



Bioprinted Adipose Tissue for Research

Bioprinted human adipose tissue as 3D cell model for research purposes

Based on tissue engineering principles and biofabrication techniques, a human 3D cell model was created. This model contained human primary mature adipocytes encapsulated in an exopolysaccharide called gellan gum and bioprinted into an agarose-based support bath.

As adipose tissue fulfils important roles besides its well-known storage function, such as secreting hundreds of adipokines that modulate the immune system, control homeostasis and regulate appetite, the loss of this tissue has serious consequences. Furthermore, adipose tissue is involved in several serious diseases or is associated with their development like cardio-vascular-disorders or diabetes.

The heterogeneous structure of adipose tissue, which contains many different cell types and predominantly sensitive mature adipocytes, makes in-vivo-near replication complex. To achieve mature adipocytes with high viability,

the assembly was successfully established using extrusion-based 3D printing in a support bath. This technique allows other cell types such as stem cells, fibroblasts, or immune cells to be introduced in a spatially resolved manner, thereby improving the functionality of the models. Such human-based models can improve the transfer from preclinical studies. Such models can be helpful in drug development and preclinical research because they offer several advantages over animal testing. They are human-based and patient-specific, raise no ethical concerns and can be reproduced. In summary, 3D cell models based on mature human adipocytes are a solid foundation for further research into the

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[exhibit overview](#)