

**Department of Surgery Research Day  
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**ACOMYS: UNLOCKING A PATHWAY TO REGENERATION**

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**Introduction:** A goal in surgery is to maintain functionality of the afflicted tissues by reducing scarring. Typical mammalian skin healing processes result in non-functional scar tissue. We have previously discovered that the spiny mouse, *Acomys*, can regenerate skin wounds without scarring. The ability to induce regeneration therapeutically would have a great impact in medicine. To explore the regenerative properties of *Acomys*, we are studying divergences in normal healing between *Acomys* and *Mus musculus*, as a function of mast cell activity. We have already shown a 3.5-fold increase in resident dermal mast cells in *Acomys* as compared to *Mus*. Current literature proposes that an *absence* of mast cells has a direct correlation with decreased scarring, contrary to our observation in *Acomys*. We tested the effects of aberrant mast cell activity on normal healing in skin wounds in *Acomys* and *Mus*.  
**Methods:** *Acomys* and *Mus* were given daily injections of either C48/80 (mast cell activator), Quercetin (mast cell inhibitor), or PBS (n=3) for 25 days total. Full thickness excisional wounds were performed 4 days after first injection and wounds were harvested 21 days post-wounding. Wax sections were evaluated for mast cell quantity and activity, scar tissue formation, and new tissue regeneration.

**Results:** Abnormal mast cell activation in *Acomys* results in dramatic inflammatory response, suggesting that activation of mast cells in *Acomys* is tightly regulated during normal wound healing. Differences were observed in coloration, size, and depth of wound in treated animals as compared to controls showing that abnormal mast cell activity affects normal wound healing.

**Conclusions:** Controlled and normal mast cell activity is crucial to normal wound healing in *Acomys* and *Mus*.