Promising Directions of Repurposing 4-AP to Promote Hair Follicle Regeneration and Collagen Remodeling Following Severe Burn

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The healing process for severe thermal skin burns is often impeded by inflammation in the wound site and apoptosis, or programmed cell death. Typical treatment for burn wounds revolves around supportive wound care and protection. Given the frequency of thermal skin burns, with almost half a million patients suffering from burn injuries in the US annually, an effective treatment to accelerate healing, foster regeneration, and mitigate impediments is clear. 4-aminopyridine (4-AP) is a US FDA approved drug for multiple sclerosis (MS). This research aims to repurpose 4-AP to treat severe, or full-thickness skin burns. Digital images of saline, or control, treated or 4-AP treated skin tissues over 28 days were analyzed, and skin tissue slides of post-burn healing period tissue were stained for hair follicles and collagen levels. It was found that systemic injection of the treatment over a 28-day healing period promoted faster burn healing and displayed significant hair follicle regeneration and collagen remodeling, both of which contribute to dermal remodeling. Furthermore, 4-AP evidently allowed for higher mature collagen levels in the later stage of the wound healing. Overall, 4-AP displays promising directions novel and clinically relevant in thermal burn treatment.

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