QUANTIS

Where Human Biology Meets Precision Biofabrication

TERMIS EU-Chapter 2026 PALMA DE MALLORCA 21-24 APRIL / SPAIN

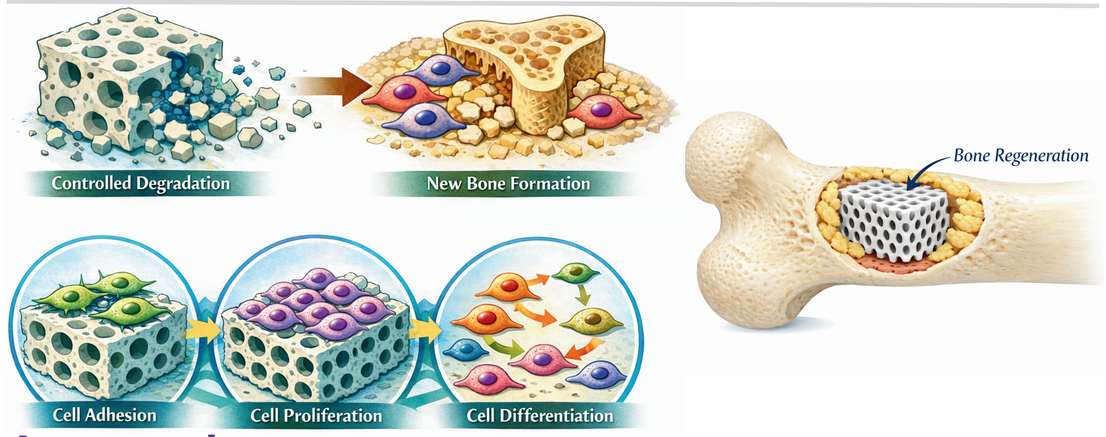
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3D-Printed scaffolds functionalized with extracellular matrix for bone regeneration

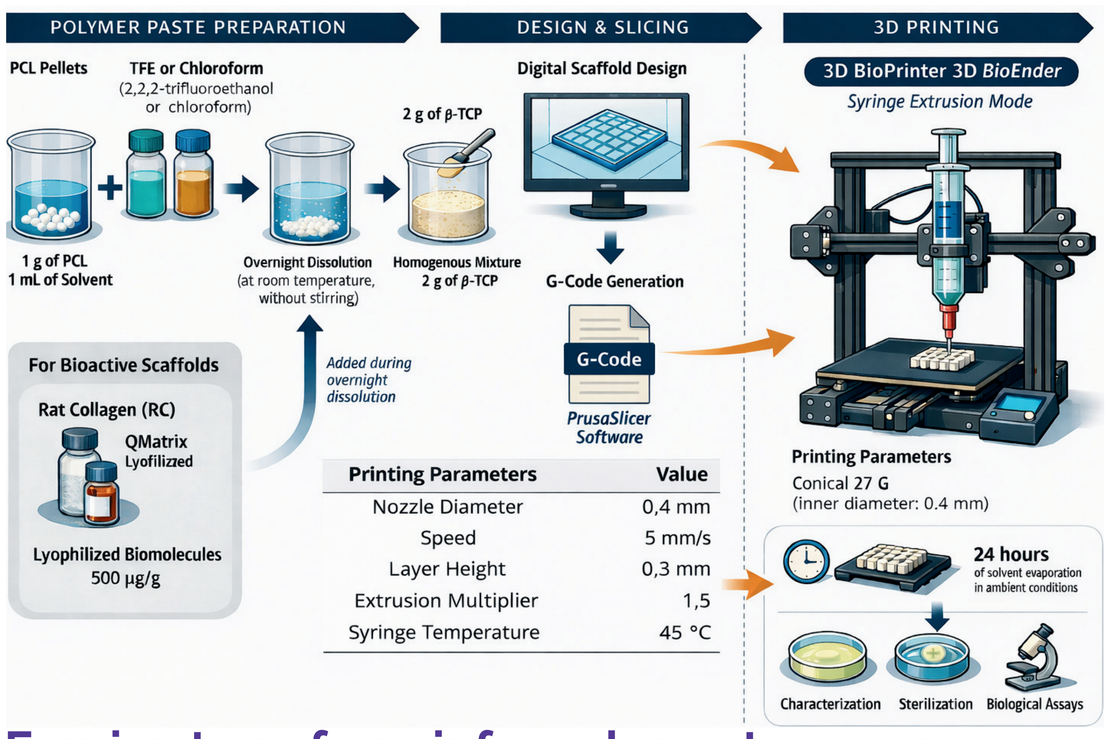
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Introduction



Approach



Fourier-transform infrared spectroscopy

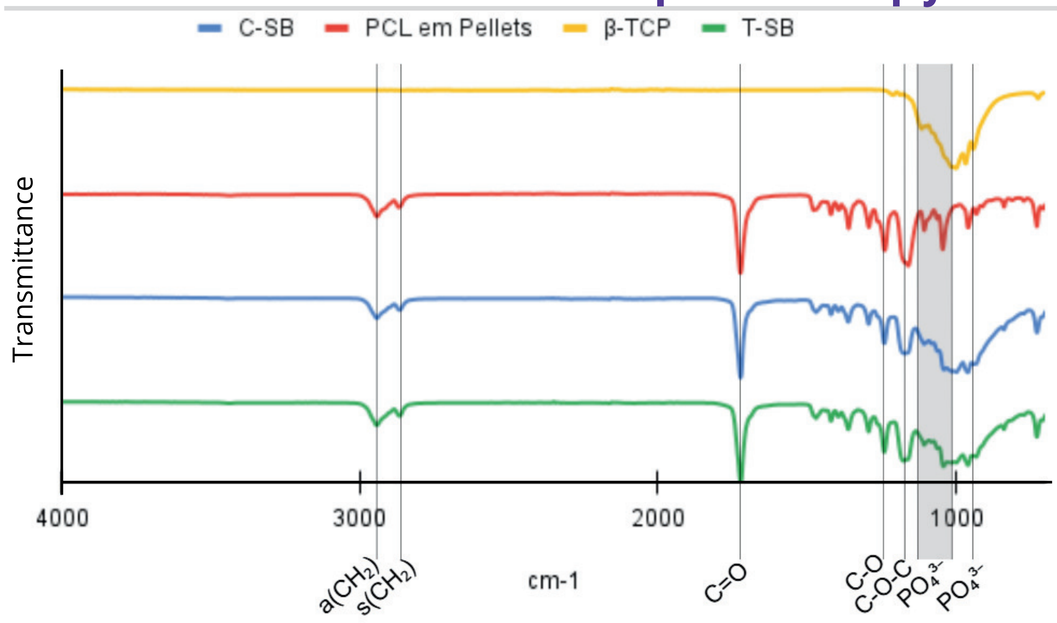


Figure 1. FTIR spectra of PCL/β-TCP scaffolds show characteristic bands, confirming a physical mixture and complete solvent removal.

Cell Viabillity - Resazurin

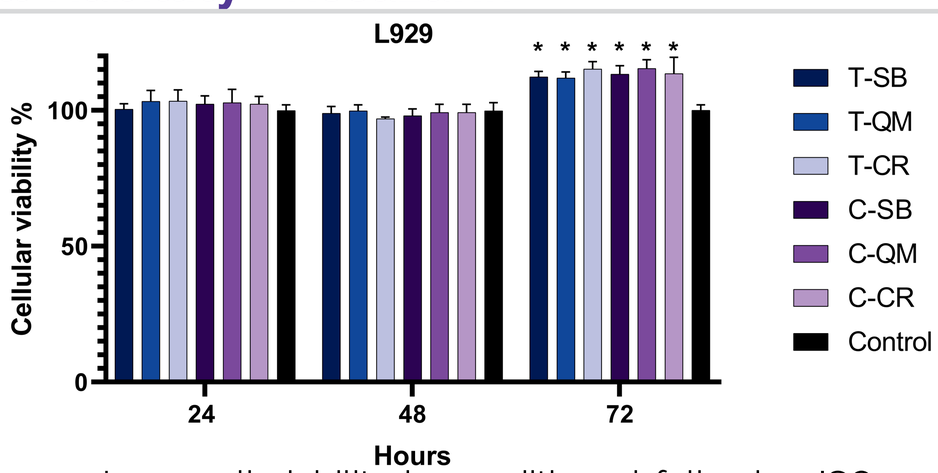


Figure 2. L929 cell viability in conditioned following ISO 10993-5 and ISO 10993-12. All groups showed high viability, with increased values at 72 hours.

Scanning Electron Microscopy and cell adhesion

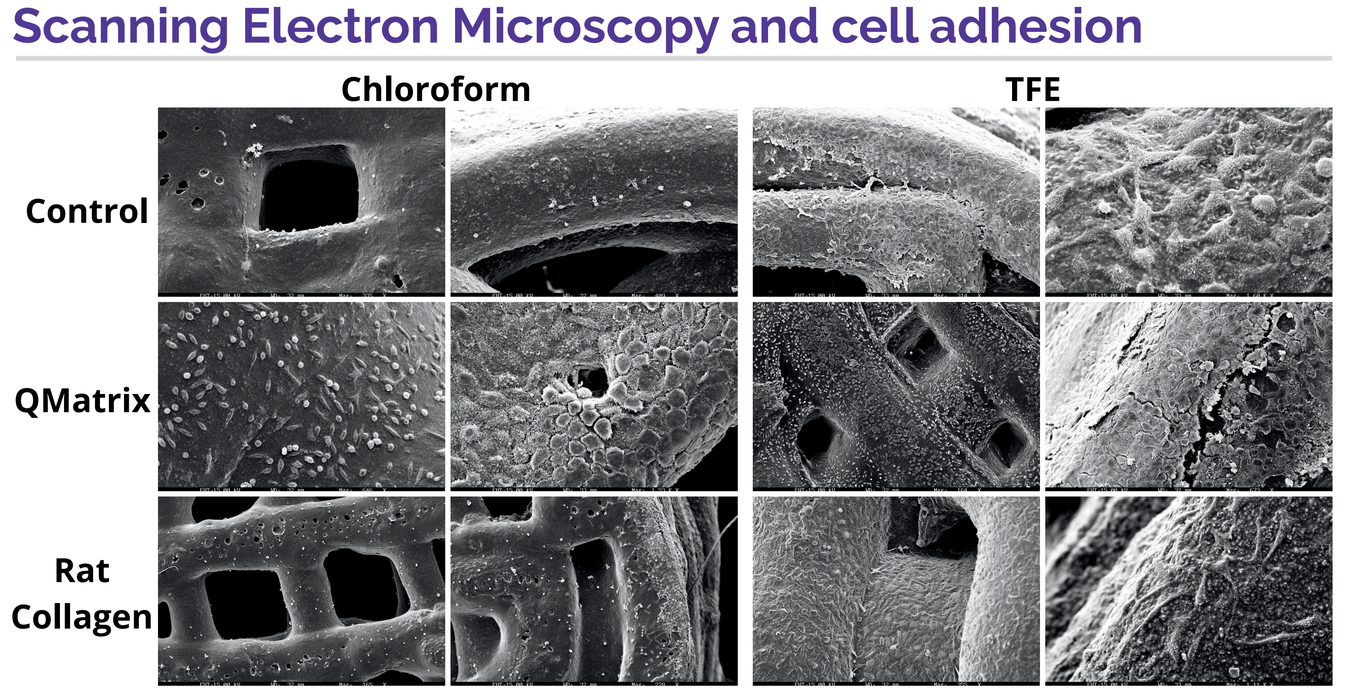


Figure 3. L929 cell adhesion on scaffolds. TFE and QMatrix improved adhesion after 10 days.

Osteoinduction - Alkaline phosphatase activity

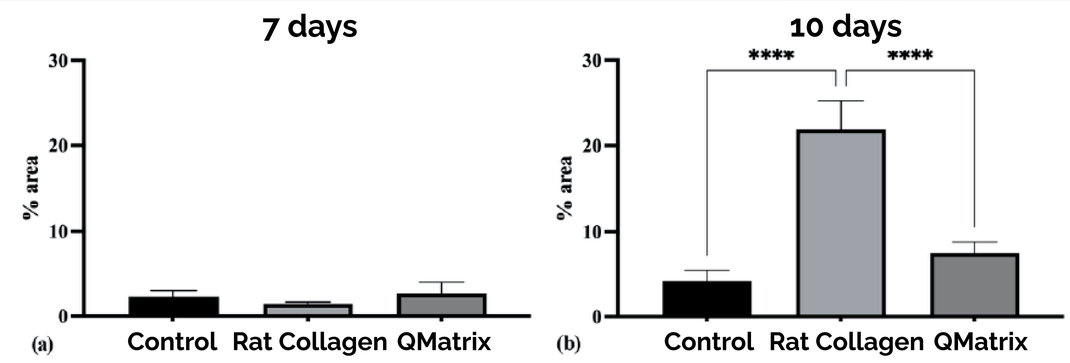
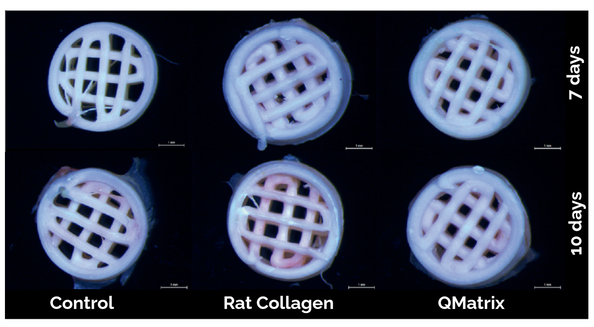


Figure 4. ALP activity of MC3T3-E1 cells increased in collagen groups, indicating enhanced early osteogenic differentiation.



Mineralization - Alizarin Red

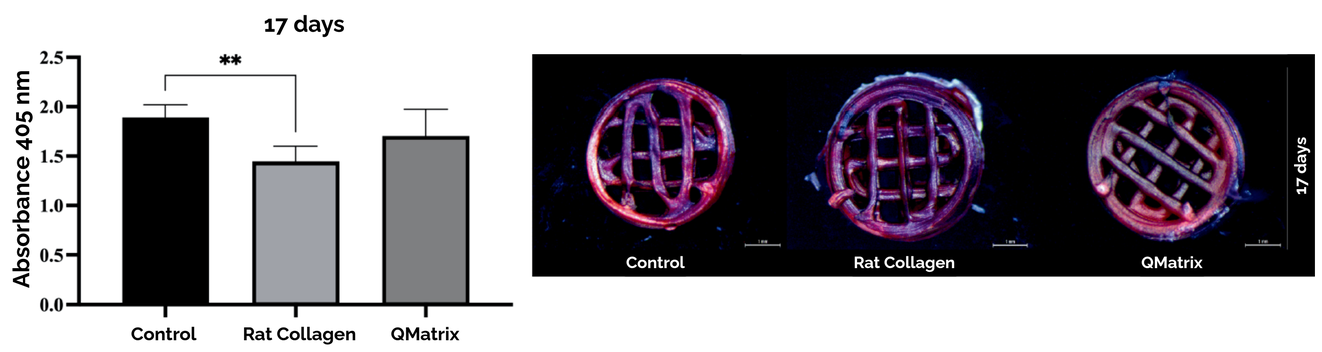


Figure 5. Mineralization (Alizarin Red) was more homogeneous and enhanced in QMatrix groups after 17 days.

Conclusions

- High biocompatibility with no chemical modification.
- TFE improves cell adhesion, while chloroform ensures better print fidelity.
- QMatrix enhances adhesion and promotes homogeneous mineralization.
- Collagen increases early osteogenic differentiation.

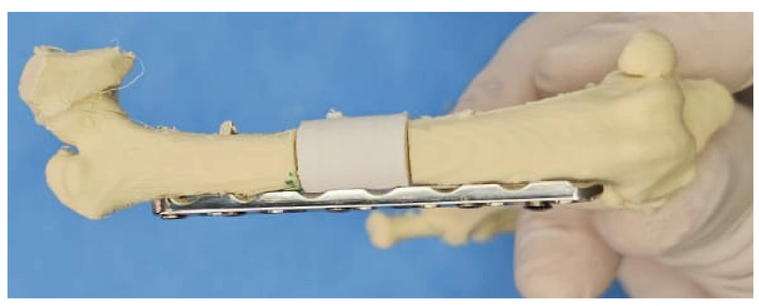


Figure 6. Photograph of a PCL/β-TCP scaffold inserted into bone, representing a simulated implantation for bone regeneration.

Acknowledgements

UFABC · FAPESP Fundação de Amparo à Pesquisa do Estado de São Paulo · Instituto Butantan A serviço da vida · USP · Anton Paar