Fresh isolates of *B. bronchiseptica* obtained from pigs with atrophic rhinitis were found to exhibit a complex surface structure. Although flagella were present in freshly isolated cultures, the flagella were not apparent in older cultures. Whole cell radioimmunoassay (RIA) with antibodies against the outer membrane protein (OMP) showed that most strains reacted with anti-sera to *B. bronchiseptica* OMP. Immunoelectrophoresis revealed that OMP was composed of at least three antigenic components. When the outer membrane protein complex was subjected to SDS-PAGE, followed by electroblotting to nitrocellulose, it was found that the most serologically reactive portion was a complex which consisted of a 44 KD heat-modifiable protein, protein 39, and 53 KD proteins, and a protein showing an apparent molecular weight of approximately 54 KD. This latter antigen is, however, exceptionally reactive in OMP preparations and is not present in fresh isolates as a major component. It is possible that this antigen is a minor component of fresh isolates or that it is present in fresh isolates but not detected by the RIA or immunoelectrophoresis methods used.

Attempts were made to determine the virulence of fresh isolates, and of the *B. bronchiseptica* strains tested, multiplication in the tracheal culture was very fast; all of the strains showed resistance to the "clearing effect" of the tracheal mucus. Using this method, as in the experiments of Banai and Kennedy (1981) with isolated ciliated epithelial cells, differences in virulence between strains are not apparent. However, when we challenged the tracheal cultures 14-16 hours after point inoculation, we found that some strains (including both L and D colonial forms) had a tendency to "penetrate" deep into the mucus layer, and *B. bronchiseptica* cells could be found between bundles of cartilages. Unfortunately, we did not have the chance to investigate this ability to penetrate the deep layers of mucus using *B. bronchiseptica* isolates obtained from pigs not showing clinical atrophic rhinitis.

A "K-antigen" preparation (Björk, Braskö, Jann, and Jann, 1977) of *B. bronchiseptica*, which consists mainly of the fibres antigen and outer membrane proteins, was used in ELISA to determine the immune status of mice previously injected with graded doses of *B. bronchiseptica* vaccines. By determining the level of antibodies reacting with this antigenic mixture, it was possible to predict whether or not a mouse would survive an intraportal *B. bronchiseptica* challenge. Similarly, ELISA was used to detect the level of antibodies in sera and colon of vaccinated mice, of passively transferred antibodies in sera of piglets and of actively produced antibodies in infected piglets. However, after the fractionation of the "K-antigen" preparation and the analysis of the titres of antibodies reacting with its individual components, it appears that only those antibodies which reacted with the outer membrane protein moiety related to the level of protection against atrophic rhinitis, antibodies which reacted with the fibres antigen and/or the lipopolysaccharide (present on a minor contamination of the preparation) had no such relationship.