

## **Topical PHD inhibitors to enhance wound healing by reducing ischemia**

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### **Unmet Need**

Millions of patients experience unhealed skin wounds, and with the rise in number of surgeries per year along with the increase in older population, this burden is expected to increase. One aspect of wound healing complication is skin-flap ischemia and necrosis in plastic surgery. The incidence of skin necrosis is estimated to be above 4% in all surgical cases but can range as high as 30% in the case of mastectomy skin flaps. Surgical delay procedures are currently the most reliable means of improving skin flap survival through ischemic preconditioning. However, these procedures are limited by invasiveness and require a two-stage operation often 4 weeks apart. There is a need for an easy-to-use treatment that will prevent or reduce ischemia of the skin following surgical incision.

### **Technology**

Duke inventors have developed a topical treatment method for preventing and/or reducing ischemia following surgical incision. This is intended to be used by surgeons following closure of a surgical incision, where a topical dose will be applied to the sutured site. Specifically, the surgeons will topically administer either a lotion or gel containing an effective dose of a HIF- $\alpha$  potentiating agent, thereby reducing ischemic damage to a surgical incision. The agent reduces HIF-1 $\alpha$  degradation, which promotes transcription of vascular endothelial growth factor (VEGF) and erythropoietin (EPO) thereby inducing angiogenesis. This has been demonstrated in rat skin flap models, where the topical HIF-1 potentiating agent significantly reduced the percent of necrotic skin at 3 days and 7 days post-operation.

### **Other Applications**



#### Duke File (IDF) Number

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#### Meet the Inventors

[Brown, David](#)  
[Hollenbeck, Scott](#)

#### Department

Surgery (Dept. & CRU)

#### Publication(s)

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#### External Link(s)

• [From the Frank Hawkins Kenan Plastic Surgery Research Laboratories](#)

This technology could also be applied to the veterinary field, where animals experience necrotic tissue following flap surgery.

### Advantages

- Noninvasive approach reduces need for surgical procedures
- Increases tissue survival rates up to 92%
- Reduces up to 80% of ischemic incidents
- Reduces cost associated with necrotic complications

