Tri-Dimensional Printing as an Advanced Technique in Manufacturing Bioinspired Materials
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Research objectives
Enhance the understanding of the successful mechanisms found in biological materials with the aid of 3D printing. Specifically analyzing:
• Structure and function relationship
• Mechanical properties
• Scalability

Background
Nature, through the mechanism of evolution, has developed strategies to produce remarkable biological materials and structures. These systems are often multifunctional, adaptable, self-assemble, and have hierarchical characteristics which contribute to their unique properties that distinguish them from synthetic materials. Understanding nature's motifs provides insight into novel design architectures that are necessary to produce superior synthetic analogs. Tri-dimensional (3-D) printing is a rapid prototyping technique that can generate intricate 3-D structures. This advanced technique is used to replicate the defining characteristics of biological designs to further understand nature's effective mechanisms.

Extract defining characteristics

Bioinspired devices

Conclusion
• 3D printing is successfully used to enhance our understanding of biological materials
• Bioinspired devices capture the principle features of biological structures
• As manufacturing technologies continue to improve, our capability to integrate 3D printing into our research increases.