test recipient (*Escherichia coli* strain W 3110). However, it is possible that a permeability barrier also exists in these four strains which may be a major factor contributing to their resistance to β-lactam antibiotics. A comparative study of cell envelope constituents is in progress which should help to clarify this.

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A comparative study of the gamma-radiation responses of *Bacillus megaterium* spores suspended in aqueous solutions of ethanol and ethylene glycol

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Standard techniques that maintain equilibrium between cells *in water suspensions* and the gases above them during continuous ^{60}Co gamma-irradiation (Tallentire & Jones, 1973) have been used for measurement of the radiation responses of *Bacillus megaterium* spores while suspended in aqueous solutions of alcohols.

Ethanol was chosen as typical of a mobile, monohydric alcohol. The observed responses (slopes of dose-ln survival curves) of spores suspended in concentrations of ethanol in the range 0–95% under air or nitrogen were similar to those seen with spores in water, but at higher concentrations, the oxic response exceeds that seen with water and the anoxic response is less. These changes in response at high ethanol concentrations have been attributed to dehydration of the spores (Stratford & Tallentire, 1973). The similarities in responses at low concentrations clearly show that ethanol in oxic or anoxic aqueous solution is not playing a role in the radiation chemical events that determine spore response.

Ethylene glycol was chosen as an example of a dihydric alcohol of simple chemical composition. It is a viscous liquid, miscible with water in all proportions, resembling more closely those non-aqueous liquids used as vehicles in topical preparations. Changes in ethylene glycol concentration within the range 0–95% have no effect upon the anoxic response, which lies very close to that seen for water alone; 100% ethylene glycol gives a small but significant reduction in response. Thus *in anoxia*, the effects of ethylene glycol resemble closely those of ethanol, leading us to suppose that dehydration is responsible for the reduction in response and that ethylene glycol has no chemical involvement in effective processes during anoxic irradiation. This contrasts with events occurring when irradiation is in air. Under these conditions over the concentration range 0–95% the responses progressively decrease to a minimum level that is almost characteristic of anoxia, while between 95 and 100% the responses increase steadily to a level appreciably greater than that of oxic water. The increase in response observed at high ethylene glycol concentrations is probably due to spore dehydration, but the fall in response below that of water seen at low concentrations indicates functional chemical involvement of this alcohol. Tests carried out with 50% ethylene glycol under air at four different dose rates (1·8, 3·6, 5·4 and 7·2 krads min^{-1}) gave responses that were inversely related to rate, a clear indication that this involvement results in oxygen depletion from the system. The absence of depletion in water and ethanol suggests strongly that the mobility of the suspending liquid is one determinant of radiation response when the irradiation system is in contact with air.

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