

Evaluation of the effect of biological cellulose dressing on wound healing

1. **Title of Research** : Evaluation of the effect of biological cellulose dressing on wound healing

2. **Cross-School Research and Development**

Team Members

Department	Name	Position
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Omega Animal Hospital	Shih-Cheng Hsu	Director of Hospital

3. **Content of Cross-School Research and Development**

National Pingtung University Science and Technology : This project planned to conduct animal experiments in NPUST campus. After the back injury of rats, they were covered with commercial gauze, 3M artificial skin, advanced dressing material (Aquacel[®], Convatec Inc.) and our bio-cellulose membrane dressing. In addition, in order to explore the amount of exudate caused by inflammation and the adhesion of the dressing,

different doses of *Staphylococcus aureus* were treated onto the wound to induce inflammation, and then the wound skin specimen were stained for morphology observation. Biochemical analysis was also conducted to compare the effect of this bio-cellulose membrane dressing with other commercially available dressings.

National Fengshan Senior Commercial & Industrial Vocational School : In addition to comparing the effect differences between various dressing materials, this project also hopes to expand into the animal or pet market before obtaining the human medical device certification. In this regard, the group in the special seminar course which was led by Huan-je Wu, the chair of Department of Business Management of National Fengshan Senior Commercial & Industrial Vocational School, analyzed the advantages and disadvantages of current products in market promotion, and shared student progress with the cross-school team at any time.

Omega Animal Hospital : In addition to animal experiments, this project also hopes to be used in the pet market for practical trials and to collect trial experience from owners. Therefore, we cooperated with Omega Animal Hospital to provide this dressing material for animal treatments. The Director of Hospital, Shih-Cheng Hsu, will also compile relevant post-use information and contact

the cross-school team at any time.

4. Description of Industrial Needs and Research Result Applications

At present, this product can be used to treat large-scale abrasions, burns and other wounds in animals. After necessary debridement, this bio-cellulose membrane dressing can be directly covered on the wound surface, and covered with ordinary gauze. It is estimated that if the exudate is not obvious, there is no need to change the dressing until it dries and falls off naturally. If it is necessary to change the dressing, the dressing is only needed to moisten with water and it can be easily removed. This is useful for animals such as animal hospitals, zoos or shelters when caring for injured animals.

In addition to animal experiments and market expansion, the more positive purpose of this project is to prepare for future applications for medical device license. For the human medical device market, especially in schools, hospitals, long-term care centers, etc., it is expected to reduce the time and labor costs of dressing changes. This dressing material hopes to strengthen its competitiveness with other similar products through this feature.

5. Performance of Cross-School Research and Development

The animal experiment of this project has been initially completed. The results show that after the wound was injured, after

covering with the four different dressings for 10 days, there was still obvious redness, swelling and exudation in the gauze group. When the gauze was replaced, it was extremely difficult to tear off and the wound was not easy to recover. In the group of 3M artificial skin dressing treatment, the exudate condition was also serious. However, the effect of the bio-cellulose membrane dressing developed by our team and the commercially available Aquacel® dressing was not much different after about 10 days of injuring, the wounds were all dry, scabbed and significantly reduced in size. This product is currently sold in our campus for use by animals. Currently, the student group of the National Fengshan Senior Commercial & Industrial Vocational School are researching and expanding it to the pet market. In the future, based on the experimental results, we will also work towards applying for a registration for human medical devices.

According to the current animal experiment results, the wound healing effect of this bio-cellulose membrane dressing is not far from that of the dressing material on the market (Aquacel®) . Although the commercial price of this dressing is higher than gauze, it is lower than Aquacel® (approximately 100:560 for each) , and this dressing is non-sticky and easy to tear off, causing minimal damage to the healing wound. If the exudate is reduced, the bio-cellulose membrane dressing does not need to be replaced and can be dried naturally. The scab will fall off. For the human medical device market,

especially in schools, hospitals, long-term care centers, etc., it is expected to reduce the time and labor costs of dressing changes. This dressing material hopes to strengthen its competitiveness with other similar products through this feature.



Fig 1 : Rat animal experimental operations, including anesthesia, shaving and other techniques.



Fig 2 : Observation of morphological sections of rat skin specimens.



Fig 3 : The project investigator exchanged the implementation results with Huan-je Wu, the chair of Department of Business Management of National Fengshan Senior Commercial & Industrial Vocational School.



Fig 4 : The director Huan-je Wu held discussions with students on special topics.