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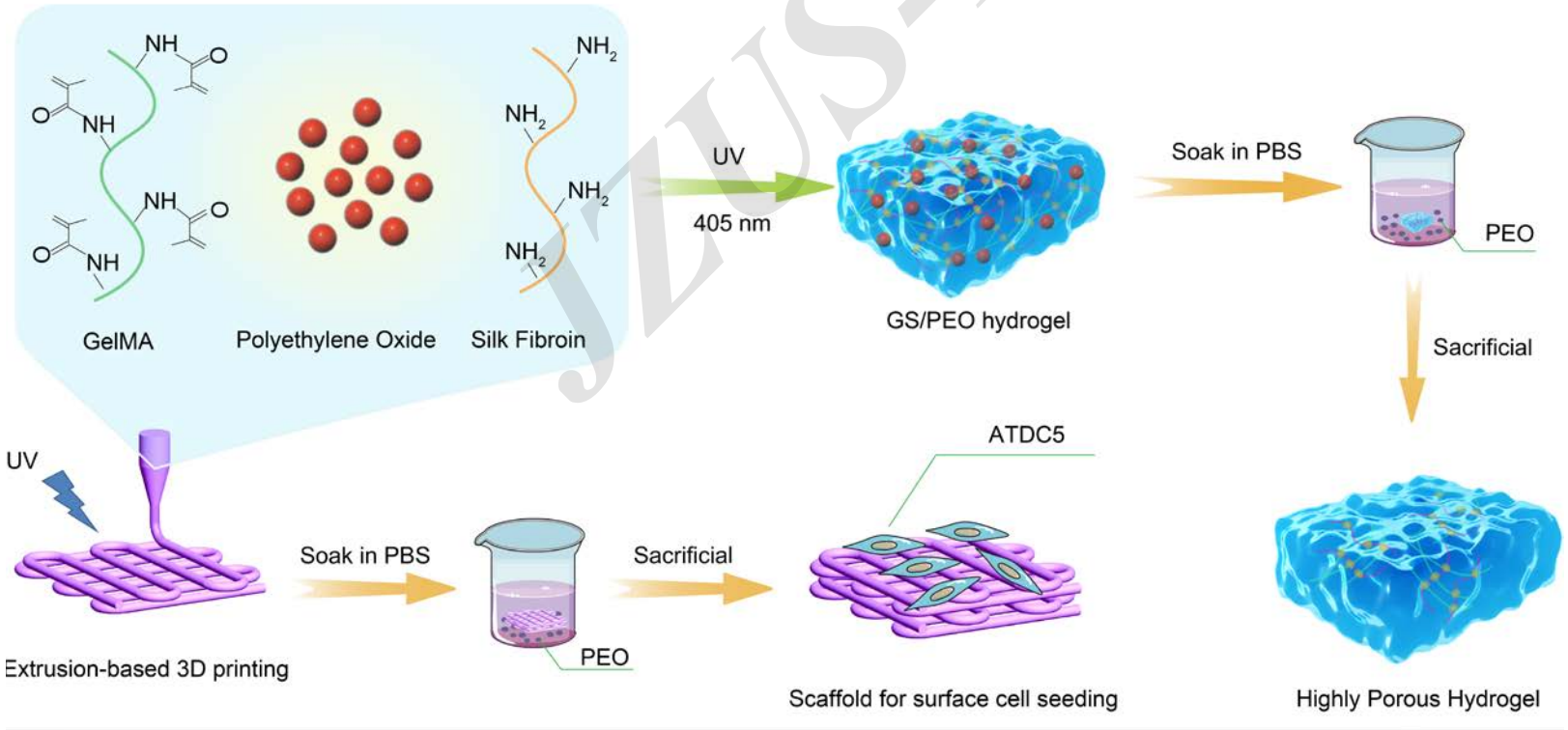
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Novel multi-component synergistic bioink that balances biocompatibility and mechanical strength for cartilage regeneration

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

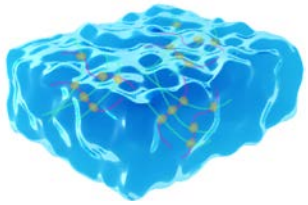
Research Summary

This article prepared GelMA/SF/PEO composite scaffolds and explored their application prospects in cartilage tissue engineering through characterization and biocompatibility studies.



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Research Summary



Highly Porous Hydrogel

Material characterization

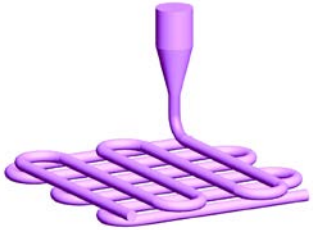
SEM FTIR GPC

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

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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.

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