

Evaluation of skin irritation in rats using simultaneous laser Doppler flowmetry and oxygenation monitoring

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Abstract

© 2016, Springer Science+Business Media New York. The possibility of assessment of skin irritation in rats with the use of simultaneous laser Doppler flowmetry (LDF) and oxygenation monitoring was investigated. The study was designed according to ISO 10993-10 using formaldehyde as a model irritant. 4-Hour application of 1 % formaldehyde induced significant local increase in skin microcirculation for the first 2 days by a factor of up to 2.4, whereas tissue oxygenation increased in much lower extent. The microcirculation was significantly inhibited by 10 % formaldehyde following treatment and then it gradually increased for 24 and 48 h of recovery period. The results correlated with visual evaluation of skin edema and erythema in treated zones. LDF/oxygenation signals provide early information on skin irritation and damage in rat model. The technique is valuable for preclinical/toxicological studies of chemical substances and medical materials.

<http://dx.doi.org/10.1007/s12668-016-0242-9>

Keywords

Doppler flowmetry, Formaldehyde, Microcirculation, Skin irritation, Tissue oxygenation