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Characterization of an Outer Membrane Protein - Macromolecular Complex of *Neisseria gonorrhoeae*

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ABSTRACT OF DISSERTATION

Dissertation: Characterization of an Outer Membrane Protein - Macromolecular Complex of *Neisseria gonorrhoeae*

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Outer-membrane (OM) proteins of gram-negative bacteria are significant virulence determinants of the organism and important targets for host immune responses. Various antigenic OM proteins of *Neisseria gonorrhoeae* have been examined serologically and structurally to assess the role these proteins might play in gonococcal infections. Conservation of serological reactivity of a particular OM protein among strains could serve as the basis for an immunological approach to control of disease caused by the organism.

The extent of interstrain serological relatedness and structural similarity of a recently detected gonococcal OM protein called OMP-MC (outer membrane protein - macromolecular complex) was examined in this dissertation.

Rabbit antisera raised against purified OMP-MC of a single gonococcal strain reacted equally in immunoprecipitation and immunoelectrophoretic transfer direct binding tests with OMP-MC isolated from strains designated as distinct by other serological typing schemes. Heterologous OM's, anti-OMP-MC Fab's or anti-OMP-MC IgG's could competitively inhibit homologous binding of all strains in a variety of

test formats, indicating shared antigenic determinants. Investigation of the species distribution of OMP-MC using mono-specific antiserum determined that OMP-MC was present in all gonococcal strains examined and, to a quantitatively lesser extent, in other *Neisseria sp*. OMP-MC was not detected in any non-neisserial organism.

The structural similarity of OMP-MC was probed by isoelectric focusing, N-terminal amino acid analysis and tryptic peptide mapping. OMP-MC from all strains of gonococci examined had an apparent pI of 7.6. The subunits of the native 800 kD OMP-MC complex all shared the same pI, indicating conservation of protein substructure. Amino terminal analysis by both dansyl-chloride labeling and protein sequencing have shown that glycine is the sole N-terminal amino acid of all the strains, again reinforcing structural similarity of the 76 kD protein subunits. Tryptic peptide analysis of intrinsically labeled OMP-MC revealed superimposable peptide profiles for all the test strains, indicating that conservation of tryptic cleavage sites existed to a high degree.

The serological cross-reactivity and structural constancy of OMP-MC from diverse strains of *N. gonorrhoeae* are unique among quantitatively significant gonococcal OM Proteins. These findings suggest that OMP-MC may be a valuable protein antigen to consider for the serological detection of gonorrhea and/or the development of a gonococcal vaccine.

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