

Development and decay of thermotolerance in relation to heat shock modification of cell membranes

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The kinetics of development and decay of thermotolerance in HT29R cells is reported following exposure of cells to 45°C/10mins. In parallel studies, heat shock-induced modification in membranes fluidity and hence order, was studied by measurement of anisotropy values, using fluorescence polarization techniques. Membrane cholesterol and phospholipid content was also assessed after heat shock. The experiments were designed to determine whether increased resistance to hyperthermia could be related to increased anisotropy, at a time when the cholesterol-phospholipid ratio may have increased. The results indicate that the development of thermotolerance and membrane modification probably occur at different times post-heat shock and the heat shock-induced changes in anisotropy value remain at a time when thermotolerance has decayed almost completely. Hence, these changes may be separate manifestations of the effect of heat shock on mammalian membranes rather than having a cause and effect relationship.