The National Academies of SCIENCES ENGINEERING MEDICINE

HEALTH AND MEDICINE DIVISION

BOARD ON HEALTH SCIENCES POLICY

# Understanding the Role of the Immune System in Improving Tissue Regeneration: A Workshop

November 2-3, 2021

#RegenMedForum

Post-workshop Survey

Forum on REGENERATIVE MEDICINE

## Session IV - Modulating the Host Immune System

Exit Survey

**James Kirkland**

- Fundamental aging processes are linked, so interventions that target one tend to affect the rest
- Senolytics target senescent cells (not a single molecule or pathway). Senolytics can delay, prevent or alleviate senescence and age-related conditions and diseases
- The combination of senolytics and anti-fibrotic agents can have a synergistic pro-healing effect

**Jennifer Elisseeff**

- Regenerative immunology marries the fields of regenerative medicine, immunology, and biomaterial design to develop novel engineered therapies to promote endogenous tissue regeneration
- The future of immunotherapies will likely include combination therapies to promote tissue productive regeneration and inhibit fibrotic responses

**Charles Serhan**

- Resolving inflammation stimulates regeneration via pro-resolving mediators, which are distinct from anti-inflammatory compounds that may interfere with the beneficial effects of inflammation
- Optimal timing for treatment intervention differs across organs and tissues and needs to be customized

## Session V - Tools and Preclinical Models

Exit Survey

**Garry Nolan**

- Cellular neighborhoods are defined as repeatable units of different cell types found in tissues and the immune system. Some structures are tissue-specific and others are conserved across different tissues
- Interfaces between cellular neighborhoods tell us about the local biology and may have prognostic value

**Michel Sadelain**

- CD19 CAR immunotherapies uses synthetic  engineered T cells for anti-cancer therapies . These cells can be designed and manufactured as “living drugs”
- Regenerative medicine can benefit from novel applications of CAR T cell therapies. For example, engineered T cells may be a tool for removing senescent cells and modulating tissue egeneration

**Kaitlyn Sadtler**

- We need to understand the basic biology to create targeted therapeutics and develop rationally designed biomaterials. Multidisciplinary studies that integrates this knowledge will push the field forward
- To move forward, we need integrative, iterative approaches that apply preclinical and quantitative modeling data to clinical therapeutics and vice versa

## Summary of Key Points from Days 1 and 2

Exit Survey

- **Combining different modalities** for niche manipulation could be a powerful strategy to promote tissue regeneration (Moore, Blau, Hajishengallis)
- Strategies to achieve **immune tolerance and evasion** would obviate the need for immunosuppressive drugs with negative side effects and benefit patients (Schrepfer, Sykes)
- Targeted therapies require **customization** based on features like tissue type, timing of intervention, patient profile, and more
- **Biomaterials** can be used to model the immune microenvironment and understand the immune response in disease and wound healing (Moore, Elisseeff, Sadtler)
- The field would benefit from **iterative hypothesis generation**, moving from bench to bedside and back to bench (Jenq, Sadtler)

## Next Steps

- Please complete the **post-workshop survey** using the QR code below or the link emailed later today. We want to hear your thoughts!
- Workshop materials and videos will be posted to the website in a couple of weeks
- A proceedings will be published in 2022 to capture the discussion here

Thank you for participating with the Forum on Regenerative Medicine!

Post-workshop Survey