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Herff College of Engineering

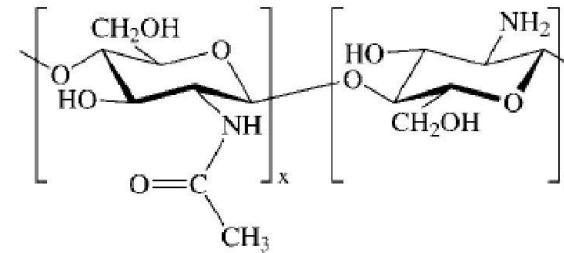
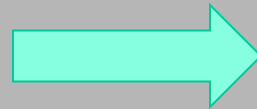
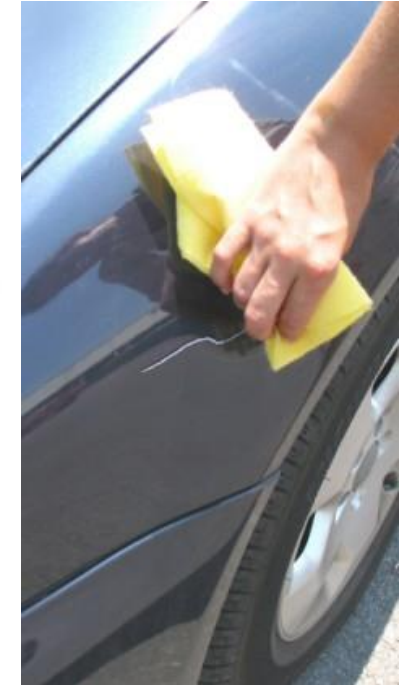
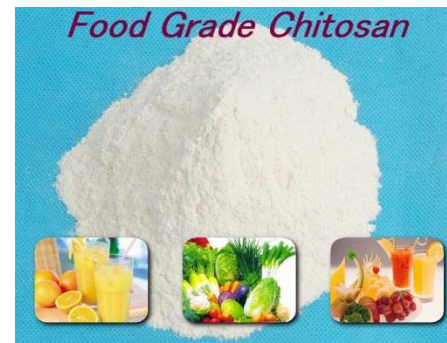
Town Hall Meeting: Biomaterials & BioImaging

24 March 2023



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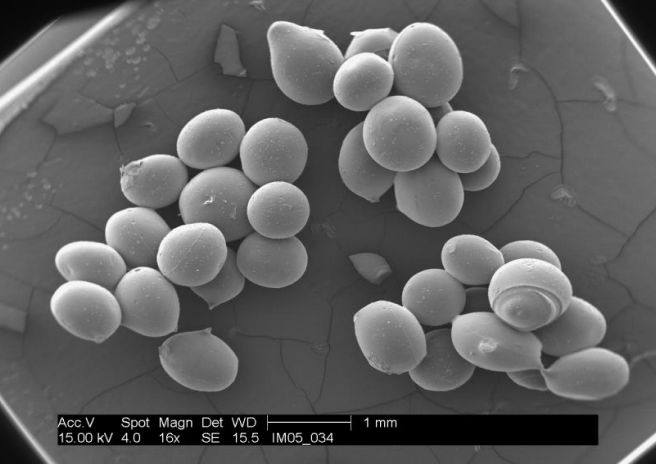
Department of
Biomedical Engineering



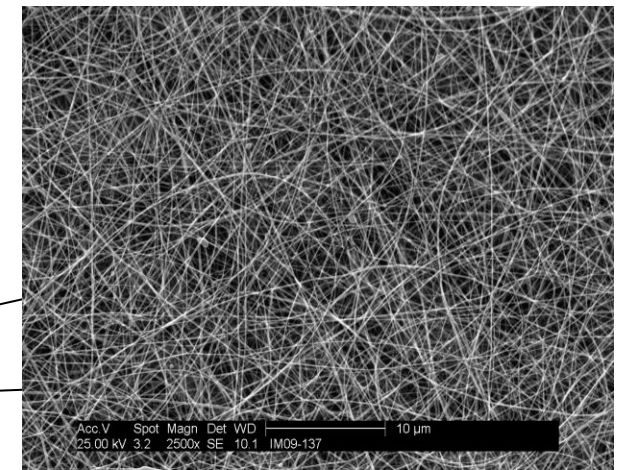
Chitosan is a value added commodity with market size valued at USD 10.88 billion in 2022 and is anticipated to expand at a CAGR of 20.1% from 2023 to 2030.



Bumgardner Team: Chitosan Biomaterials



MicroBeads for bone tissue engineering & drug delivery



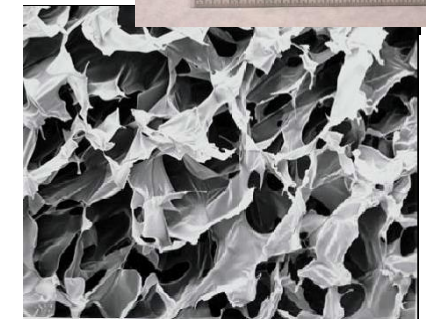
Electrospun membranes for dental/craniofacial/orthopedic and skin tissue engineering



Films for wound treatments

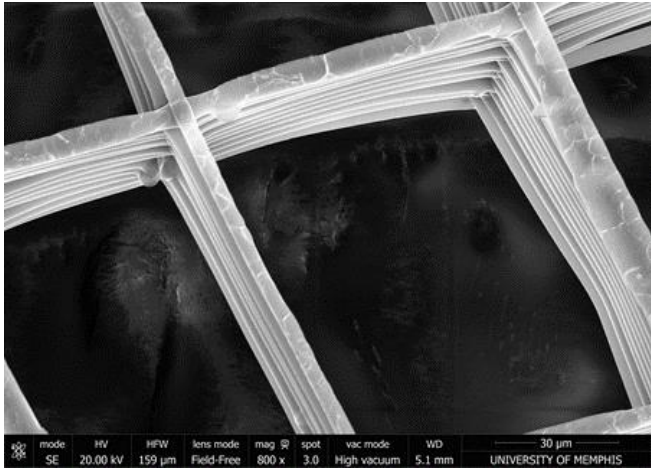
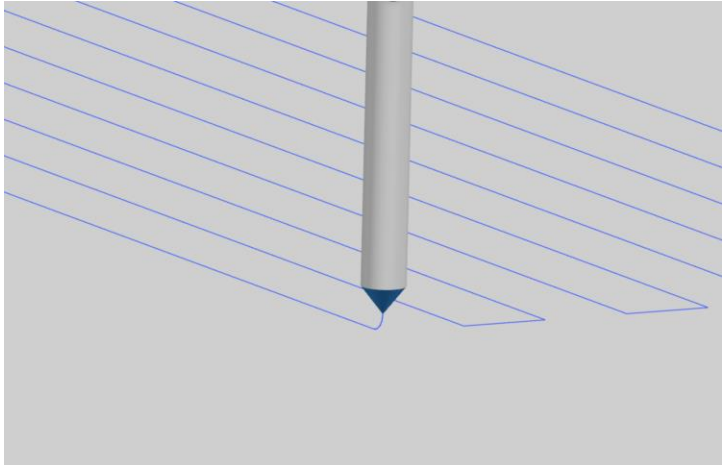
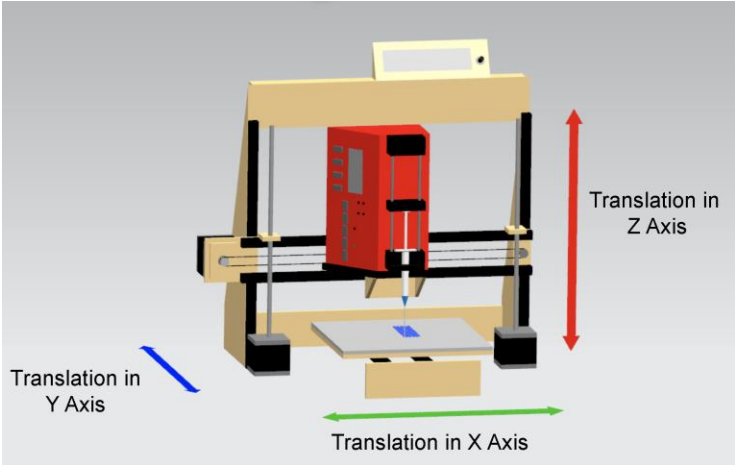


Coatings for implants

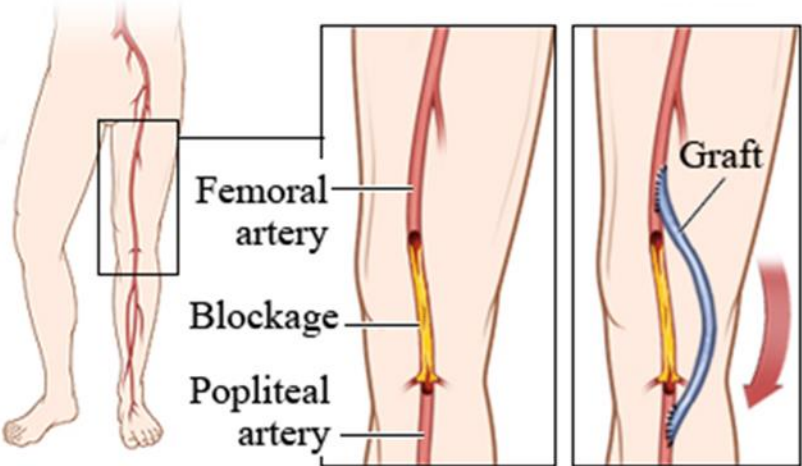
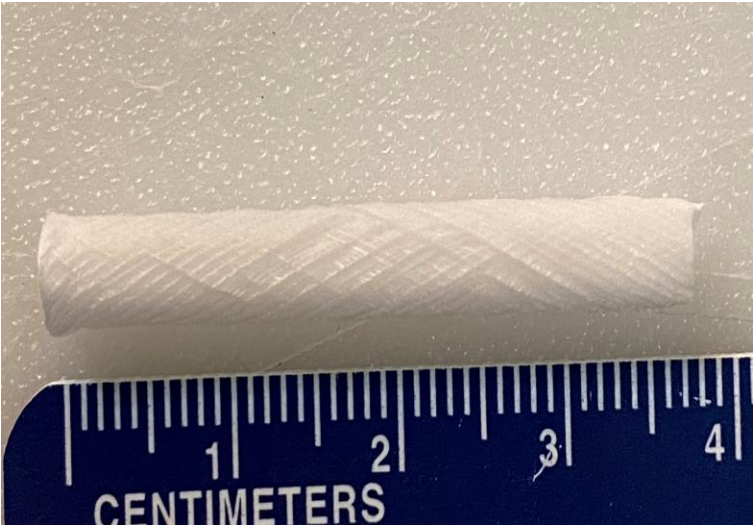


Sponges (Sentrex™) wound dressing
BioNova Medical, TN

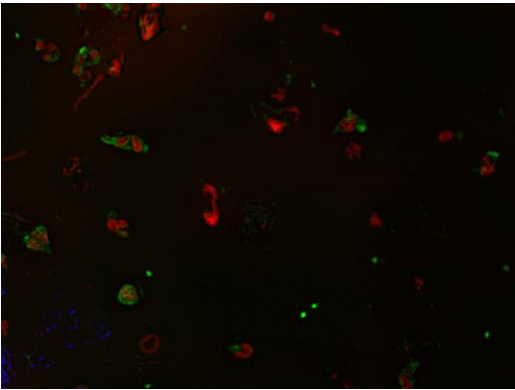
Bowlin Team: Near Field Electrospinning Tissue Regeneration Templates & Neutrophil Interaction Regulation – Goal is *In Situ* Regeneration



Novel Vascular Template



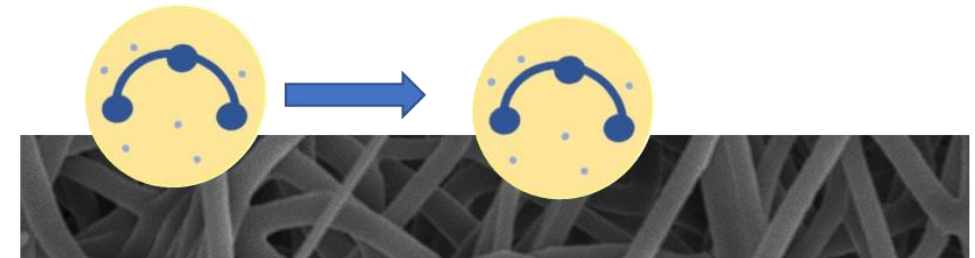
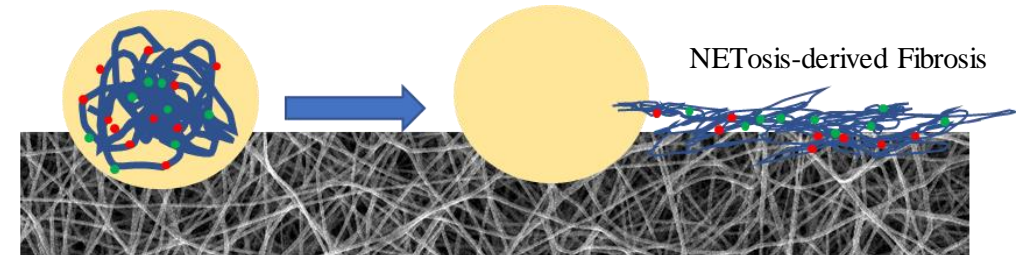
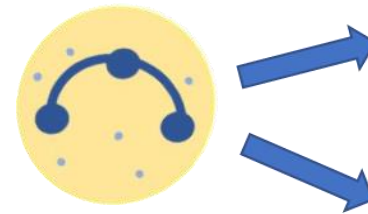
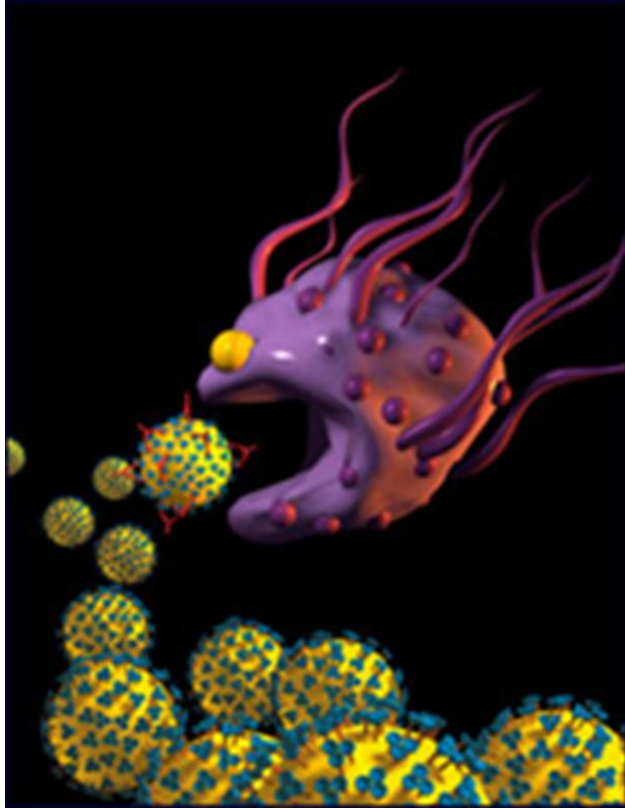
Analyzing & Regulating Neutrophil Physiological State



Bowlin lab citation data from Google Scholar and patents:
 Total citations to date: 22, 579
 h-index: 65
 i-10 Index: 146
 17 U.S. Patents and over 150 International Patents
 11 License agreements, 6 Start-ups, 6 Cleared Products

U.S. Patent Application: US-20220370191-A1: “SEMI-STABLE NEAR-FIELD ELECTROSPUN SCAFFOLDS AND METHODS OF MAKING AND USING THE SAME.” King, William and Bowlin, G.L. University of Memphis
 Application date: November 24, 2022

Future Focus: Neutrophil-Biomaterial Interactions and Regulation!



Sponsor: NIH R15 (Bowlin, PI)

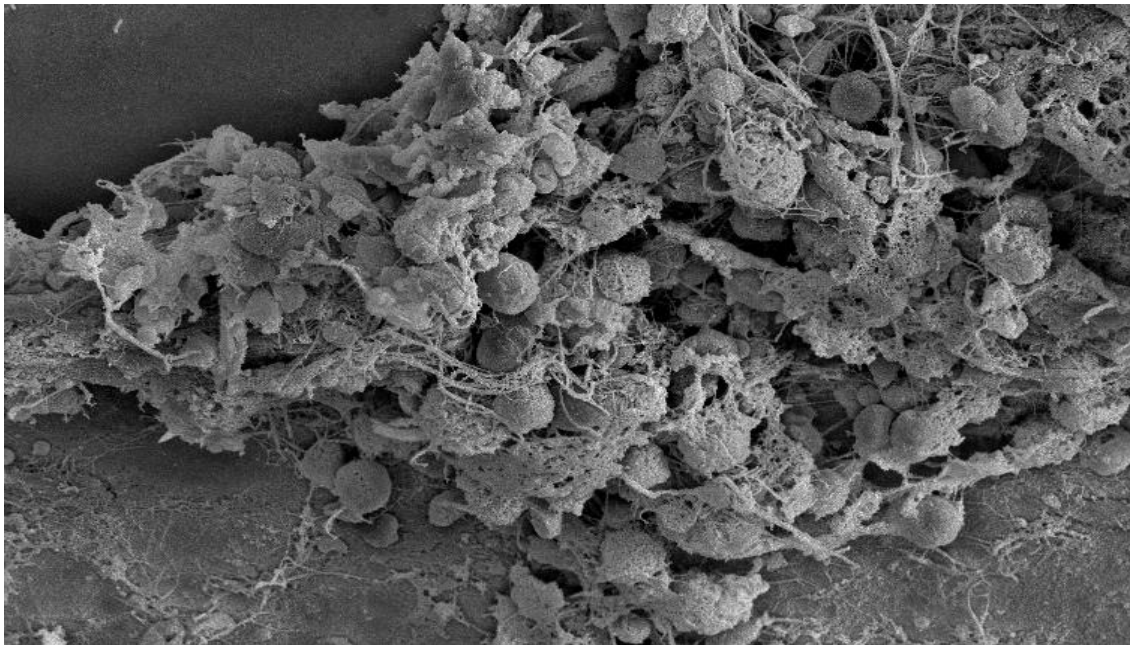
Project title: Downregulation of neutrophil extracellular traps by fibrous regeneration template design.

Proposed dates: 4/01/2023 - 3/31/2026

Grant Submission Result: 4 percentile ranking, awaiting award notification

Jennings Team: Winning the War on Bugs: Design of Antimicrobial Materials for Biomedical Applications

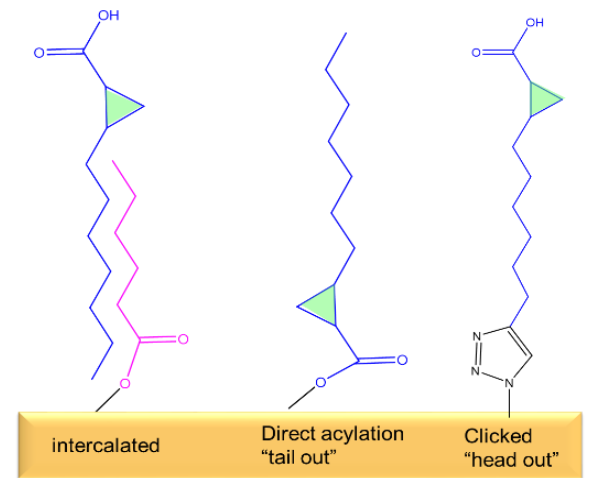
Microbial biofilm formation can threaten patients with injuries or implants



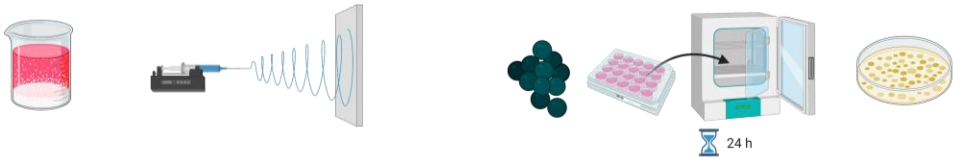
Drug delivery biomaterials



Surface modifications

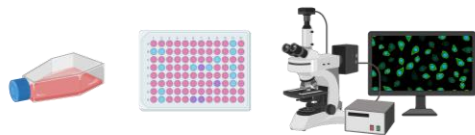


What we can do.....and what we need

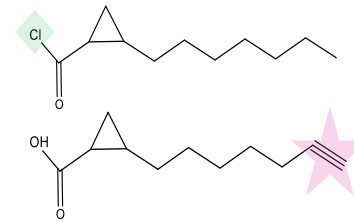


Chemical synthesis
and material
fabrication

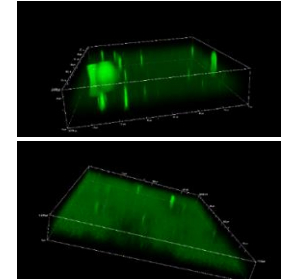
Microbiological
evaluation



Biocompatibility



Drug/therapeutic
discovery



Detection



Data analysis/
computation



Smart materials/
translation

Opportunities for expanding research



Project grants

Major system/theme



Disease 1

Disease 2

Disease 3

Disease 4

Foundational/
Basic

Therapeutic
discovery/ application

Imaging/
modeling

Clinical/
translation