Phosphate mediation in the autolysis of *Myxococcus xanthus*

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Abstract

Autolysis was studied in various strains of *Myxococcus xanthus* during growth in liquid media, and depended on the bacterial strain, temperature and phosphate concentration. When *M. xanthus* was cultivated with low phosphate concentrations, strain DK718 showed autolysis at 28°C and 33°C, and strain DK1050 only at 33°C. Autolysis was stimulated by high phosphate concentrations in strains DK1050 and DK718 depending upon the growth temperature. High phosphate concentration also increased the lysis of *M. xanthus* induced by several uncoupling agents in stationary and exponential cells. Strain DK2834 did not lyse under any conditions.

Introduction

Autolytic processes play an important role in cell wall growth, cell division and in the maintenance of the shape of growing cells (Rogers, 1979). The control of the autolytic system is complex, and a variety of factors may be involved (Jollife *et al.*, 1981; Leduc *et al.*, 1982). In myxobacteria there is a strong correlation between development and autolysis, so development-induced autolysis is an important prerequisite to myxospore formation in fruiting bodies (Wireman and Dworkin, 1977; Zusman, 1984).

Myxococcus coralloides D, when grown vegetatively in a liquid medium, autolysed readily but this autolysis was inhibited by the addition of a high (40 mM) phosphate concentration (Fernández-Vivas *et al.*, 1983). Nevertheless, phosphate stimulated autolysis of *M. xanthus* in studies carried out in water, potassium phosphate and Tris-maleate buffer at 55°C (Jones and Barr, 1983). These conditions are not, however, usual in liquid cultures of myxobacteria.

Autolysis in various strains of *M. xanthus* was investigated by varying the phosphate concentrations and the incubation temperature. We also examined the effects of various metabolic inhibitors on the lytic process in this myxobacterium.

Materials and methods

Micro-organisms and culture conditions

Three *Myxococcus xanthus* strains were used in this study: DK1050, DK718 and DK2834. These strains were provided by F. J. Murillo (Department of Genetics, University of Murcia, Spain). All strains were grown in CTT

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