Team 10 - Immunomodulatory Scaffolds for Diabetic Wound Healing

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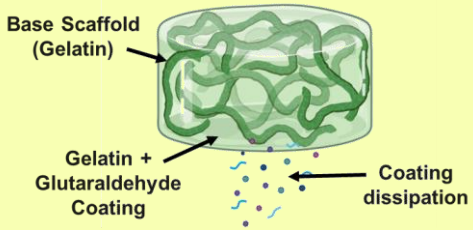
User: Patients w/ diabetic foot ulcers (DFUs)

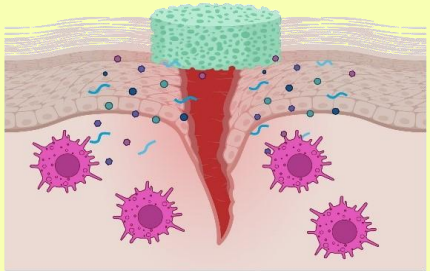
- *1.6M U.S. diabetics develop DFUs,*
  - *20% lead to amputation*
- *Recurs 40% in 1 year, 65% in 3 years*
- *Root cause: chronic inflammation and dysregulated immune cells*
- *Current treatments **fail to address underlying immune dysfunction***

DESIGN INPUTS:

Polymer-based	No Therapeutics	Limited Pro-Inflam. Response	Boost cytokines >25%	Cell Metabolism >70%

SOLUTION – DESIGN





Solution placed on diabetic wound; scaffold coating activates inflammatory macrophages (pictured in pink)

IMPACT:

Reduces hospital visits, amputation risks and management costs

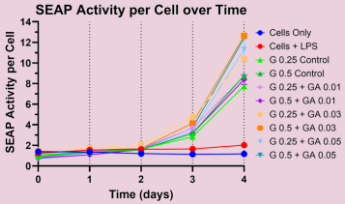
FUTURE

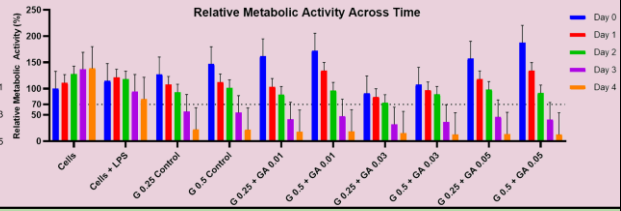
- *Improve Experimental Protocols*
- *Optimize Polymer Coating*
- *SEM for Pore Structure*

TESTING RESULTS

Cell Viability: All groups declined in metabolic activity after 48 hrs → delayed cytotoxicity

Cellular Response: All groups showed >25% increase by 48 hrs, continued beyond 48 hrs. exceeding duration req





SOLUTION – BUILD

Gelatin Variation (0.25% & 0.5%)

- Forms thin uniform layer over porous surfaces

Glutaraldehyde Variation (0 - 0.05%)

- Promote response and enabling effective crosslinking