

Prof. Dr. Sandra Franz

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Research Areas Inflammatory and wound healing responses in the skin
 Mechanisms of disturbed skin wound healing
 Biomaterial-based therapeutic approaches in the skin

Professional Career

Since 06/2023	Professor for Skin Regeneration, Department of Dermatology, Leipzig University, Germany
02/2021	Habilitation in Experimental Dermatology, Leipzig University, Germany
2013 – 2023	Group leader "Wound healing/Immunomodulation", Department of Dermatology, Leipzig University, Germany
2009 – 2013	PostDoc, Department of Dermatology, Leipzig University, Germany
2007 – 2009	PostDoc, MRC Centre for Inflammation Research, University of Edinburgh, United Kingdom
04/2007	Dissertation in Immunology, University of Erlangen, Germany
2003 – 2007	PhD student, Institute for Clinical Immunology and Rheumatology, University of Erlangen, Germany

Research Projects

- „Innovative cell therapy to promote skin regeneration“ (BMBF, SaxoCell: ZellTWund)
- „Intradermal 3D drug device administration – ex vivo and in vivo studies“ (M-ERA.NET 2: 3D4D2)
- „Pathomechanisms of disturbed wound healing“ (DFG)
- „Immune responses to native and artificial extracellular matrices“ (TRR-SFB 67)
- “Regulation of macrophage polarisation by fibroblasts – impact for the wound healing response” (DFG)

Awards, Fellowships

2018	Egon-Macher Award of the ADF
2007	Research Fellowship (<i>German Research Foundation (DFG)</i>)
2003	PhD Fellowship (<i>Research Training Group 592, University of Erlangen</i>)

Organization of Conferences

11/2023	ETRS-Session “Research – Patients – Wound treatment”, 6 th Wundkongress (WUKO), Nürnberg, Germany
07/2021	Session 2 “Wound healing and repair”, 3 rd International Symposium “Frontiers in Biomaterial Science”, Leipzig, Germany
09/2019	Special Symposia “Matrix engineering in skin and bone regeneration”, 30 th European Conference on Biomaterials, Dresden, Germany
09/2006	1 st International Symposium on Regulators of Adaptive Immunity, Erlangen, Germany

Review Activities

peer-reviewed
journals

Acta Biomaterialia, Bioactive Materials, Biomaterials, Biomaterial Science, Cellular Physiology and Biochemistry, Experimental Dermatology, Frontiers of Immunology, Journal of Biomedical Materials Research: Part A, Journal of Immunology Research, Journal of Investigative Dermatology, Journal of Leucocyte Biology, Journal of Tissue Engineering and Regenerative Medicine, PlosOne, Science Advances, Scientific Reports, Theranostics

research funding
organizations

German Research Foundation (DFG), Medical Research Council (MRC), Swiss National Science Foundation (SNF), Wellcome Trust

Membership in scientific associations

- European Tissue Repair Society (ETRS, board member)
- European Wound Management Association (EWMA)
- European Society for Dermatological Research (ESDR)
- German Society for Immunology (DGfI)
- German Society for Biomaterials (DGBM)
- Arbeitsgemeinschaft Dermatologische Forschung (ADF)

Leipzig, 19.02.2025

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Selection of peer-reviewed publications relevant to the field of skin wound healing and tissue regeneration

- 1 Ertel A, Anderegg U, **Franz S**, Saalbach A. *Dermal White Adipose Tissue-Derived IL-33 Regulates IL-4/13 Expression in Myeloid Cells during Inflammation*. **J Invest Dermatol**. 2025, 145(2):370-382
- 2 **Franz S**, Torregrossa M, Anderegg U, Ertel A, Saalbach A. *Dysregulated S100A9 Expression Impairs Matrix Deposition in Chronic Wounds*. **Int J Mol Sci**. 2024, 25(18):9980
- 3 Saalbach A, Stein M, Lee S, Krügel U, Haffner-Luntzer M, Krohn K, **Franz S**, Simon JC, Tuckermann J, Anderegg U. *Bone quality relies on hyaluronan synthesis - Insights from mice with complete knockout of hyaluronan synthase expression*. **Matrix Biol Plus**. 2024, 9:24:100163.
- 4 Ferrer RA, Torregrossa M, **Franz S**. *Germ-free, carefree: injured skin uses IL-24 to kick-start repair independent of pathogen-recognition*. **Signal Transduct Target Ther**. 2023, 8(1):379.
- 5 Schmaus A, Rothley M, Schreiber C, Möller S, Roßwag S, **Franz S**, Garvalov BK, Thiele W, Spataro S, Herskind C, Prunotto M, Anderegg U, Schnabelrauch M, Sleeman J. *Sulfated hyaluronic acid inhibits the hyaluronidase CEMIP and regulates the HA metabolism, proliferation and differentiation of fibroblasts*. **Matrix Biol**. 2022, 109:173-191.
- 6 **Franz S**, Ertel A, Engel KM, Simon JC, Saalbach A. *Overexpression of S100A9 in obesity impairs macrophage differentiation via TLR4-NFκB-signaling worsening inflammation and wound healing*. **Theranostics**. 2021, 12(4):1659-1682
- 7 Hauck S, Zager P, Halfter N, Wandel E, Torregrossa M, Kakpenova A, Rother S, Ordieres M, Räthel S, Berg A, Möller S, Schnabelrauch M, Simon JC, Hintze V, **Franz S**. *Collagen/hyaluronan based hydrogels releasing sulfated hyaluronan improve dermal wound healing in diabetic mice via reducing inflammatory macrophage activity*. **Bioact Mat**. 2021, 6:4342–4359
- 8 Spiller S, Wippold T, Bellmann-Sickert K, **Franz S**, Saalbach A, Anderegg U, Beck-Sickinge AG. *Protease-Triggered Release of Stabilized CXCL12 from Coated Scaffolds in an Ex Vivo Wound Model*. **Pharmaceutics**. 2021; 13(10):1597
- 9 Torregrossa M, Kakpenova A, Simon JC, **Franz S**. *Modulation of macrophage functions by ECM-inspired wound dressings – a promising therapeutic approach for chronic wounds*. **Biol Chem**. 2021, 402(11):1289-1307
- 10 Li H, Masieri FF, Schneider M, Kottek T, Hahnel S, Yamauchi K, Obradovic D, Seon J-K, Yun SJ, Ferrer RA, **Franz S**, Simon JC, Lethaus B, Savkovic V. *Autologous, Non-Invasively Available Mesenchymal Stem Cells from the Outer Root Sheath of Hair Follicle Are Obtainable by Migration from Plucked Hair Follicles and Expandable in Scalable Amounts*. **Cells**. 2020, 9(9):2069
- 11 Gay D, Ghinatti G, Guerrero-Juarez CF, Ferrer RA, Ferri F, Murakami S, Gault N, Barroca V, Rombeau I, Mauffrey P, Irbah L, Treffeisen E, **Franz S**, Boissonnas A, Combadiere C, Plikus MV, Romeo P. *Phagocytosis of Wnt inhibitor SFRP4 by late wound macrophages drives chronic Wnt activity for fibrotic skin healing*. **Sci Adv**. 6(12):eaay3704
- 12 Herbert D, **Franz S**, Popkova Y, Anderegg U, Schiller J, Schwede K, Lorz A, Simon JC, Saalbach A. *High fat diet exacerbates early psoriatic skin inflammation independent of obesity: Saturated fatty acids as key players*. **J Invest Dermatol**. 2018, 138(9):1999-2009
- 13 Lohmann N, Schirmer L, Atallah P, Wandel E, Ferrer RA, Werner C, Simon JC, **Franz S***, Freudenberg U*,. *Glycosaminoglycan-based hydrogels capture chemokines and rescue defective wound healing in mice*. **Sci Transl Med**. 2017, 9(386):eaai9044 (*equal contribution)
- 14 Ferrer RA, Saalbach A, Grünwedel M, Lohmann N, Forstreuter I, Saupe S, Wandel E, Simon JC, **Franz S**. *Dermal fibroblasts promote alternative macrophage activation improving impaired wound healing*. **J Invest Dermatol**. 2017, 137(4):941-950
- 15 Friedemann M, Kalbitzer L, **Franz S**, Moeller S, Schnabelrauch S, Simon JC, Pompe T, Franke K. *Instructing Human Macrophage Polarization by Stiffness and Glycosaminoglycan Functionalization in 3D Collagen Networks*. **Adv Healthc Mater**. 2017, 6(7), 1600967
- 16 Jouy F, Lohmann N, Wandel E, Ruiz-Gómez G, Pisabarro MT, Beck-Sickinge AG, Schnabelrauch M, Moeller S, Simon JC, Kalkhof S, von Bergen M, **Franz S**. *Sulfated hyaluronan attenuates inflammatory signaling pathways in macrophages involving induction of antioxidants*. **Proteomics**. 2017, 17(10),1700082
- 17 Scharnweber D, Hübner L, Rother S, Hempel U, Anderegg U, Samsonov SA, Pisabarro MT, Hofbauer L, Schnabelrauch M, **Franz S**, Simon J, Hintze V. *Glycosaminoglycan derivatives: promising candidates for the design of functional biomaterials*. **J Mater Sci Mater Med**. 2015, 26(9):2329
- 18 Savkovic V, Li H, Seon JK, Hacker M, **Franz S**, Simon JC. *Mesenchymal stem cells in cartilage regeneration*. **Curr Stem Cell Res Ther**. 2014, 9(6):469-88.
- 19 **Franz S**, Allenstein F, Kajahn J, Forstreuter I, Hintze V, Möller S, Simon JC. *Artificial extracellular matrices composed of collagen I and high-sulfated hyaluronan promote phenotypic and functional modulation of human pro-inflammatory M1 macrophages*. **Acta Biomater** 2013, 9(3):5621-9
- 20 **Franz S**, Rammelt S, Scharnweber D, Simon JC *Immune responses to implants – a review of the implications for the design of immunomodulatory biomaterials*. **Biomaterials**. 2011, 32(28): 6692-709