

Anti-bacteria Ti- based alloys for bone implants

Y. Fortouna, A. Balerba, Ch. E. Lekka*

*Department of Materials Science and Engineering, University of Ioannina
Institute of Materials Science and Computing, Univ.of Ioannina, Ioannina, Greece*

J.J. Gutierrez-Moreno

BSC – Barcelona Supercomputing Center, Barcelona, Spain

L. A. Alberta, M. Calin

*Institute of Complex Materials, IFW Dresden, Helmholtzstraße 20, 01069
Dresden, Germany*

Bacteria colonization and biofilm formation on orthopaedics or dental implants usually appears after an implant surgery causing serious infections while resist highly to conventional antibiotic treatment. For these reasons, innovative materials that will fruitful the metallic implants' requirements such as low Young moduli, high corrosion resistance and minimal cytotoxicity along with anti-bacterial properties are urgent/important to be designed. [1,2]

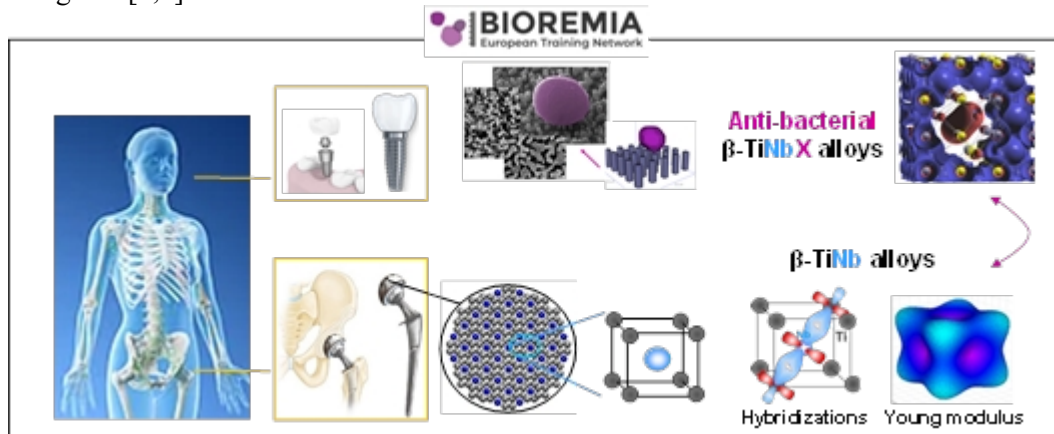


Figure 1: Structural, electronic and mechanical properties of Ti based alloys for hard tissue implants applications

The β -type Ti-Nb alloys have been suggested as promising materials for replacing the widely used TiAl_6V_4 implants while their enrichment with elements showing antibacterial properties like Ga, Cu and Ag might cause antibiofilm activity [2,3,4].

The results of this work could be of use in the design of antibacteria, low rigidity β -type Ti-alloys with non-toxic additions, suitable for orthopedic and orthodontics applications.

Acknowledgements

This work is supported by the Bioremia (H2020-MSCA-ITN-2019, No 861046, 2020-2024) and BioTiNet (FP7-PEOPLE-2010-ITN No 264635, 2011-2014).

References

- [1] Mitsuo Niinomi, Metals for biomedical devices. Woodhead Publishing Limited (2010)
- [2] Lekka, Gutiérrez-Moreno, Calin, J. Phys. Chem. Solids 102 (2017) 49
- [3] Gutiérrez Moreno, Panagiotopoulos, Evangelakis, Lekka, (2020), 13,1–11, 1288
- [4] Alberta, Fortouna, Vishnu, Gebert, Lekka, Calin (to be submitted)

* chlekk@uoi.gr