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Anti-adhesive surface properties of nature-based hydroxyapatite scaffolds against bacteria

Elisa Restivo[1], **Giovanni Lo Bello**[2], Lorenzo Fassina[3], Aurora Ferrari[4], Alberto Ballardini[5], Giacomo Morozzi[5], Roberto Raiteri[2], Simone Sprio[6], Anna Tampieri[6], Livia Visai[1,7]

1 Molecular Medicine Department (DMM), Centre for Health Technologies (CHT), Unità di Ricerca (UdR) INSTM, Interuniversity Center for the Promotion of the 3Rs Principles in Teaching and Research (Centro 3R), Operative Unit (OU) of University of Pavia, Pavia, Italy
2 Department of Informatics, Bioengineering, Robotics and System Engineering—DIBRIS, University of Genoa, Genoa, Italy
3 Department of Electrical, Computer and Biomedical Engineering, University of Pavia, Pavia, Italy
4 Department of Industrial Engineering, University of Bologna, Bologna, Italy
5 GreenBone Ortho SpA, Faenza, Italy
6 Institute of Science, Technology and Sustainability for Ceramics - Italian National Research Council (ISSMC-CNR), Faenza, Italy
7 UOR6 Nanotechnology Laboratory, Department of Prevention and Rehabilitation in Occupational Medicine and Specialty Medicine, Istituti Clinici Scientifici Maugeri IRCCS, 27100 Pavia, Italy

e-mail: giovanni.lobello@edu.unige.it; elisa.restivo@unipv.it

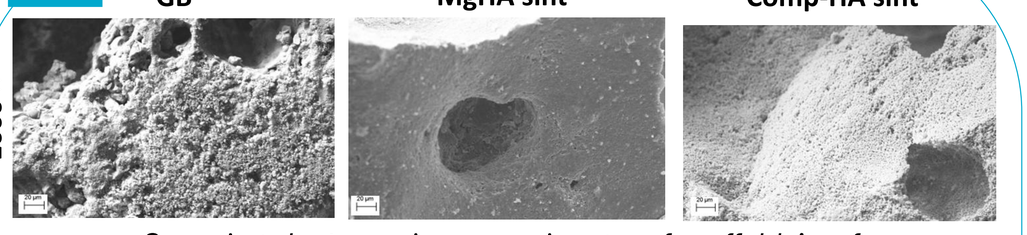
Introduction

In the field of orthopedics, there is the need for biocompatible and antibacterial scaffolds that can be used as bone implants. They must be capable of guiding and sustaining the natural metabolism of cells towards tissue regrowth as well as conferring antibacterial properties to prevent post-surgical infections.

Evaluation of anti-adhesive properties of hydroxyapatite (HA) scaffolds' surface against planktonic cultures of *S. aureus* MRSA & *P. aeruginosa* bacteria

Results

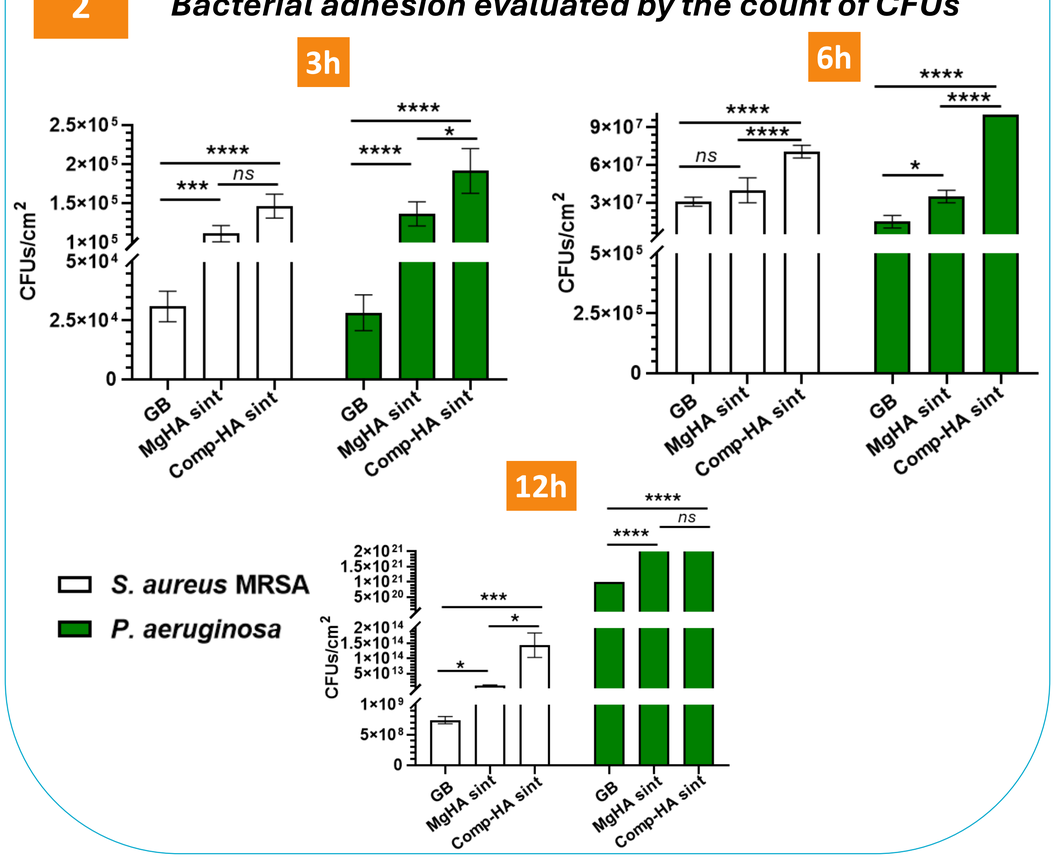
1



Scanning electron microscopy images of scaffolds' surfaces

Haralick and **AFM analyses** demonstrated a difference in texture and roughness among all the scaffolds in terms of morphology and topography. GB surfaces is the most flat compared to the others.

2 ***Bacterial adhesion evaluated by the count of CFUs***

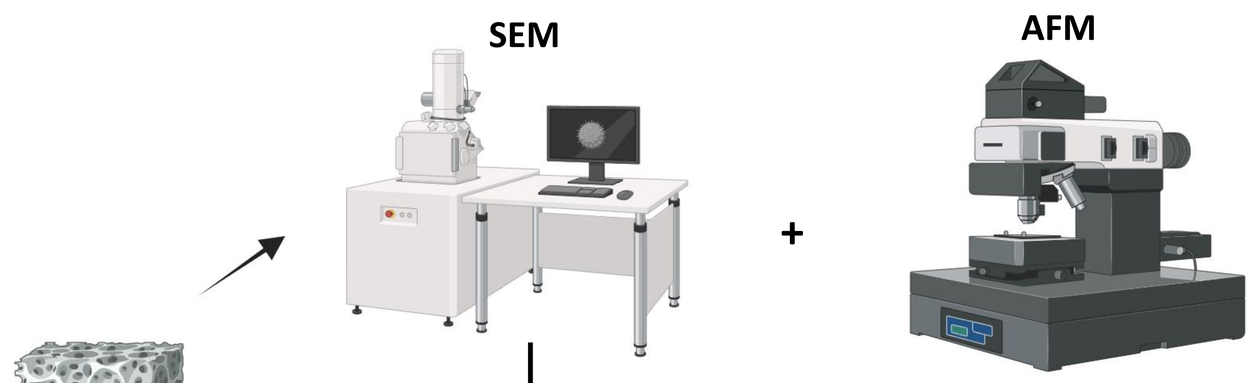


Experimental section

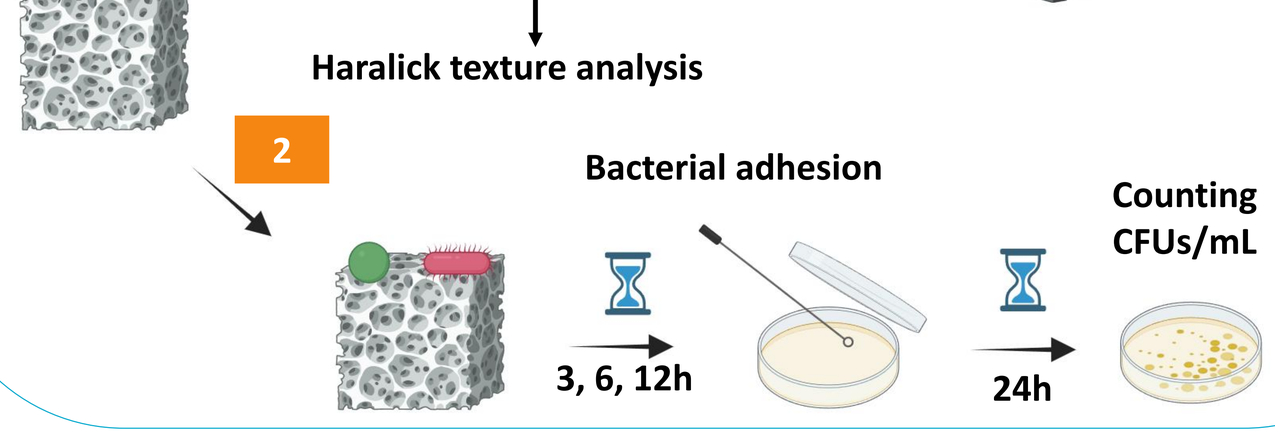
HA scaffolds

- ❑ GB: wood-derived scaffolds (not-sintered)
- ❑ MgHA (sintered)
- ❑ Comp-HA (sintered)

1 **Morphological & topographical characterization**



2 **Bacterial adhesion**



The obtained data demonstrated a difference in roughness and texture among all the scaffolds in terms of morphology and topography. Preliminary microbiological results indicated a reduced adhesion on surfaces, in particular on GB scaffolds, suggesting a correlation between surface properties and bacterial adhesion behavior.

GreenBone scaffold is a nature-based synthetic, resorbable bone substitute, that is suitable for surgical reconstruction of bone defects and implantation in the human body. Further microbiological studies will be conducted to evaluate the anti-adhesive properties of the scaffold.

References

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[3] Restivo E. et al, 2024, 10.3390/jfb15010024.

Acknowledgements