: Photo-cross-linked; Acidic bio-inks; Bone; Cartilage; Tissue engineering; Biomaterials

Tissue engineering holds great promise for regenerating damaged or diseased bone and cartilage tissues through the development of biomimetic sca olds that closely mimic the native extracellular matrix (ECM) [1]. Central to this endeavor is the creation of biomaterials with tunable properties capable of supporting cell adhesion, proliferation, and di erentiation. In recent years, there has been a growing interest in the use of bio-inks, a class of biomaterials that can be 3D printed and subsequently cross-linked to form sca olds tailored to speci c tissue engineering applications. One promising approach involves the development of chronically acidic bio-inks that can be photo-cross-linked to create sca olds suitable for bone and cartilage tissue engineering [2]. e acidic nature of these bio-inks mimics the native microenvironment of bone and cartilage tissues, promoting cell adhesion and proliferation. Furthermore, the ability to photo-crosslink these bio-inks o ers precise controls over sca old architecture and mechanical properties, essential for supporting tissue regeneration.

In this study, we aim to explore the potential of photo-cross-linked acidic bio-inks for bone and cartilage tissue engineering applications. By leveraging biocompatible polymers and photoactive components, we can design bio-inks with tailored properties that closely resemble the ECM of bone and cartilage tissues. Moreover, the photo-crosslinking process allows for spatial and temporal control over sca old formation, enabling the incorporation of bioactive molecules and cells to enhance tissue regeneration. rough a combination of advanced fabrication techniques and biomimetic design principles, we anticipate that photo-cross-linked acidic bio-inks will o er a versatile platform for developing sca olds for bone and cartilage tissue engineering. ese sca olds have the potential to address critical challenges in regenerative medicine by providing customizable and biocompatible platforms for promoting tissue repair and regeneration [3]. Ultimately, our e orts aim to advance the eld of tissue engineering and contribute to the development of innovative therapies for bone and cartilage disorders.

Biocompatible polymers with acidic functional groups, such as bioactive molecules, such as growth factors or cytokines, incorporated into the bio-ink sca olds were evaluated using ELISA or spectroscopic methods [6]. e response of the engineered tissues to mechanical loading or biochemical stimuli was assessed using bioreactor systems or functional assays. Data obtained from experiments were analyzed using appropriate statistical methods, such as ANOVA or t-tests, to determine signi cant di Daoc