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Korea develops novel 3D adipose tissue bioprinting method

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Paving the way for their applications in regenerative medicine



Adipose tissues, which serve as fat reserves, have been recognised as an endocrine organ. The three-dimensional (3D) bioprinting of adipose tissues has potential applications in regenerative medicine. However, the 3D bioprinting conditions have not been optimized for adipose tissues.

Now, researchers from Pusan National University, South Korea have developed a novel method for 3D adipose tissue bioprinting using a hybrid bioink. The 3D bioprinted adipose tissues exhibited skin regeneration ability, paving the way for their applications in regenerative medicine.

The adipose tissue, which serves as an endocrine organ, releases various molecules that regulate the repair of other damaged tissues, including the skin. Hence, adipose tissues can potentially be reengineered to regenerate the damaged organs. Three-dimensional (3D) bioprinting technology has revolutionized regenerative medicine by enabling the generation of engineered and functional 3D organs or tissues, including adipose tissues. However, the currently used tissue biofabrication methods cannot replicate the native structure and densely packed lipid droplets of adipose tissues, hindering the therapeutic application of 3D-printed adipose tissues.

According to the lead author Jae-Seong Lee, "The 3D bioprinted endocrine tissues enhanced skin regeneration, indicating their potential applications in regenerative medicine. While current fat grafting procedures suffer from low survival rates and gradual resorption, our hybrid bioinks enhance endocrine function and cell viability, potentially overcoming these limitations. This approach could be particularly valuable for treating chronic wounds such as diabetic foot ulcers, pressure sores, and burns."