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Better burn treatment using soluble factors from irradiated white blood cells

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Extensive burn injuries are usually treated by transplanting layers of skin from other parts of the body. Although this is a commonly used method, the wounds do not always heal completely. A research group headed up by plastic surgeon Stefan Hacker of MedUni Vienna's Department of Surgery has been able to show that soluble factors from white blood cells improve tissue healing following skin grafting. The study has been published in the top journal *Scientific Reports*.

Burn victims often have extensive wounds, as the damaged skin cannot be saved and therefore has to be removed. Usually, skin is transplanted from the upper thigh or back of the patient onto the injured area. These wounds are more likely to heal completely in younger patients, but the process takes considerably longer in older patients and those suffering from certain diseases (e.g. diabetes). Sometimes complications occur, requiring new operations or leaving disfiguring scars.

In an animal model, a research group led by Stefan Hacker, surgeon at the Division of Plastic and Reconstructive Surgery at MedUni Vienna, has now demonstrated a method, whereby soluble factors from white blood cells induce a significant improvement in tissue repair. In this method, white blood cells are stressed by irradiating them with gamma radiation so that they release certain proteins that stimulate angiogenesis and tissue regeneration. The secreted factors are processed to produce a medication, which can be applied to the wounds. The study has shown a doubling of the number of blood vessels and also quicker and better skin growth than in the control groups. The study project was planned and

conducted in collaboration with Rainer Mittermayr of the Ludwig Boltzmann Institute for Experimental and Clinical Traumatology and Michael Mildner from MedUni Vienna's Department of Dermatology.

The study is a good example of translational research that could very quickly benefit patients. Stefan Hacker: "Clinical application in humans should not be restricted to burn injuries but can also work for other types of wounds, for example it could be beneficial for poorly healing diabetic skin ulcers or for wounds after microsurgical tissue transplantation." The study was conducted and financed within the framework of the Christian Doppler Laboratory for Cardiac and Thoracic Diagnosis and Regeneration (director: Hendrik Jan Ankersmit) at MedUni Vienna's Department of Thoracic Surgery.

More information: Stefan Hacker et al. Paracrine Factors from Irradiated Peripheral Blood Mononuclear Cells Improve Skin Regeneration and Angiogenesis in a Porcine Burn Model, *Scientific Reports* (2016). DOI: 10.1038/srep25168

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