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Biological cell printing technologies

ABSTRACT. In the field of bioengineering, there is a lot of ongoing research with the aim of fabricating cellular constructs with very fine spatial control of cell location. Precise cell placement can enable research thought previously to be impossible, such as cell-by-cell assembly of complex biological structures, including whole organs. Over the years many different techniques have been developed and tested. These techniques employ an extremely varied collection of printing methods including those based on laser pulses, inkjets and other more novel approaches. However, most research has been geared towards developing techniques for accurately positioning viable cells rather than applying the technology to the wide range of possible uses. Here we present a review of the different cell printing technologies that have been developed over the years. The strengths and limitations are evaluated and the techniques are compared and contrasted. A number of applications for cell printing are described.

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