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Major Advances in the Treatment of Burns in Hong Kong

The Chinese University announced yesterday (July 22) the breakthrough of basic research applied to a practical clinical situation in saving a patient's life.

Professor Arthur Li Kwok Cheung, Chairman of the Department of Surgery of the Chinese University of Hong Kong stated that for the past 3 years active research has been undertaken to culture human skin in the Lee Hysan Laboratory at the Prince of Wales Hospital. Early this year Dr Walter King Wing Keung, Senior Lecturer in Surgery made the breakthrough and successfully managed to grow Chinese skin of good quality and in sufficient quantity. This research has immense therapeutic significance.

Loss of skin from flame and scald burns is life-threatening because without this covering, there is loss of fluids and protein from the body and the lack of barrier to infection. Treatment is by covering the burnt wound with partial-thickness skin harvested from the patient's body. However with extensive loss of skin such option is not readily available. Temporary coverage of the wound with skin substitute is then required. In the West, use of human cadavar skin graft for temporary wound coverage is widely practised. However this option is not available in Hong Kong because of the lack of organ donors. Moreover, the potential for transmission of AIDS and hepatitis viruses from cadavar skin grafts limits their use. Furthermore, persistent wound infection has restricted the application of processed biological dressings or synthetic skin substitutes. Recently, cultured human epidermis has been successfully used as skin substitutes in USA and Europe. For the first time in Hong Kong, the Department of Surgery of The Chinese University of Hong Kong has successfully applied the technique to grow human skin and then transplanted it back onto the patient.

In April this year, a patient with severe full thickness burns involving 45% of the total body surface area was first treated successfully at the Prince of Wales Hospital by using fresh pigskin for temporary wound coverage followed by permanent wound coverage with autogenous skin graft and cultured epidermis. In this patient, temporary coverage of the wound with fresh pigskin was useful in controlling wound infection and allowing time for the patient skin to be grown in the laboratory. The harvesting of pigskin is labor-intensive and calls for a team of trained surgical staff and veterinarian. The harvested pigskin is stored in a skin bank for subsequent use.

Under the direction of Dr Walter King Wing Keung, using specially prepared culture medium, cultures of epidermal cells from the patient were propagated from original small pieces of partial-thickness skin to provide more than two hundred-fold increase in the size of the donated skin in 3 to 4 weeks. The expanded multi-layered sheets of human epidermal cells was then used for permanent coverage on the raw surface of the wound together with autogenous skin grafts.

The use of fresh pigskin to stabilize the patient's condition until the wound is permanently covered by autogenous skin graft and cultured epidermis promises to offer an efficacious and unique approach in the treatment of extensive burns in Hong Kong.

Professor Arthur Li Kwok Cheung said that this case illustrated the importance of basic scientific research in the clinical care of patients. The Department of Surgery of the Chinese University of Hong Kong is proud to play its role in advancing the frontiers of science and medicine. However, despite numerous innovation and successes, funding is extremely limited and in order to continue with this excellent work, public appeal for donation towards research and treatment will be necessary. All donation to the Department of Surgery, Chinese University of Hong Kong will be gratefully acknowledged.

Having shown what has been achieved by this outstanding team and not just saying what one intends to do, and with solid results behind them, Professor Li concluded with the remark: "We urgently need your help to help us to help others who are less fortunate."

Current research activities are directed toward the making of a durable human composite skin graft consisting of culture human epidermis and collagen dermis for temporary or permanent coverage of burn wound. With adequate funding and manpower as well as government and community support, the Department of Surgery, Chinese University of Hong Kong is making it a priority to organize Hong Kong's first skin bank to store frozen pigskin and continue to culture human epidermis for the treatment of burns patients in Hong Kong.

July 22, 1991

Attachment:
1. Human epidermal cells successfully cultured at Prince of Wales Hospital
2. Microscopic appearance of pure culture of human epidermis
3. Patches of cultured human epidermis (left top & right lower corner) successfully autografted next to traditional skingrafts
4. Cultured human epidermis at seven weeks after grafting seen at centre of picture surrounded by traditional skingrafts
5. Microscopic appearance of successfully grafted cultured human epidermis at six weeks showed normal maturation