

Artificial Skin

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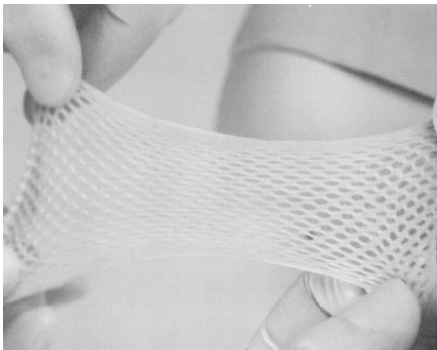
Abstract— the first successful artificial skin was developed at MIT. Using collagen fibers and a long sugar molecule, a porous material was formed resembling skin. When placed on burns, this material encouraged the growth of new skin cells around the area. This substitute for human skin can be used to save the lives of thousands of severely burned patients around the world.

I. INTRODUCTION

DURING the 1970s, the first synthetic skin was invented by John Burke and Ioannis Yannas. Burke, having treated numerous burn victims, saw the need for an artificial skin. Yannas had been working with collagen and agreed to team up with Burke in order to develop a successful artificial skin. Although today's methods for treating burn victims are effective, many patients continue to die due to the fact that their bodies are unable to produce the quantity of skin needed to heal the affected area, or because they reject the graft they received. After years of research and experimenting, the two finally developed a polymer that solved the search for an artificial skin.

II. METHODS

The synthetic skin created by the Yannas-Burke team received the name Silastic. Silastic is a two layer polymer. Polymers are compounds with repeating molecular structures. They can either be synthetic or natural. The artificial skin developed by Burke and Yannas had two layers of polymers—one layer synthetic, the other organic. The top layer of Silastic is composed of a thin silicone sheet that protects the victim from infection and dehydration. The bottom layer was a kind of scaffolding made from the molecular material in cow tendons and shark cartilage. It acted as a seed bed for healthy skin cells taken from other parts of the patient's body. In order to use Silastic, a doctor would place the film over a burned area on a victim.



Approximately one month after this film is in place, new skin cells begin to form around the area at an incredibly healthy rate.

III. RESULTS

The Yannas-Burke team announced its first successful experiments with the skin in 1981. Silastic was used on ten

severely burned patients in the following year, including a woman who had been burned over more than 50 percent of her body. In each of the ten cases the Silastic film was seen to dramatically increase the growth of new skin cells.



IV. DISCUSSION

Developing a material to use for synthetic skin was a huge challenge. Dr. Burke and Dr. Yannas needed a material that was flexible, protected against infection and dehydration, and could be made from ordinary substances. Furthermore, the film needs to be accepted by the patient's immune system.

The two-layer polymer developed by the two MIT engineers in the 1970s was brilliant for its time.

It was the first



synthetic skin that was seen to truly improve recovery for burn victims. These two doctors started a movement with their discovery of a successful synthetic skin. News of Silastic led to the development of more prototypes similar to the two-layered polymer made by Burke and Yannas.

REFERENCES

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