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# Skin Graft Acceptance Rates in Xenopus laevis

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# Skin Graft Acceptance Rates in *Xenopus laevis*


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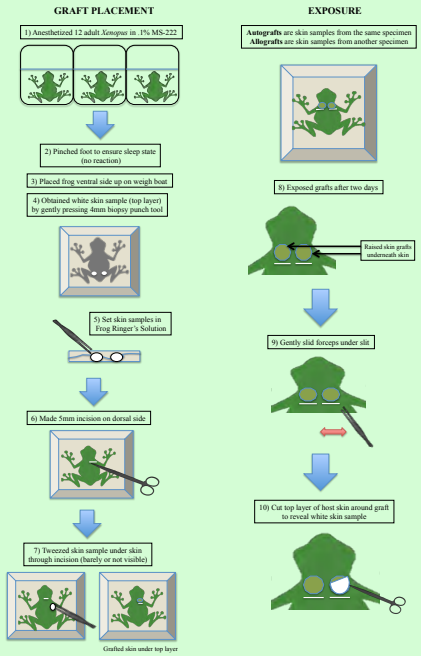
### Introduction

Grafting, a form of skin transplantation, shows similar rates of rejection among different species. The process of autografting (skin sample grafted onto the same specimen) is characterized by a 100% acceptance rate. An allograft (from a different individual of the same species), contrarily, is rejected over time unless immunosuppressive assistance is administered. Janis Kuby tells us that the first time a skin sample is allografted; the rejection rate ranges 10-14 days for complete rejection (primary or first-set rejection). The second time that the same specimen's skin sample is allografted; the rejection rate ranges 5-7 days (second-set rejection). The rejection rate is cut in half due to the specificity and memory capacities of the immune system (Kuby 1997).

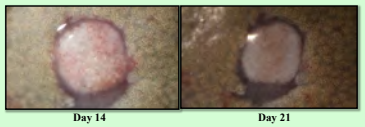
In our study of immunologic function in the species *Xenopus laevis*, we sought to examine the proposed rate of skin graft rejection on this species. In addition to observing the expected rates of rejection, we also hope to later discover the effects of a stressful environment on these rates as well. Janice K. Kiecolt-Glaser's experiment involving psychological stress and its effect on wound healing in humans highlights the application of the stress variable. She found that it took significantly more time for wounds to heal on stressed individuals than on unstressed individuals suggesting that stress plays a role in immunologic functions. Kiecolt-Glaser's work sets the stage for a future experiment (Kiecolt-Glaser et. al. 1995). Our experiment establishes a baseline in which stress will be applied to later.

### Materials and Methods




### Results

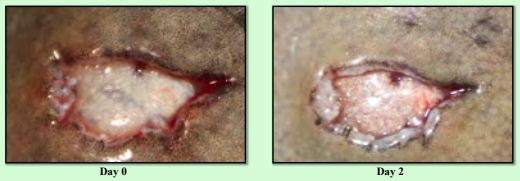
Autograft A → A


Allograft A → B

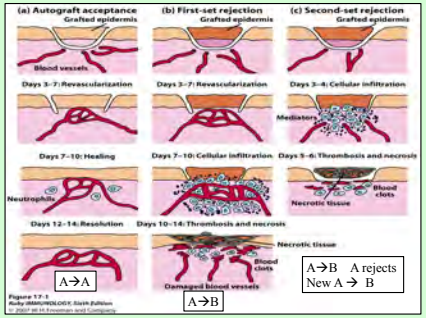


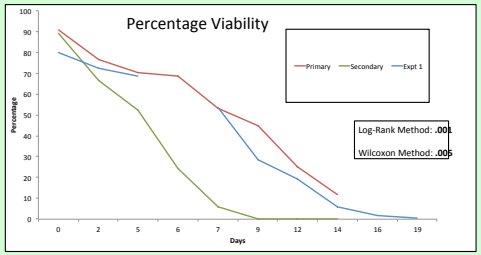
Secondary A → B, then A again





### Graft Rejection




### Discussion

Our research demonstrated that there was an increase in the rejection rate from autografts to allografts. While autograft rejection ranged from 10 to 14 days, allograft rejection ranged 5 to 7 days. The halved rejected rate can be attributed to the specificity and memory capabilities of the *Xenopus laevis*' immune system. The foreign skin specimen is recognized and rejected much more quickly than initial exposure. We utilized two grafting methods differing in the shape of the skin graft. There was no difference in rejection rate between the circular and square-shaped grafts. We will employ a more detailed and specific stress model and examine the effects of stress on wound healing. In addition, we will experiment with skin grafting on tadpoles and look for differences in rejection rates as compared to adult skin grafting. Future work may lead to skin xenografting between *Xenopus laevis* and other amphibians.


### References

Kiecolt-Glaser, J.k., P.t. Marucha, A.m. Mercado, W.b. Malarkey, and R. Glaser. "Slowing of Wound Healing by Psychological Stress." The Lancet 346.8984 (1995): 1194-196. Web.

Kuby, Janis M. Immunology. 3rd ed. N.p.: W H Freeman &, 1997. Print.



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