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Effects of Anti-inflammatory Nanofibers on Urethral Healing

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BEST CHILDREN'S HOSPITALS U.S.News & WORLD REPORT RANKED IN 10 SPECIALTIES 2019-20

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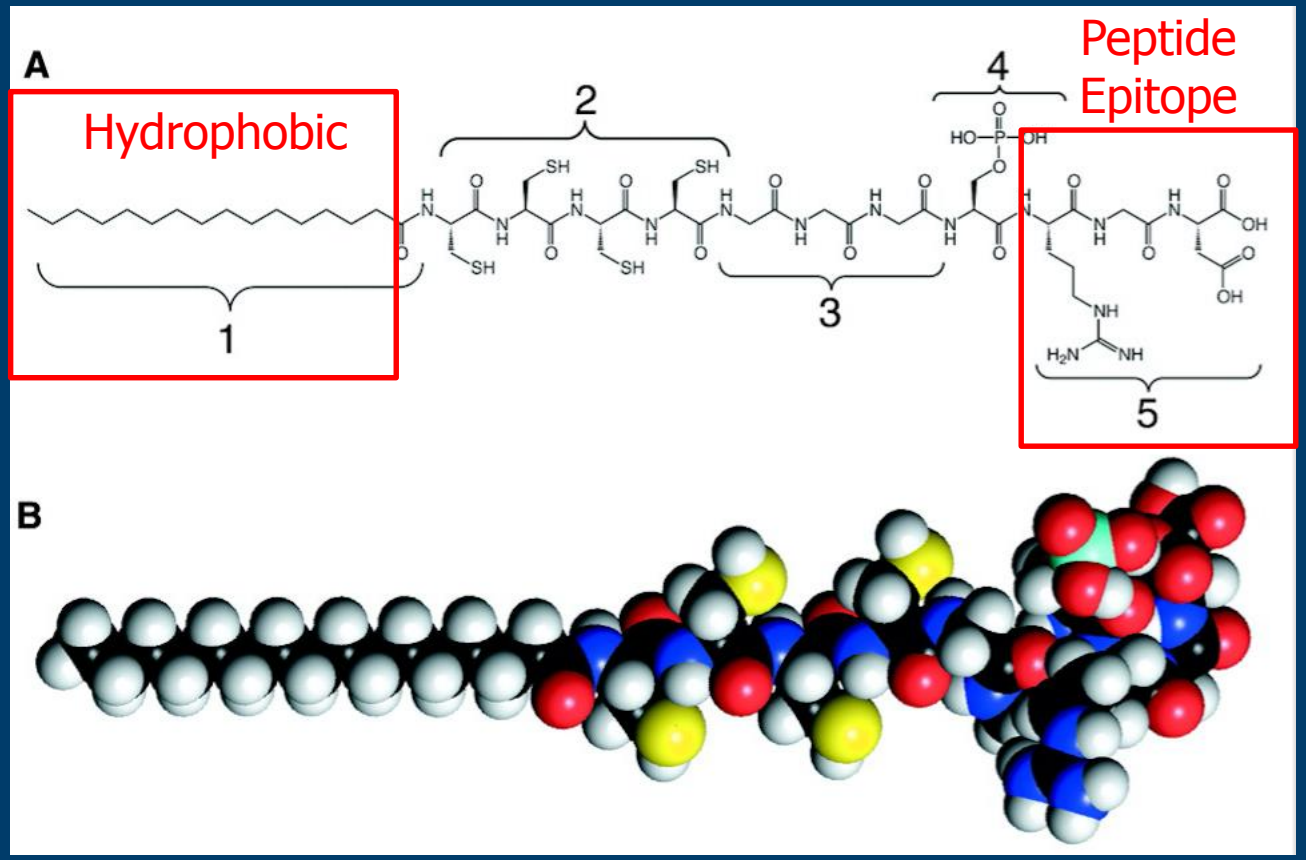
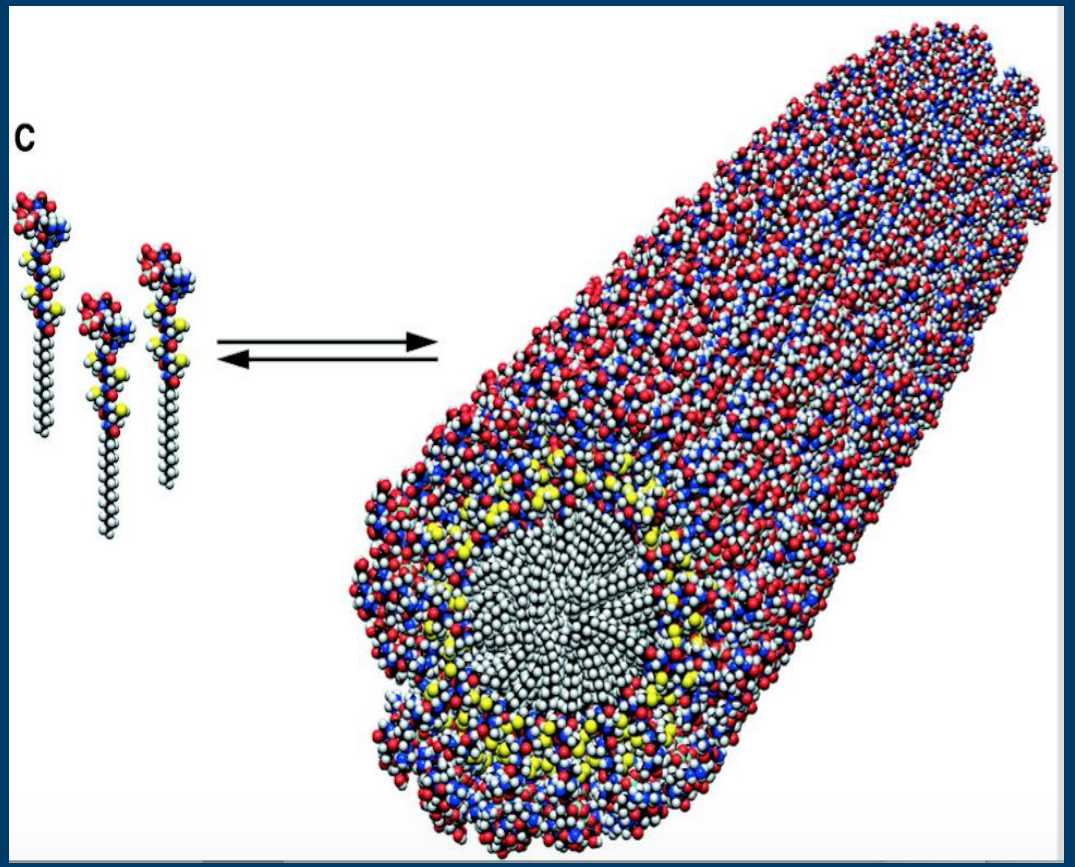
Disclosures

- None

Inflammation Prolongs Urethral Wound Healing

Peptide Amphiphiles (PA)





Cui H, Webber MJ, Stupp SI. Biopolymers. 2010

Anti-inflammatory Peptide Amphiphiles (AIF-PA) in bladder regeneration

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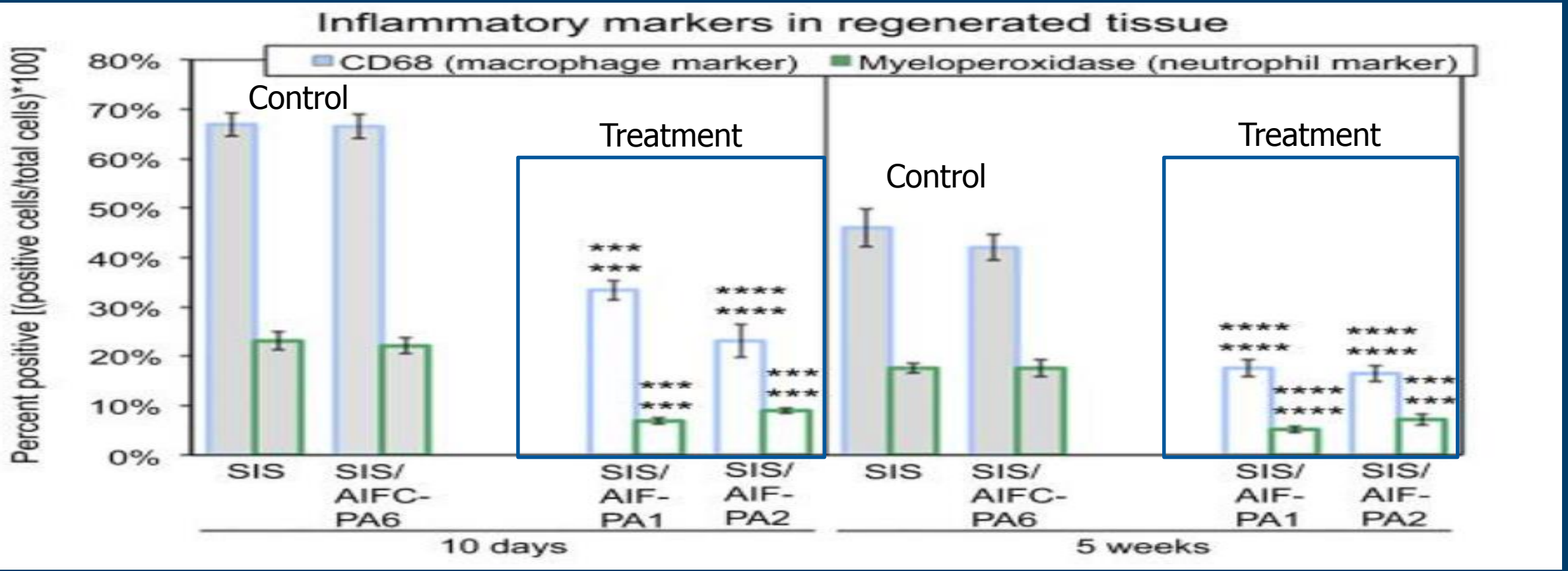
- Decreased inflammatory markers



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Sharma *et al.* Biomaterials. 2014

Anti-inflammatory Peptide Amphiphiles (AIF-PA) in bladder regeneration

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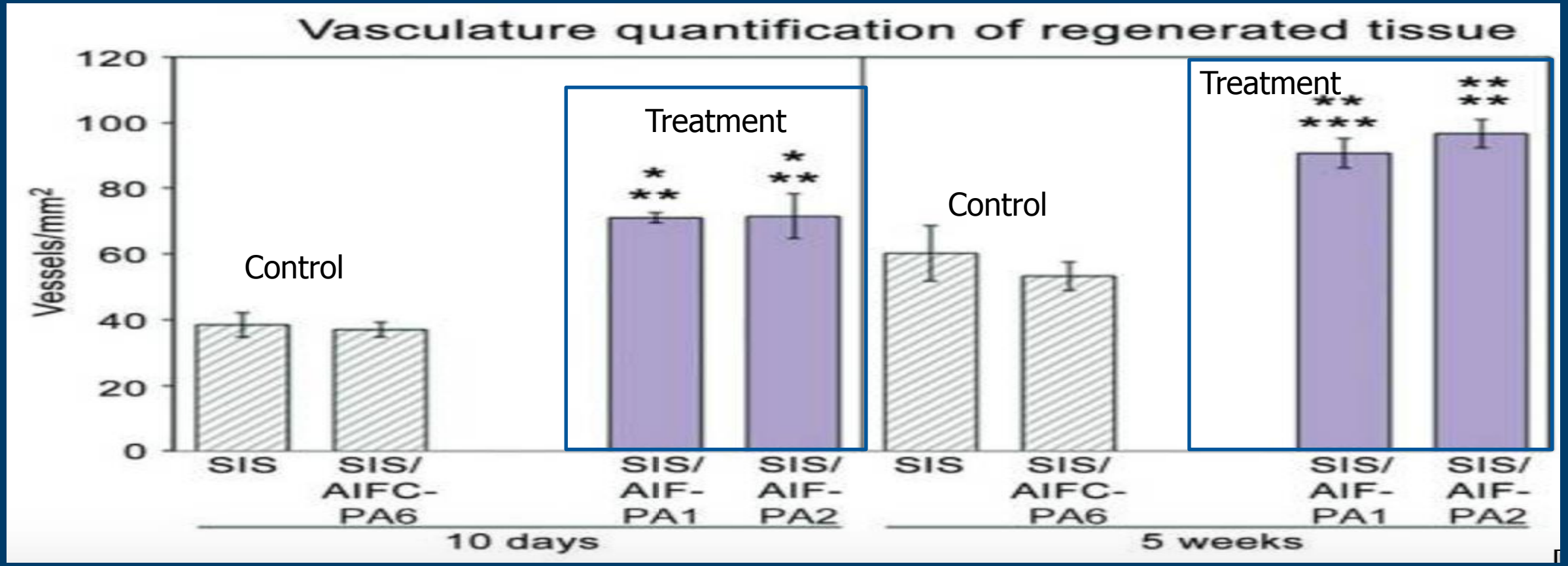
- Increased Vasculature



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Sharma *et al.* Biomaterials. 2014

Aim

- Evaluate the effect of anti-inflammatory nanofibers in urethral wound healing

Hypothesis

- Anti-inflammatory PAs (AIF-PA) will positively modulate post-operative local tissue inflammatory responses and enhance urethral wound healing

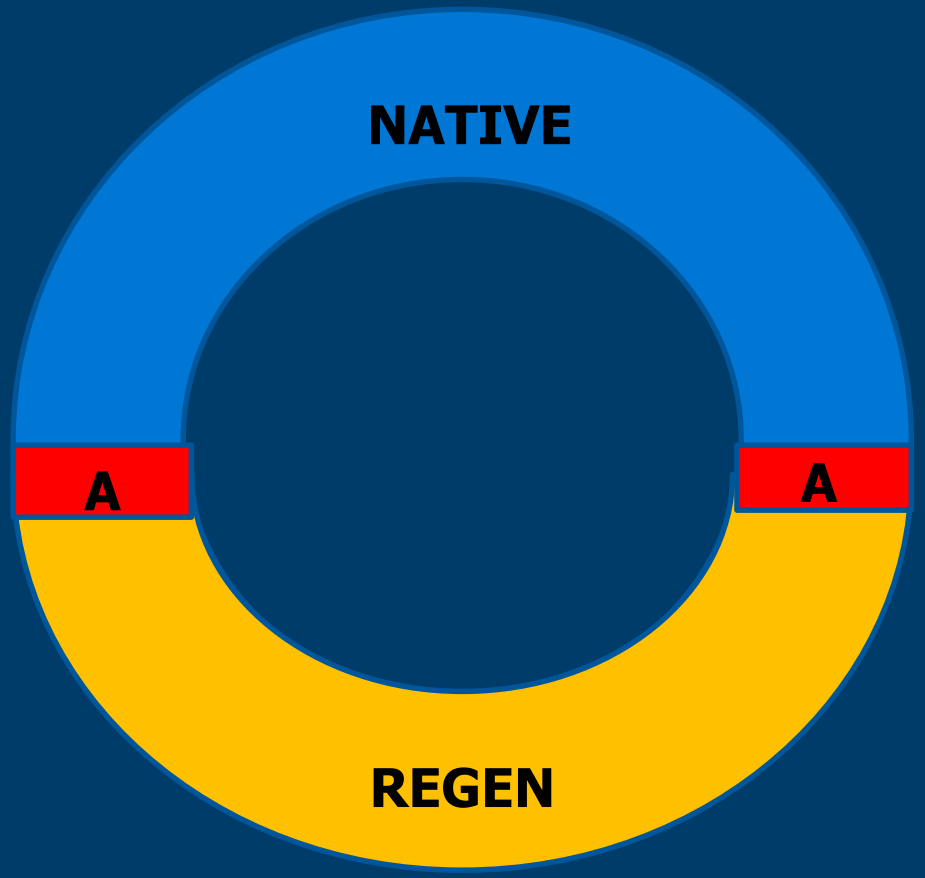
Urethroplasty

SIS Alone
(Control)

SIS + Control PA
(Control)

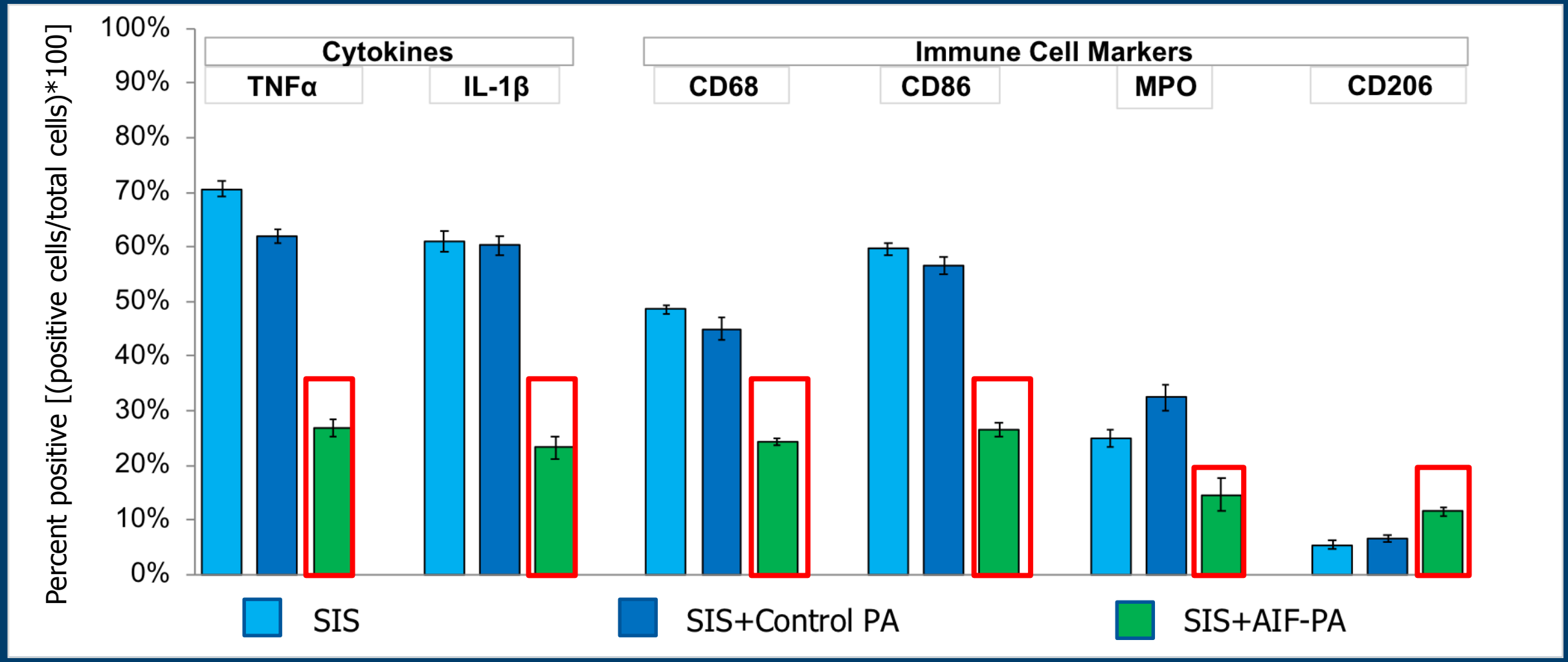
SIS + AIF-PA
(Experimental)

Analysis

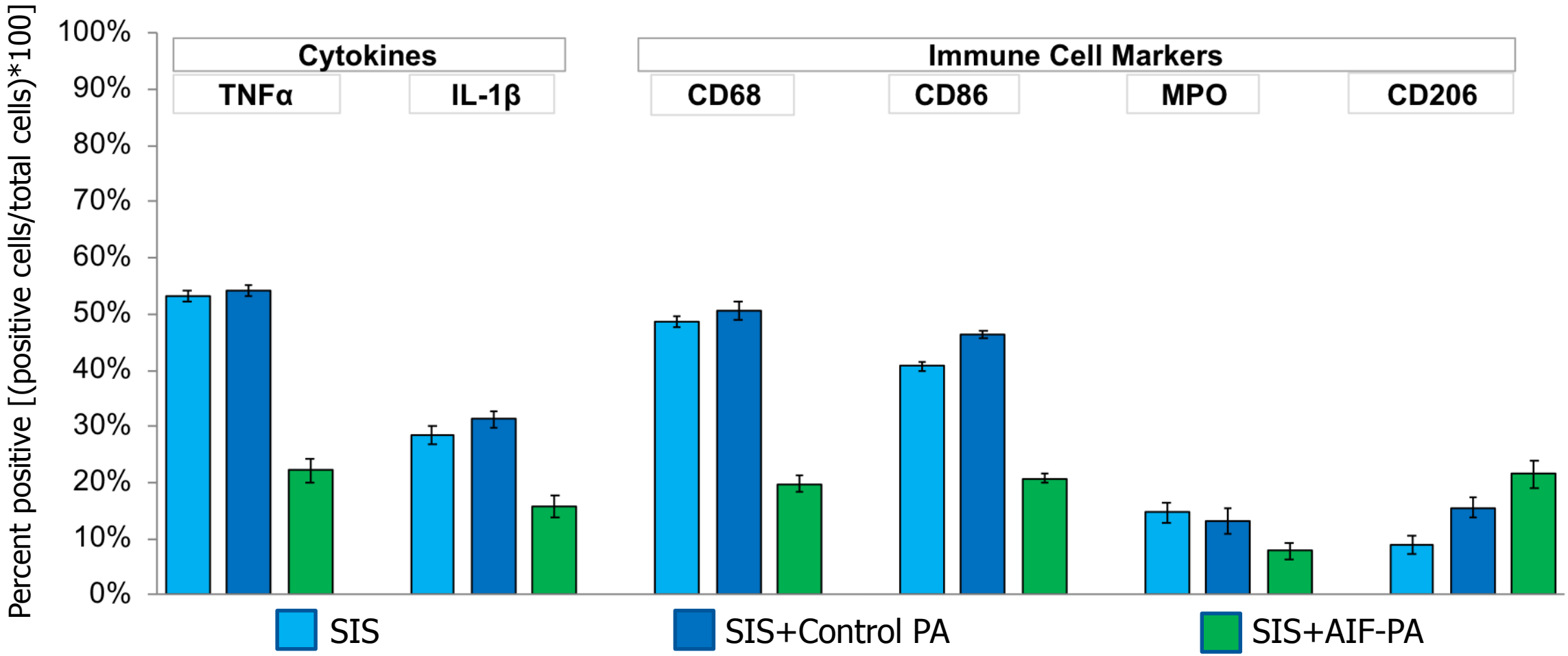


- Animals euthanized at 14 and 28 days
- Urethra divided into 3 sections for analysis
  - NATIVE
  - ANASTOMOSIS (A)
  - REGEN (area of tissue regeneration)
- Analyses:
  - H&E staining
  - Trichrome staining (evaluate vasculature)
  - Immunohistochemistry
    - Cytokines-TNFα and IL-1β
    - Immune cell markers- CD68, CD86, CD206, Myeloperoxidase (MPO)

Inflammatory markers at 14D at the Anastomosis



Inflammatory markers decreased by 28D but the pattern remained in the same



More Complete Urethral Wound Healing in AIF-PA group at 14 days

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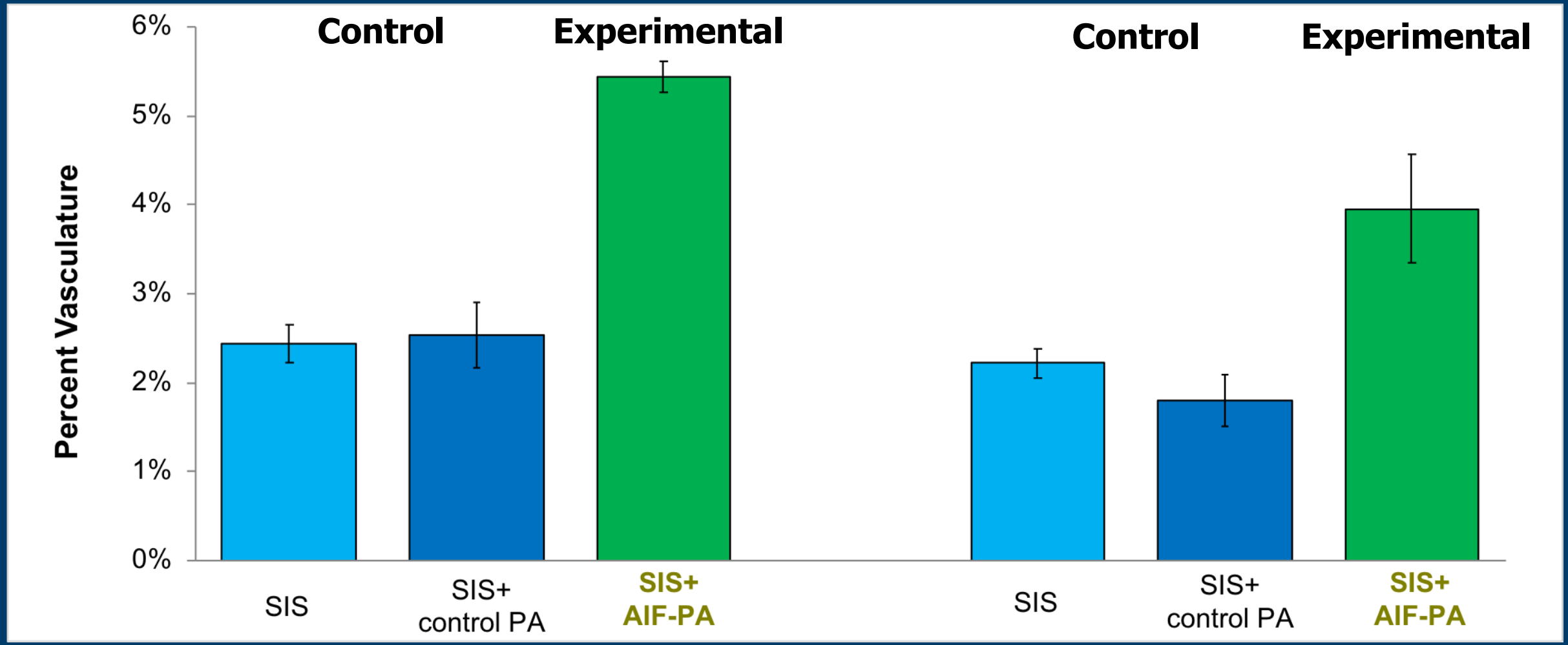
- Presence of complete urethral healing with tissue regeneration in the REGEN area.

	SIS alone	SIS + control PA (control)	SIS + AIF-PA (experimental)
14 Day	3/6 (50%)	2/6 (33%)	5/6 (83%)
28 Day	6/6 (100%)	6/6 (100%)	6/6 (100%)

Increased Vasculature in the AIF-PA group at 28 Days



ANASTOMOSIS **REGEN**

Conclusion

- AIF-PA altered the inflammatory cytokine profile in urethral wound healing.
- Further studies are needed to elucidate the specific mechanism of inflammatory response modulation on angiogenesis and overall urethral healing.
- AIF-PA may have future applications in enhancing post-surgical healing in urethral reconstruction.

Acknowledgement

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  - Dr. Arun Sharma
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Thank you.