



## A Brief Comparison of the Different Bioprinting Techniques

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### Abstract

There are many seriously ill individuals on long waiting lists due to the lack of available organs for transplant. The period of time needed for human trials in drug development significantly extends the time before the drug is allowed to use for the patients. Drug researchers are looking for alternate settings that can closely resemble in vivo conditions. In vivo models, the study of the biological effects of a drug in a complex living organism and is used to observe the complex physiological effects of a drug. Synthetic human tissue could be produced to address both of these problems. Recently, 3-D printing-based tissue synthesis techniques were developed by tissue engineering experts in order to produce artificial human tissue. Recently, tissue engineering researchers created 3-D printing-based tissue production techniques to create artificial human tissue. These tissue engineering techniques can be broadly divided into laser-assisted and laser-free or non-laser assisted bio printing categories. The laser assisted bio printing has moderate speeds (less than 102 drops per second), but they have extremely fine spatial resolutions (10s per  $\mu\text{m}$ ). The latter are faster and measured up to 5 to 103 drops per micro seconds. On the other hand, non-laser assisted bio printing has poorer spatial resolutions up to 100s of  $\mu\text{m}$ . In this study, we compare the modern methods in each of these categories according to their claimed resolution, printing speed, cell density, and cell survival. Furthermore, the modern alterations of technology, materials and the process of bio printing and their effects on the potential applications are also reviewed.

Keywords: *Bio-printing, 3-D Printing, Tissue Engineeringm Vivo Models, Artificial Human Tissue.*

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