CHEMISTRY DEPARTMENT SEMINAR

Chemically Modified Natural Medicinal Compounds for Tissue Engineering

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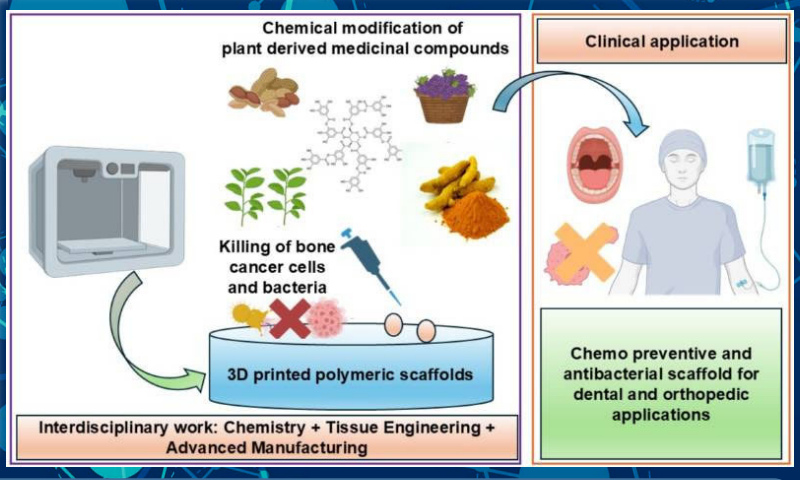
Natural and synthetic bone grafts for managing bone defects have notable limitations, including availability and infection risk. Tissue engineering using biomaterial scaffolds offers promise, but enhancing scaffold performance remains challenging. Natural compounds like curcumin and tannic acid possess anti-inflammatory, antioxidant, and antibacterial properties, yet their instability and poor bioavailability limit biomedical applications. We investigated chemically modified curcumin and tannic acid incorporated into 3D-printed poly lactic acid (PLA) and hydroxyapatite (HA) scaffolds to enhance therapeutic potential for tissue engineering and cancer therapy. We analyzed the scaffolds' chemical, structural, and surface properties and evaluated bioactivity, biocompatibility, antibacterial, and anticancer activities. Results demonstrate successful scaffold fabrication with ~4.8-fold decrease in osteosarcoma cell viability by day 7, enhanced antibacterial efficacy, improved bioactivity, and excellent cytocompatibility with healthy cells. This strategy represents a promising approach for improving implant biological properties and reducing infection risk in tissue engineering and cancer therapy applications.



January 30th @2 pm – Lopez 106