



Skin microbiome identified as factor in stem cell transplants Bacterial diversity on skin decreases due to complications

(Vienna, 13 October 2022) Organ damage occurs in up to 70 percent of patients in the first few months following stem cell transplant. The precise reasons for this potentially life-threatening reaction have long been the subject of scientific research. Researchers led by Georg Stary from the Department of Dermatology at MedUni Vienna and Vienna General Hospital in collaboration with the Ludwig Boltzmann Institute for Rare and Undiagnosed Diseases have recently identified bacterial proliferation on the skin as a factor associated with the occurrence of the complication. The findings recently published in the medical journal "Leukemia" contribute to the research and development of new therapeutic approaches.

The researchers came to their findings by examining the skin of 50 patients, most of whom had undergone stem cell transplant (SCT) for leukaemia at the Department of Bone Marrow Transplantation at the Department of Internal Medicine I at MedUni Vienna and Vienna General Hospital. In the first few weeks or months after receiving the stem cells from the donor, a donor-versus-recipient reaction (graft-versus-host disease, GVHD) occurred in some of the test subjects. When the microorganisms on the skin (skin microbiome) of those affected were analysed in detail, the research team led by first author Nadine Bayer and study leader Georg Stary from MedUni Vienna and Vienna General Hospital found a drastic decrease in bacterial abundance. "The reduction in proliferation was particularly pronounced in severe cases of GVHD - even before symptoms appeared," Georg Stary reported on key findings. At the same time, the scientists observed an increased occurrence in patients with GVHD of staphylococci on the skin, i.e. bacteria that can cause serious infections.

Reaction almost always involves the skin

Despite precise examinations of the stem cell donors' and recipients' tissue characteristics as well as preventive medication, GVHD occurs in approximately 30 per cent of patients after sibling donations and in approximately 70 per cent of patients after donations from unrelated donors. This reaction means that body cells are attacked as foreign by immune cells that are newly developed from the transplant, and organs are subsequently damaged. The complication almost always affects the skin: the first symptoms are usually rashes, which, depending on the severity, can manifest themselves as slight redness or severely inflamed cutaneous changes with a detachment of the uppermost skin layer.

The fact that the composition of the gut microbiome influenced the clinical course after stem cell transplantation was already known to medical researchers. With the identification of the skin microbiome in GVHD, the scientists have another tool at their disposal with which to



research and develop improved treatment measures. "Follow-up studies will now show whether the change in the skin microbiome may contribute to the development of GVHD and whether new therapeutic approaches can be identified from the knowledge gained," says study leader Georg Stary, who also works at the CeMM Research Centre for Molecular Medicine at the Austrian Academy of Sciences and at the Ludwig Boltzmann Institute for Rare and Undiagnosed Diseases, with an eye toward the future.

Publication: Leukaemia

Disturbances in microbial skin recolonization and cutaneous immune response following allogeneic stem cell transfer

Nadine Bayer, Bela Hausman, Ram Vinay Pandey, Florian Deckert, Laura-Marie Gail, Johanna Strobl, Petra Pjevac, Christoph Krall, Luisa Unterluggauer, Anna Redl, Victoria Bachmayr, Lisa Kleissl, Marion Nehr, Rasmus Kirkegaard, Athanasios Makristathis, Martin L. Watzenboeck, Robert Nica, Clement Staud, Lukas Hammerl, Philipp Wohlfarth, Rupert C. Ecker, Sylvia Knapp, Werner Rabitsch, David Berry, Georg Stary

DOI: 10.1038/s41375-022-01712-z

Send queries to:

Mag. Johannes Angerer
Medical University of Vienna
Head of Communications and Publicity
Tel.: 01/ 40 160 11 501
Email: pr@meduniwien.ac.at
Spitalgasse 23, 1090 Vienna
www.meduniwien.ac.at/pr

Karin Fehringer, MBA
University Clinic Vienna General Hospital
Head of Information Centre and PR
Vienna Health Association
Tel.: +43 1 404 00-12160
Email: presse@akhwien.at
Währinger Gürtel 18-20, 1090 Vienna
www.akhwien.at/presse

Medical University of Vienna – Short Profile

The Medical University of Vienna (abbreviated: MedUni Vienna) is one of the most established medical schools and research institutes in Europe. With about 8,000 students, it is now the largest medical school in the German-speaking world. With 6,000 employees, 30 university hospitals and two clinical institutes, 13 medical research centres and numerous highly specialised laboratories, it is one of the most prominent top-level research institutions in Europe in the field of biomedicine. The MedUni Vienna along with the Josephinum is home to a medical history museum.

Vienna General Hospital – Short Profile

At the University Clinic Vienna General Hospital of the Vienna Health Association around 80,000 patients are treated as inpatients every year. The outpatient clinics and specialised outpatient departments of Vienna General Hospital are also visited about 1.2 million times. In addition to the



doctors at MedUni Vienna, around 3,000 nurses, more than 1,000 members of the medical, therapeutic and diagnostic health professions and many other employees from a wide range of professions are available to care for our patients.