

The physicochemical basis for thermal and non-thermal 'burn' injuries

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Abstract

One of the most basic problems of burn science may well be the confusing nomenclature we use. The word 'burn' is used to identify several different mechanisms of tissue injury. This article describes the problem of accurately characterizing and defining the various burn injuries on the basis of molecular events. The most important objective is to distinguish between the various physicochemical injuries on the basis of differences in their fundamental physicochemical mechanisms and physiological consequences. Also, pathophysiologically important biophysical processes such as the central importance of cell membrane permeabilization in acute cellular necrosis, which different types of burn injury have in common, are emphasized. The biophysics of membrane formation and permeabilization is presented to clarify the conditions for membrane damage as well as to discuss the potential for therapeutic intervention. Where feasible, plausible new strategies to reverse the molecular alterations caused by injury are hypothesized.