

TITLE: Anti-bacterial compounds present in the blood of the regenerating spiny mouse

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RESEARCH PROJECT DESCRIPTION (brief overview of background, hypothesis, methods, role of medical student, funding and relevant publications -- SHOULD NOT EXCEED ~ 250 WORDS)

We have recently described the remarkable regenerative properties of the skin of the spiny mouse, *Acomys*. Following removal of large pieces of full thickness skin this mammal can within a period of 5 weeks completely regenerate the removed skin and replace hairs, sweat glands, dermis, adipose tissue, epidermis, skeletal muscle without any scarring at all (Seifert et al., 2012). Furthermore, the heart and the spinal cord of this mammal also recovers from injury without any scarring. Molecular analyses by microarrays and RT-PCR arrays have revealed that this non-scarring, non-fibrosing mammal responds to damage by *failing* to up-regulate the host of cytokines and chemokines that the normal mouse does (Brant et al., 2015a: b). These cytokines and chemokines are known to be responsible not only for the induction of fibrosis and scarring in the normal mammal, but also for the prevention of infection at the site of the wound. Since the spiny mouse does not up-regulate these molecules we are left contemplating why this animal does not die of infection after skin wounding in the way that other mammals do when the immune system or the cytokine induction mechanisms are compromised. Our hypothesis is that the blood of these animals contain novel anti-bacterial compounds and this project will test this hypothesis by using *Acomys* and *Mus* serum in classical bacterial cell killing assays and looking for known compounds in the serum such as defensins by ELISAs. The role of the medical student is to perform these experiments under guidance from the PI and the project is funded by the Keck Foundation.

Seifert, A., Kiama, S.G., Seifert, M., Goheen, J., Palmer, T & Maden, M. (2012). Weak skin and tissue regeneration in African spiny mice (*Acomys*). *Nature* **489**, 561-566.

Brandt J.O., Lopez, M-C, Baker, H.V., Barbazuk, W.B. & Maden, M. A comparative analysis of gene expression profiles during skin regeneration in *Mus* and *Acomys*. *PlosOne* Nov 25;10(11):e0142931.

Brandt, J.O., Yoon, J.H., Polvadore T., Barbazuk, B. & Maden, M. (2015). The cellular basis of scar-free skin regeneration in the spiny mouse. *Wound Rep Regen* doi: 10.1111/wrr.12385. PubMed PMID: 26606280.