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Bioprinting Composites: Continuous vs. Chopped Fiber Reinforcements

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Abstract

Additive Manufacturing, also known as 3D printing, has changed composites manufacturing over the last couple of decades, by reducing the amount of waste created during the manufacturing process and allowing pieces to be made with complex geometries not possible with traditional processing techniques. More recently, Additive Manufacturing methods have been adapted to create pieces with biological end uses for the field of Bioprinting, bringing the benefits of 3D printing into cell and tissue engineering. The addition of reinforcing polymer or glass fibers creates composite prints to better mimic the extracellular environment, and the ability to print complex shapes both improves cellular integration and assists in tailoring prints to specific patients. In this presentation, I will be discussing two methods of Bioprinting with polymer fibers: printing with a continuous fiber versus printing with chopped fibers. In addition to describing the differences in fiber reinforced composites printing methods, I will discuss the benefits of different fiber types on the prints, as well as the effects of the fibers on cell growth.