VII. BIBLIOGRAPHY


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VIII. ABSTRACT

An attempt was made to understand the pathology of *E. coli* mastitis by inducing mastitis experimentally in rabbits using *E. coli* strains isolated from bovine mastitis cases and to compare the efficacy of a biofilm vaccine with that of a free cell vaccine in reducing the intramammary infections in rabbits. In the first phase of the experiment, six rabbits each were infected with *E. coli* strains O9(36) and O147 to establish the pathology induced mastitis. In the second phase, 12 rabbits each were vaccinated with the free cell and biofilm vaccines against *E. coli* O9(36) and were later challenged with either a homologous or heterologous strain of *E. coli*. Both O9(36) and O147 strains induced acute clinical mastitis in the rabbits by 24 hours post inoculation characterized by rise in body temperature, steep rise in SCC and viable counts of *E. coli* in milk and inflammation of the mammary glands. Histologically, the infected mammary glands revealed degeneration and necrosis of the lining epithelial cells, presence of large number of heterophils in the lumina of acini and septa, severe destruction of the acini, and presence of *E. coli* organisms in clumps within the acini, interlobular septa and the perivascular areas. The lesions were more intense at 48 hours PI and reduced thereafter in magnitude and severity. Both FC and BF vaccinated rabbits showed reduced clinical signs of mastitis upon challenge but the clinical signs were very mild in the biofilm immunized rabbits. The SCC values and viable counts of *E. coli* in milk of the challenged rabbits showed an increase after challenge but the values were significantly lesser compared to that of the positive controls. The reduction in the mean SCC and viable counts of *E. coli* values in the BF vaccinated rabbits was much higher compared to that of the FC vaccinated rabbits. The severity of the microscopical changes and ultrastructural changes observed in the mammary glands of both FC and BF vaccinated rabbits challenged with *E. coli* were lesser in comparison with those of the positive controls and the severity of lesions was lesser in the BF vaccinated group than the FC vaccinated group of animals. The vaccinated rabbits showed considerably higher number of both CD4 and CD8 cells compared to the control animals on all the occasions. Among the free cell vaccinated group, the homologous challenged rabbit showed most number of CD4 cells at 48 hours post infection while the homologous challenged biofilm vaccinated rabbits showed profoundly increased number of both CD4 and CD8 cells on 14th and 21st days post
challenge. The seromonitoring of the vaccinated rabbits by an indirect ELISA revealed that the biofilm vaccinated rabbits showed increased IgG titers after vaccination indicative of better immune responses. The titers were significantly higher in the biofilm vaccinated rabbits than the free cell vaccinated rabbits particularly on day 14 & day 21 post challenge.