

Tissue Engineering Brief

Mouse RAW264.7 macrophages inkjet encapsulated cells in alginate hydrogel survive 7 days post printing

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Summary

MicroFab, in ongoing collaboration with Wake Forest Institute for Regenerative Medicine (WFIRM), has confirmed 7-day survival following printing and encapsulation using MicroFab's inkjet dispensing technology.

Experimental Results

Mouse RAW264.7 macrophages at concentration 9×10^6 cells/ml were added to hydrogel consisting of 0.8% sodium alginate and 0.2% gelatin and optimized for dispensing waveform stability. Cells were then encapsulated by printing them in an array pattern into a dish containing a bath of 0.25M CaCl_2 . After printing, the encapsulated cells were imaged, CaCl_2 was removed and subsequently incubated with growth media consisting of Dulbecco's modified Eagle's medium (DMEM) (Cellgro, Manassas, VA) supplemented with 10% fetal bovine serum (FBS; Atlanta Biologicals, Lawrenceville, GA), and 100 U/ml penicillin/100 $\mu\text{g/ml}$ streptomycin (Gibco). Figure 1 shows a section of macrophages encapsulated in alginate/gelatin hydrogel imaged soon after printing. Figure 2 shows the results of a live/dead assay (LifeTechnologies, NY) 7 days after encapsulation. Viable cells stain green, otherwise cells appear red. Cells were printed using a MJ-ABL-120-DLC device, orifice 120 μm .

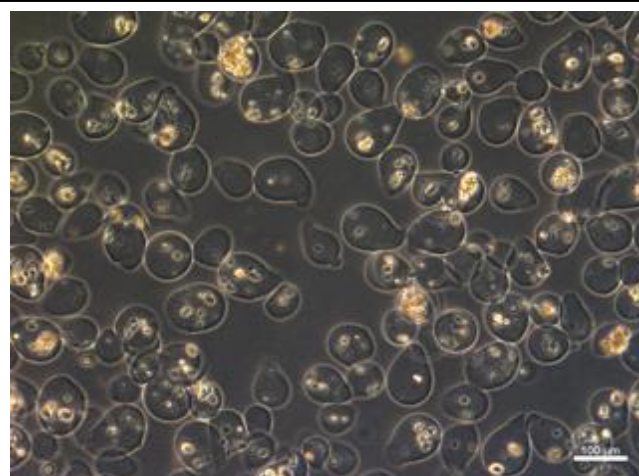
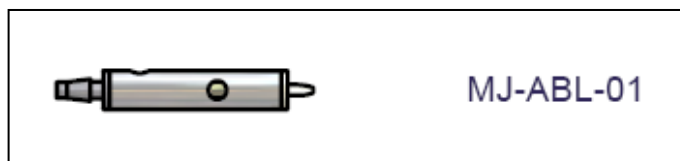


Figure 1. Encapsulated cells moments after printing into CaCl_2 bath.

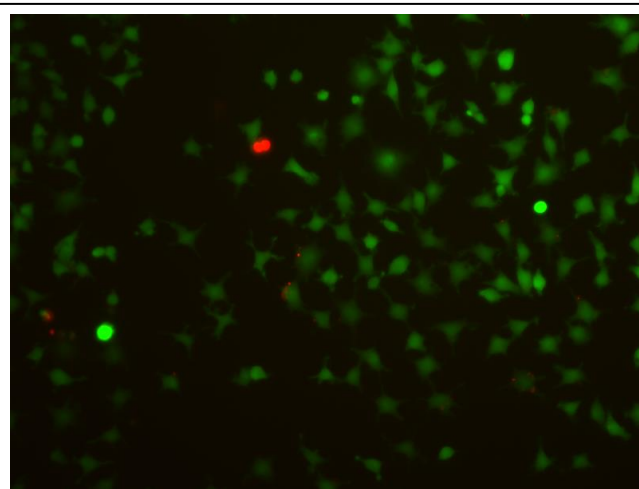


Figure 2. Live/ Dead assay, 98% survival, 7 day post printing