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THE BASIS OF PATHOGENICITY IN  
*AGROBACTERIUM*

by

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## SUMMARY

A number of non-pathogenic strains of *Agrobacterium* were converted to pathogens using the method of Kerr (1971). The converted pathogenic strains were compared with the original non-pathogenic strains by serology, isoenzyme patterns after electrophoresis, reaction to mitomycin C, nucleic acid analysis and sensitivity to bacteriocin 84 produced by *Agrobacterium* strain 84 (Roberts and Kerr 1974). There was a close correlation between bacteriocin 84 sensitivity and pathogenicity. No other consistent difference between non-pathogens and converted pathogens was found. In contrast to the work of Van Larebeke, Zaenen, Teuchy and Schell (1973) no evidence was found for the presence of a plasmid in the pathogenic strains used in this study.

Purification of bacteriocin 84 was attempted using gel filtration, chromatography and electrophoresis. Although good purification was not achieved some characteristics of the bacteriocin were determined. In contrast to bacteriocins produced by other bacteria, bacteriocin 84 is of relatively low molecular weight and not a protein. It is rapidly degraded at temperatures above approximately 80°C and by alkaline pH. It is strongly polar and has a residual negative charge which is due to the presence of a phosphate group.

The mode of action of bacteriocin 84 did not follow the same kinetics that have been reported for other bacteriocins. When bacteriocin 84 was added to a culture of sensitive bacteria there was a

rapid decrease in the number of bacteria able to form colonies. Although there was little immediate effect on the rate of oxygen consumption of a culture of sensitive bacteria after bacteriocin treatment, the normal increase in optical density with time stopped and it is suggested that bacteriocin 84 acts by stopping cell division without grossly affecting the metabolism of the cell. Radioisotope tracer studies showed that DNA synthesis stops very soon after adding bacteriocin and it is possible that this is the primary mechanism of bacteriocin action.

Although bacteriocin 84 affected all the converted pathogenic strains used in this study, no effect on the original non-pathogenic strains was observed. The possible mechanism of bacteriocin sensitivity and its relationship to pathogenicity is discussed.