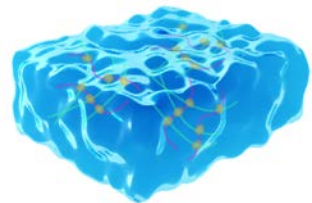


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Novel multi-component synergistic bioink that balances biocompatibility and mechanical strength for cartilage regeneration

Key words: Silk fibroin; Polyethylene oxide; Multi-component collaboration; Cartilage regeneration; Tissue engineering

Research Summary



Highly Porous Hydrogel

Material characterization

SEM

FTIR

GPC

Compression test

Rheological test

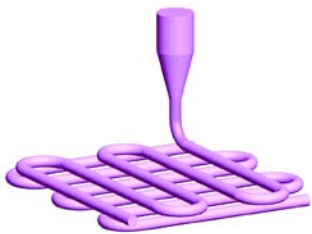
Swelling

Degradation

Contact angle measurement

Biocompatibility

CCK8, Calcein-AM/PI staining, Skeleton staining



Extrusion-based 3D printing

Printability analysis

Ink spreading degree (S_p)

Window printability (P_w)

Printability map

Immunofluorescence staining

Collagen II and aggrecan

Conclusion

- **PEO acts as a porogen, generating a highly porous structure with a porosity of up to 88%, while SF compensates for the mechanical loss caused by PEO, allowing the scaffold to maintain a compression strength of up to 29.10 kPa.**
- **As the concentration of PEO increases, the compressive modulus of the composite scaffold decreases, while the swelling rate, printability, and biocompatibility improve.**
- **GS/1.5PEO supports a robust deposition of collagen II and aggrecan by chondrocytes after printing.**