Additive Manufacturing of Biodegradable Polymers for Tissue Engineering and *In Vitro* Cancer Modelling

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The biomedical community's great interest in additive manufacturing (AM) is a result of its versatility in terms of processing approach, materials selection, and customization of the resulting device. Specifically, the unmatched ability to control structural and compositional characteristics at the macro- and microscale is making AM the technology of choice for fabricating biodegradable medical devices. This contribution aims to provide an overview of recent research activities on AM of biodegradable polymers for application in the biomedical field.[1] The main AM techniques that have been applied to biodegradable polymers will be presented by discussing the necessary requirements for materials processing. The presentation will cover the different classes of biodegradable polymers that have been studied for AM, including proteins, polysaccharides, and aliphatic polyesters. Case studies that demonstrate how material-extrusion AM can be used to process synthetic and microbial aliphatic polyesters, e.g., poly(ε-caprolactone) and poly(3-hydroxybutyrate-co-3-hydroxyvalerate), as well as polysaccharides from marine sources, e.g., chitosan and alginate, will be discussed. Moreover, significant emphasis will be given to recent research on innovative AM strategies for loading polymeric scaffolds with osteoinductive ceramics or natural anti-inflammatory/antimicrobial agents. Tailored experimental activities will be described to highlight the potential of the developed bioactive devices for advanced biomedical applications, such as bone regeneration, wound treatment, and *in vitro* cancer modeling.[2-5] Ongoing research on photocrosslinkable macromolecules of natural origin for bioprinting strategies will also be presented.

References

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