



## Alginate Bioink Bioprinting Protocol

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 This protocol has been optimized for general bioprinters, depends on extruder type, parameters may vary

 Room temperature assumes 22°C, times and printing parameters may vary at a different room temperature

### Materials


- 1) Alginate Hydrogel Bioink in 3mL Syringes

### Bioprinting Process

- 2) Let the Foldink Alginate bioink reach 35-37°C before mixing with cells.
- 3) Calculate the desired number of living cells.
- 4) Create 500-1000µL cell suspension with culture medium
- 5) Place cell suspension into the Luer lock syringe
- 6) Connect the cartridge of bioink with the syringe with cell suspension
- 7) Gently mix until the mixture will become homogenous and the color of the final ink becomes similar into the whole volume of bioink

 **Be careful during the mixing process to not create air bubbles.**

- 8) As the solution is 35°C, remove all air bubbles
- 9) Cap the bioink with syringe caps and let the bioink cooldown
- 10) If the bioprinter has temperature controlled printhead, set 10-15°C
- 11) Place the bioink into the printhead, cool down for 5-10 minutes
- 12) Cap with sterile printing nozzle or conical tip of the desired diameter
- 13) Print test lines to adjust the necessary pressure or extrusion speed (if mechanical extruder)
- 14) If temperature control is unavailable, place the bioink in the fridge for 5-10 minutes. The temperature should be adjusted via printing testing lines
- 15) If filament characteristics are sufficient, replace the nozzle, and print as planned
- 16) If filament characteristics are non-ideal due to too low of a viscosity (high temperature) wait another minute for additional cooling and retest.
- 17) If filament characteristics are non-ideal due to too high of a viscosity (low temperature), increase pressure or reheat and repeat steps
- 18) Adjust cooling time as necessary
- 19) Print
- 20) **Apply a crosslinking agent after finishing the printing process. Spraying will give better results, if not, gently add the crosslinking agent to not to damage printed scaffolds. Let the scaffolds into the crosslinking solution for 10-15 minutes**

 **If performed correctly, an approximate 15-20 minute bioprinting window exists where viscosity will be ideal.**