Contribution ID: **267** Type: **Poster Presentation**

Surface Modified Glassy Carbon for Improved Fibronectin Protein Adsorption and Bioactivity in Bone Implants

Abstract:
Glassy Carbon (GC) has gained attention as a potential substrate for bone-implant application owing to its excellent properties such as biocompatibility, chemical stability, and mechanical strength. Despite these benefits, tissue integration and cellular adherence are restricted by it's inherently bio inert surface. To increase bioactivity and encourage osteointegration, protein adsorption on GC must be improved.In this study, we investigate the protein adsorption behaviour of fibronectin (a key extracellular matrix protein involved in osteoblast attachment and spreading) on GC surfaces subjected to various physicochemical modifications. To enhance surface reactivity, GC samples will undergo different surface pre-treatment, including polishing, polishing followed by biomimetic coating of apatite (HAp) layer on GC surface , acid etching (with HNO3) and acid etching followed by HAp coating. Fibronectin adsorption will be evaluated in vitro by immersing the treated surfaces in a fibronectin solution at 37 ℃ for 4 hours. Surface morphology before and after each treatment will be assessed using Scanning Electron Microscopy (SEM), while Atomic Force Microscopy (AFM) will quantify surface roughness, adhesion forces, and mechanical properties (Young's modulus) to assess protein-surface interactions. Fluorescence microscopy, including confocal imaging, will be used to analyse protein coverage, distribution, and potential conformational differences across treatments. Additionally, SEM will be used in visualizing fibronectin localization and structure on the surface.
Key words: Fibronectin Adsorption, apetite, Osteointegration, Surface Roughness.

Apply for student award at which level:

PhD

Consent on use of personal information: Abstract Submission

Yes, I ACCEPT

Primary author: MATHEWS, Thabiso (University of Pretoria)

Co-authors: Dr THABETHE, Thabisile (University of Pretoria); Mr MASHABELA, Tshegofatso (University of Pretoria); Dr NTSOANE, Tshepo (NECSA); Ms DOCKRAT, Unaisa (University of Pretoria)

Presenter: MATHEWS, Thabiso (University of Pretoria)

Session Classification: Poster Session

Track Classification: Track A - Physics of Condensed Matter and Materials