

#### 54.4.1.3 Inflammation and Contact Dermatitis

Inflammation is well suited for LDF studies because of its marked vasoactive component. An increase in blood flow indicated the induction of erythema by topical application of *Staphylococcus aureus* superantigen on intact skin (51). This occurred with both healthy subjects and patients with atopic dermatitis, suggesting that the superantigen may exacerbate and sustain inflammation. The UV-induced inflammation was increased following topical application of estrogen (52), while hypnotic suggestion attenuated UV inflammation (53).

The effect of various topical steroid formulations on UV-induced inflammation was measured by LDF, and it enabled grading the potency of these topical corticosteroids (54).

LDF was also used to assess the effect of systemic antiinflammatory drugs, and it enabled grading of the effect of these drugs (55, 56). Prick tests with allergens and histamine may also be evaluated by LDF (57). Regional variations in response to histamine should be taken into consideration (58).

LDF is widely used for measuring the response to known irritants. Increased duration of exposure resulted in an increased response, and comparison between the back and forearm indicated a greater sensitivity on the back (59). The cumulative effect of subthreshold concentrations of irritants was indicated in studies with LDF (60). The vehicle effect on irritation was also studied by LDF, and the irritant effect depended on the vehicle (61).

The damage to the skin by repetitive washing (62) and the protective effect of barrier creams were also assessed by LDF (63), as well as the effect of treatment such as topical application of nonsteroidal antiinflammatory drugs in various vehicles (thus studying the vehicle effect as well) (64). LDF measurements also suggested an improvement of acute irritant contact dermatitis (ICD) with twice-daily application of cool compresses. No significant difference was found between the efficacy of physiologic saline or water compresses (65).

Nonimmunologic contact urticaria induced by benzoic acid was followed, and regional variations mapped by LDF (66), as was the suppressive effect of psoralen plus ultraviolet A (PUVA) treatment (67) and topical nonsteroidal antiinflammatory drugs (68). Regional variations, as well as age-related regional variations, in the response to histamine were found (69).

Patch tests for allergic contact dermatitis may be objectively evaluated with LDF, as were patch tests with calcipotriol ointment in various patients, including psoriasis patients (70).

Laser Doppler imaging was more suitable for the quantification of allergic contact dermatitis than the regular LDF, as readings with the latter are time consuming, and laser Doppler imaging is valuable for measuring the area of response (71). Both allergic contact dermatitis and ICD were studied with laser Doppler imaging (72). The technique allowed quantification of a subclinical pattern of the allergic inflammation (73).

#### 54.4.1.4 Psoriasis

Psoriasis, with its increased blood flow near the skin surface, is a natural candidate for LDF studies. Several investigators aimed at studying the disease process, whereas others were interested in the effect of several therapeutic modalities. A recent publication concentrated on the question whether cutaneous blood vessels in psoriasis possess a generalized inherently abnormal response to neuropeptides (74). Calcitonin gene-related peptide (CGRP) was intradermally injected in three concentrations to uninvolved skin of psoriatic patients and to healthy controls. This resulted in an increase in blood flow, which did not differ between the two groups, thus indicating that in uninvolved psoriatic skin, the vasculature is not different from normal in its response to CGRP. Effects of treatment were assessed by LDF and compared to clinical evaluation methods (75).

Laser Doppler imaging allows rapid measurement of the area and the level of increase of blood flow in psoriatic plaques (9). Plaque severity can be assessed in terms of mean blood flow and area of increased blood flow simultaneously. The obtained scan image reveals the distribution and intensity of the rim of increased blood flow around the psoriatic plaque. This could be used in the