

Top Stories in Research

By Dr. Jan Dutz

What's new on the research front? The articles summarized here are so hot off the press the ink has barely dried.

Sounding the alarm

The skin forms a mostly impervious barrier that keeps tissue fluids within the body and microbial invaders and external chemicals out. Skin cells form this barrier in part by linking together with "tight junctions" between cells. These tight junctions are made of specialized proteins.

In a recent issue of *Science*, investigators reported that one of the proteins in these tight junctions also helps activate immune cells in

the skin. This protein is called CAR (cox-sackie and adenovirus receptor) and is the protein that certain viruses use to gain

access to the body. When the skin barrier is disrupted by a microbe, this protein helps activate local T cells. In turn, the T cells produce chemicals needed to repair the breach. A better understanding of these proteins will lead to new avenues in skin damage repair and activating local T cells to help in eradicating infection.

Using the skin to improve vaccination

Current influenza vaccines are given by injection into muscle. The skin has a high concentration of specialized immune cells that activate the immune system and that are bypassed by administering a vaccine into muscle. Investigators publishing in *Nature Medicine* have now shown that administering a vaccine into



the skin has advantages over administration into muscle.

The investigators used a dissolvable polyvinyl micro-needle patch to painlessly administer vaccine into the skin. This patch released the vaccine within minutes. Mice immunized in this way showed a 1,000-fold more efficient clearance of the influenza virus from their lungs one month after vaccination when compared with mice vaccinated intramuscularly. This simple, inexpensive and pain-free method of administering a vaccine may one day replace the familiar needle stick.

Bone marrow transplantation may provide a treatment for a genetic skin disease

Epidermolysis bullosa is an inherited condition in which mild trauma induces painful blisters and sores on the skin. One of the most severe forms of this disease is recessive-dystrophic epidermolysis bullosa. In this condition, mutations in a protein (called collagen VII) expressed in the deeper layers of the skin causes skin fragility. Children with this disorder develop mutilating scars from birth. They also experience local and general infections and eventually skin

cancers that limit survival to an average of just 30 years. To date, there has been no therapy for this disease.

Bone marrow transplantation is an aggressive therapy that has been used in the treatment of blood-borne cancers. In a recent article in the *New England Journal of Medicine*, investigators demonstrate that individuals with this severe skin disease can withstand the treatment steps required for bone marrow transplantation. Furthermore, stem cells that are transferred with the bone marrow cells from normal donors can "seed" the skin and produce normal collagen VII, resulting in improved wound healing. This remains a high-risk approach to the treatment of an incurable skin disease. Nevertheless, this paper supports further study of stem-cell treatment strategies for patients with the severest forms of a structural skin abnormality. **CS**



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There's a lot happening in the world of skin. More CSPA news can be found at www.canadianskin.ca.