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YOU ARE INVITED TO ATTEND THE DEFENSE OF THE DOCTORAL DISSERTATION

"Helminth TGF-β mimic, TGM, increases leukocyte migration and activation while also enhancing cutaneous wound healing and tissue regeneration"

by
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Wednesday, July 27th, 2022
1:00 PM

Join in person: Cancer Center, G1196 – Space limited

Join Zoom presentation
https://rutgers.zoom.us/j/9366611556?pwd=ZTZiN1VsK25GbjRZT21jd3AraGV3UT09
Meeting ID: 936 661 1556
Password: 847410

ABSTRACT

Intestinal parasites express excretory/secretory (ES) molecules, which modulate the type-2 immune response including anti-inflammatory and tissue repair mechanisms. TGF-β mimic (TGM), an ES molecule secreted by *Heligmosomoides polygyrus* (Hp), binds TGF-β receptors yet lacks structural homology to TGF-β and exhibits distinct receptor interactions. We now demonstrate that TGM, through TGF-β receptor binding, enhanced wound healing using an *in vivo* wound biopsy model in which TGM, in a 1.5% carboxymethylcellulose solution, was topically administered beneath a Tegaderm layer. Through histological analysis, greater restoration of normal tissue structure in the wound beds of TGM-treated mice was observed during mid to late-stage wound healing. These observations included accelerated re-epithelialization as well as hair follicle regeneration, in the absence of increased scarring. Using flow cytometric, histological, and gene expression analysis, differential expansion of myeloid populations at different stages of wound healing was observed. This included enhanced early accumulation and persistence of migratory Ly6C+ macrophages in TGM-treated wounds during the early inflammatory phase. Additionally, the percentage of CD206+ alternatively activated macrophages was reduced with TGM treatment during early and mid-stage wound healing, a subset that has been associated with efficient tissue restoration. However, scRNAseq analysis of TGM-treated wounds suggests the presence of a macrophage subset that upregulates wound healing-associated genes without expressing CD206. In summary, TGM can enhance skin wound healing and pro-restorative maturation through its interaction with the TGF-β receptor. TGM was also associated with the recruitment and differential activation of specific macrophage subsets. This study indicates a role for TGM as a potential novel therapeutic option for enhanced wound healing.