Innovative pathways in bioactive materials: The role of bioactive glasses in modern science and technology (Part II)

Sílvia Gavinho
i3N and Physics Department, University of Aveiro, Portugal
Glass2Med, Lda, Aveiro, Portugal

4 November 2025

Abstract

Bioactive glasses have increasingly assumed a prominent role in various fields of biomedicine due to their remarkable ability to integrate with and regenerate biological tissues. In orthopaedics and dentistry, they are widely used in bone substitutes, coatings for metallic implants, and dental regeneration pastes, promoting osteoconduction and osteoinduction. In tissue engineering, they serve as bioactive matrices for cell growth and can be combined with biodegradable polymers to form hybrid scaffolds with optimized mechanical and biological properties. Emerging applications include the development of bioactive glasses doped with therapeutic ions (such as silver, copper, or zinc), which provide antibacterial, angiogenic, and anti-inflammatory properties, as well as their integration into controlled drug delivery systems. More recently, these materials have shown great potential in the regeneration of soft tissues, including muscles, tendons, and peripheral nerves, due to their ability to modulate cellular responses and promote neovascularization. In the field of wound healing, bioactive glasses are incorporated into bioactive dressings and gels, accelerating tissue repair and preventing infections. In the cosmetic sector, they have been applied in regenerative formulations and anti-ageing products, exploiting their ability to stimulate collagen production and improve skin quality. Overall, bioactive glasses represent a versatile and multifunctional class of materials with broad potential in regenerative medicine, healthcare, and beyond.

About the lecturer

Sílvia Rodrigues Gavinho has been a Junior Researcher at the University of Aveiro since October 2024. More recently, she became Co-founder and Chief Technology Officer (CTO) of Glass2Med, a spin-off company specializing in biomaterials. She holds a Bachelor's degree in Applied Biology (2012) and a Master's degree in Biophysics and Bionanosystems (2016), both from the University of Minho. In 2024, she completed her PhD in Physics Engineering at the University of Aveiro. Dr Gavinho's expertise is in experimental techniques in the field of biomaterials, with a particular focus on bioactive glasses for applications in

regenerative medicine. Her research also encompasses the structural, morphological, biological, and electrical characterization of biomaterials. Since 2017, she has been working on the development of microstructured metal coatings based on biomaterials. She has been affiliated with the associated laboratory i3N — Institute of Nanostructures, Nanomodelling and Nanofabrication since 2017, serving in different roles, including research fellow, FCT-funded Ph.D. student, and now as a researcher.