LASER SCANNING MICROSCOPIC *IN VIVO* ANALYSIS OF THE VOLUME OF THE BLOOD CAPILLARIES IN PSORIASIS THERAPY

Lademann, J., Archid, R., Ulrich, M., Philipp, S., Darvin, M.E., and Sterry, W.

Charité – Universitätsmedizin Berlin, Department of Dermatology, Venerology and Allergology, Berlin, Germany

Psoriasis is a chronic recurring inflammatory skin disease associated with the development of erythematosquamous patches and plaques and a disturbed skin barrier function. While many etiological aspects have been described in detail, several pathogenetic mechanisms remain unknown. The underlying inflammatory reaction of psoriasis dominated by TH 1 cells entails epidermal hyperproliferation, disturbed differentiation and structural changes in the papillary capillaries.

The blood circulation system of the skin is composed of two horizontally arranged plexi, located parallel to the skin surface. The deep dermal plexus, lying on the border to the subcutis, sends arterioles to the upper plexus lying within the zone of the dermal-epidermal junction. The upper plexus supplies every papilla with a capillary loop.

In clinical practice, the visual inspection of the patient's skin mainly determines the duration of the psoriasis therapy; although it is known that neovascularisations, which persist beyond the healing of the lesions, facilitate the development of recurrences *in loco*.

The capillary loop structure in healthy volunteers was compared to that in psoriatic patients. The diameters of the capillaries and papillae were measured for each group with confocal laser scanning microscopy (CLSM).

All psoriatic patients showed elongated, widened and tortuous microvessels in the papillary dermis, whereas all healthy controls showed a single capillary loop in each dermal papilla. The capillaries of the papillary loop and the dermal papilla were significantly enlarged in the psoriatic skin lesions (diameters (24.39 ± 2.34) μm and (146.46 ± 28.52) μm, respectively) compared to healthy skin (diameters (9.53 ± 1.80) μm and (69.48 ± 17.16) μm, respectively) ($p < 0.001$).

CLSM seems to be a promising non-invasive technique for evaluating dermal capillaries in psoriatic patients and its monitoring. The diameter of the vessels could be seen as a well quantifiable indicator for the state of psoriatic skin.

REGULATION AND FUNCTIONS OF CELL VOLUME SENSITIVE SGK1

Lang, F.

Department of Physiology, University of Tuebingen, Germany

The serum-and-glucocorticoid-inducible-kinase-1 (SGK1) is exquisitely sensitive to cell volume. SGK1 transcription is upregulated by hypertonic and isotonic cell shrinkage. SGK1 transcription is further upregulated by hyperglycemia, ischemia and a variety of hormones including glucocorticoids, mineralocorticoids and TGFß. SGK1 is activated by insulin and growth factors via phosphatidylinositol-3-kinase, 3-phosphoinositide dependent kinase PDK1 and mTOR. SGK1 up-regulates the Na^+/K^+-ATPase,

a variety of carriers (e.g. NCC, NKCC, NHE1, NHE3, SGLT1, several amino acid transporters) and several ion channels (e.g. ENaC, SCN5A, TRPV4-6, Orai1/STIM1, ROMK, KCNE1/KCNQ1, GluR6, CFTR). SGK1 further up-regulates a number of enzymes (e.g. glycogen-synthase-kinase-3, ubiquitin-ligase Nedd4-2), and transcription factors (e.g. forkhead-transcription-factor FOXO3a, ß-catenin, nuclear-factor-kappa-B, NFκB). SGK1 sensitive functions contribute to regulation of epithelial transport, excitability, degranulation, matrix protein deposition, coagulation, platelet aggregation, migration, cell proliferation and apoptosis. Apparently, SGK1 is not required for house keeping functions, as the phenotype of SGK1 knockout mice is mild. However, excessive SGK1 expression and activity participates in the pathophysiology of several disorders including hypertension, obesity, diabetes, thrombosis, stroke, inflammation, autoimmune disease, fibrosis and tumor growth.