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Titel des Beitrags: Pathophysiological and vascular characteristics of tumours and their importance for hyperthermia: heterogeneity is the key issue.

Abstract: Tumour blood flow before and during clinically relevant mild hyperthermia exhibits pronounced heterogeneity. Flow changes upon heating are not predictable and are both spatially and temporally highly variable. Flow increases may result in improved heat dissipation to the extent that therapeutically relevant tissue temperatures may not be achieved. This holds especially true for tumours or tumour regions in which flow rates are substantially higher than in the surrounding normal tissues. Changes in tumour oxygenation tend to reflect alterations in blood flow upon hyperthermia. An initial improvement in the oxygenation status, followed by a return to baseline levels (or even a drop to below baseline at high thermal doses) has been reported for some tumours, whereas a predictable and universal occurrence of sustained increases in O(2) tensions upon mild hyperthermia is questionable and still needs to be verified in the clinical setting. Clarification of the pathogenetic mechanisms behind possible sustained increases is mandatory. High-dose hyperthermia leads to a decrease in the extracellular and intracellular pH and a deterioration of the energy status, both of which are known to be parameters capable of acting as direct sensitisers and thus pivotal factors in hyperthermia treatment. The role of the tumour microcirculatory function, hypoxia, acidosis and energy status is complex and is further complicated by a pronounced heterogeneity. These
latter aspects require additional critical evaluation in clinically relevant tumour models in order for their impact on the response to heat to be clarified.