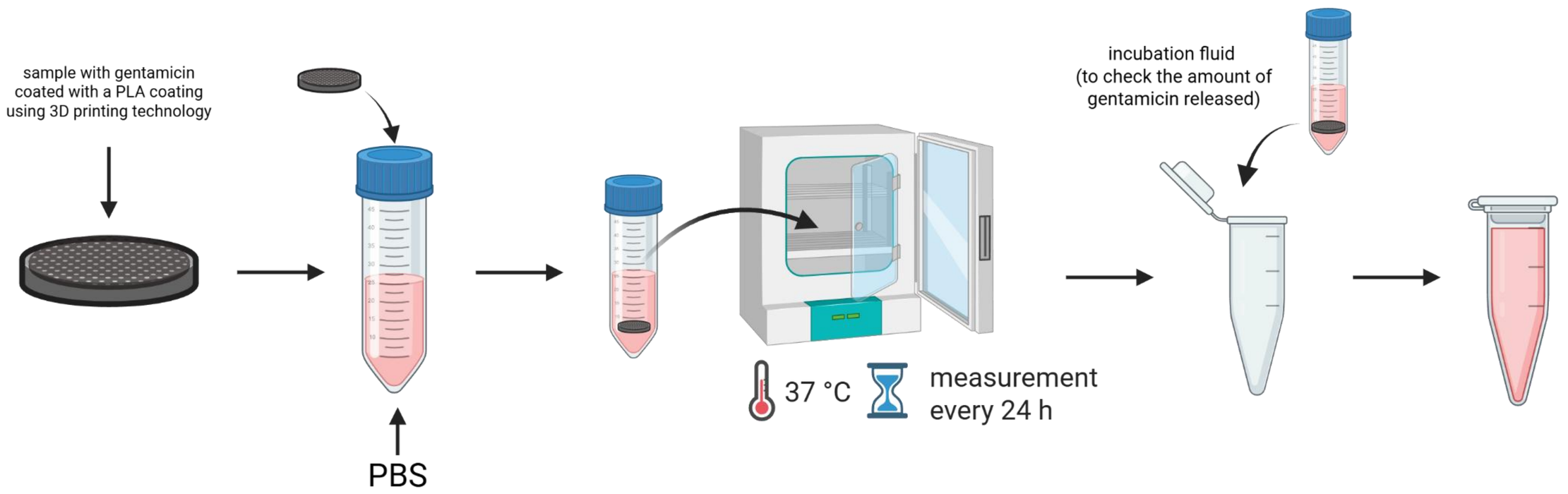
RESULTS & DISCUSSION

The gradient structure ensured an initial therapeutic release followed by a gradual decline. Surface-printed samples showed a lower burst effect and a more uniform, extended release profile. The printed layer acted as an additional diffusion barrier, effectively slowing drug diffusion.



METHOD

Gradient samples were fabricated and modified by surface printing with a gentamicin-containing layer. Release studies were performed under static conditions in PBS (pH 7.4) at 37 °C. At defined intervals, aliquots were collected and analyzed spectrophotometrically to determine gentamicin concentration.



FUTURE WORK / REFERENCES

The authors gratefully acknowledge financial support of the project “New Generation of Bioactive Laser Textured Ti/Hap Implants” under the acronym “BiLaTex” carried out within M-ERA.NET 3 Call 2022 programme in the National Centre for Research and Development NCBR (registration no.: ERA.NET3/2022/48/BiLaTex/2023)

Faculty of Materials Engineering and Physics
M-ERA.NET
NCBR National Centre for Research and Development
Cracow University of Technology
TAL TECH
UNIVERZA V LJUBLJANI University of Ljubljana
ATMAT