LIFT bioprinting for the study of the immune response

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LIFT TECHNIQUE

DIRECT LIFT
- Laser Pulser
- Optics
- Material to be transferred
- Transparent substrate
- Acceptor layer

ASSISTED LIFT
- POLYMER
- METALIC
- Absorption layer that avoid laser direct interaction with donor material

LIFT ADVANTAGES
- Small volume manipulation
- High precision
- Avoid clamping
- Aspecific process
- High cellular viability
- High resolution cell printing
- High throughput
- Different viscosities

EXPERIMENTAL LIFT SET UP

BA-LIFT (Blister Assisted - LIFT)
- Laser source UV: CRYPAS, 355 nm, 1.3 ns
- Hydrogels: Methil cellulose and Alginated based
- Gap distance: 520 µm
- Visual monitoring of the process

IMMUNE RESPONSE

CELLULAR PRESENTATION

LYMPHOID ORGAN
- Inflammatory site
- Activation (IFN-g)
- Migration
- Blood
- Lymph

LYMPHOCYTE SYSTEM

CELLULAR ACTIVATION

NK-92
- IFN-γ secretion

ADAPTIVE RESPONSE
- Activation and recognition
- C1R-A2 (APC)
- Specific TCR
- IFN-γ secretion

Activation measured by the cytokine (INF γ) gene modified expression

CELLULAR MIGRATION MODEL

Migration model based on CD69/S1P1
- Jurkat cells with different CD69 expression
- CD69+V5+1P1+ | CD69+V5+1P1- | CD69+V5+1P1+

Migration assessment (performed distance)

StP concentration gradient

RESULTS: VIABILITY ASSESSMENT

APCs and T lymphocytes

RESULTS: CELL PRINTING MODELS

CELL ACTIVATION MODELS AND GENE MODIFICATION IFN-γ

REFERENCES


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