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Hemaglutinin Protein of *Acinetobacter baumannii* Functioning as an Adhesin
(A Laboratory Experimental Study)

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ABSTRACT

Acinetobacter baumannii is an opportunistic or a nosocomial pathogenic bacterium which attacks immunocompromised host. Colonization and infection often occur while hospitalized and could lead to pneumonia infection, urinary tract infection, meningitis, septicemia, and burn or surgical wound infections. In spite of the steady increase of *Acinetobacter baumannii* infection cases, little has been revealed about the *Acinetobacter baumannii* infection mechanism.

The infection process is initiated by the adhesion of bacteria onto the host's cell, followed by multiplication, colonization and infection. Adhesion onto the host's cell is mediated by the adhesin molecule functioning as the virulence factor. Adhesin is usually found in the form of protein which is bound to the receptor available at the host's cell surface.

This study aimed at revealing the existence of hemagglutinin protein (PHA) functioning as an adhesin originating from the fimbriae or Outer Membrane Protein (OMP) of the *Acinetobacter baumannii* which causes infection of the host, the fact of which proves that *Acinetobacter baumannii* contains hemagglutinin protein functioning as an adhesin which has better adhesive ability onto the host's epithelium cell than *Acinetobacter baumannii* isolated from the environment.

Consequently, this study was conducted in several stages as follows.

Hemagglutinin protein identification was done by screening the *Acinetobacter baumannii* isolates originating from the clinical and environmental specimens using the hemaglutination test (using 0.5% mice erythrocytes). The fimbriae and OMP fractions were further separated from the selected *Acinetobacter baumannii* isolates by means of the omnimixer, and reconfirmed by hemaglutination test.

Hemagglutinin protein characterization to determine the molecular weight was done by SDS-PAGE method; Hemaglutination test using animal and human erythrocytes; Dot blot and western blot tests to determine the immunogenicity of hemagglutinin protein. The adhesin test was used to determine that functioned as an adhesin molecule and used to determine the *Acinetobacter baumannii* adhesin capacity in causing infection compared to the environmental *Acinetobacter baumannii*. Statistical analysis ANOVA was used.

Based on the series of experiments conducted above, hypothesis that the *Acinetobacter baumannii* etiology of infection containing 16 kDa molecular weight of hemagglutinin protein fimbriae fraction (PHA-F16) and 14.5 kDa molecular weight of hemagglutinin protein OMP fraction (PHA-O14.5) is confirmed. It is indicated that PHA-F16 and PHA-O14.5 function as adhesin molecules, namely AF16 and AO14.5. Adhesin proteins (AF16 and AO14.5) are available at the *Acinetobacter baumannii* fimbriae or OMP which produce positive hemaglutination reaction and are not found at those producing negative hemaglutination reaction. The *Acinetobacter baumannii* etiology of infection containing hemagglutinin protein functioning as an adhesin protein (AF16 and AO14.5) with a higher adhesion ability at the host cells than at the *Acinetobacter baumannii* environment ($p<0.05$).

Another conclusion drawn from this study is that PHA-F16 and PHA-O14.5 are immunogenic and are estimated to work synergically in the adhesion at the host's cells.

Key words: *Acinetobacter baumannii*, hemagglutinin protein, adhesin.
