AGROCIN 84 SELECTIVITY AND TOXICITY IN *AGROBACTERIUM*

by

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SUMMARY

This study encompasses a biochemical investigation of the unique mode of toxicity and selectivity of the first known nucleotide bacteriocin, agrocin 84.

Sensitivity to agrocin 84 has been shown to be a consequence of its uptake into the bacterial cytoplasm of a susceptible strain of *Agrobacterium radiobacter*. Only the pathogenic strain which harbours a tumour-inducing (Ti)-plasmid transports agrocin 84 into the cytoplasm and is thus sensitive. The non-pathogenic parent recipient strain devoid of the Ti-plasmid does not transport agrocin 84 and is accordingly not sensitive to its toxic action.

This uptake process is by a high affinity active transport system. A Ti-plasmid coded periplasmic agrocin 84 binding protein is an important component of this transport system. Only bacteria sensitive to agrocin 84 have this binding protein.

The N^6-glucofuranosyl moiety of agrocin 84 determines the strain specificity of agrocin 84 for the pathogenic bacteria. When this moiety is absent the fragment formed is toxic, at low levels, to both pathogenic and non-pathogenic bacteria.

It is the N^6-glucofuranosyl moiety which is recognized by the agrocin 84 binding protein. Recognition by this moiety results in transport into pathogenic bacteria by the high affinity transport system. Without this moiety uptake is non-specific and is much slower, presumably by diffusion.

A compound from crown gall tissue, agrocinopine A (Ellis J.G., Ph.D. student, Adelaide University) inhibited the uptake of agrocin 84

and is implicated as a possible natural substrate for the agrocin 84 transport system.

Studies to determine the basis of toxicity of agrocin 84 were also instigated and a key finding was that the 5'(3'-d-ara-)AMP core of agrocin 84 could be isolated from bacterial DNA. The incorporation of this component would by necessity result in DNA chain termination. The *in vivo* metabolism of agrocin 84 to a toxic component and a role at the DNA polymerase level is discussed.