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Differential Adherence Capacities of Pneumococcal Clinical Isolates at Different Growth States to Human Lung Epithelial Cells (*in vitro*)

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Pneumococcal adherence to surface mucosa of human lung nasopharynx is the first step before progression to colonization and invasion leading to pneumococcal diseases. This study was undertaken to evaluate the adherence capacities of two clinically important serotypes (23-valent Pneumovax vaccine types) of pneumococci at different states of growth to human lung epithelial cells (*in vitro*).

Serotype 7F and 19F pneumococci, shown earlier to be genetically different and carrying the important genes known to be associated with adherence [Desa *et al.* – Int. J. Infect Dis 2003; 7: 190-197 & Epidemiol. Infect., 2007; in press], were grown to early-, mid- and late-log phases and harvested prior to i*n vitro* adherence/invasion assay. The later was carried out by challenging a A549 monolayer (human pneumocyte II cell line) in 25 cm^2 TC-flask, with the bacterial suspension (~1 X 10^8 CFU/ml) in cell culture media for 1- and 3-hour incubation times. Visualization of bacterial adherence was done by Gram staining and numbers of adherent and invading bacteria were determined by viable count method (reported as bacterial CFU/TC-flask). Results showed that adherence capacities of the isolates at different growth states varied almost significantly ($P = 0.05$) at both incubation times. At a longer incubation period (3-hour), the number of bacterial adherence also increased by about 10-fold for both isolates with very little bacterial invasion (2-6 CFU/flask). No bacterial invasion was however observed at 1-hour incubation time. As higher bacterial adherence was correlated with greater risk of infection [Adamou *et al.* Infect Immun 1998; 66: 820-822], we conclude that a prolonged episode of bacterial adherence can also increase infection threat but it may as well depend on the growth states of the bacteria. Nevertheless, the bacteria were found to poorly invade but a few that were internalized into the human cells could probably cause severe diseases.