TUMORAL STUDIES IN FISH USING ALUMINIUM GILL PRINCIPLE (E. COLI NEUROTOXIN)  
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E. coli neuramin has been shown to be responsible for some disease in pigs (1, 2). The authors have focused on the antigenicity of this toxin with a view toward the possible prophylactic value of a vaccine against post weaning enteritis disease.  

Several studies have shown that active immunization against neuramin exerts a significant degree of protection against a challenge with attenuated E. coli neuramin. However, the antigenicity of a neuraminotoxin has not yet been demonstrated. Indeed, formalin inactivation of the neuraminotoxin is lost in the homologous antigenicity (4).  

Current studies in the development of a neuraminotoxin vaccine, i.e., the production of an antigenic toxoid and the design of an immunization regimen able to protect pigs against this new disease, are presented in this paper.  

Two neuraminotoxins prepared from E. coli septicemia  

were used. One was incubated at ambient temperature with aluminum hydroxide for different concentrations. A series of samples obtained after various incubation periods were tested for residual toxicity and antigenicity using the mouse model (5). The results indicate that the use of a glutaraldehyde concentration of 0.5% and a reaction time of 1 hour were the optimal conditions for the preparation of an antigenic toxoid. This neuraminotoxin was adsorbed on aluminum hydroxide gel and evaluated for its immunogenic capacity in pigs. In the following manner:  

1. An antigenicity study aimed at comparing the neuraminotoxins in healthy animals (3) and in pigs of 5 to 9 weeks of age. The animals were inoculated either with the toxoid or the toxoid preparation according to three different vaccination schemes. The vaccine doses were expressed as mg Neut.  

The anti-neuraminotoxin antibodies are determined by a hemagglutination in vivo test in vero cells (submitted for publication). The results of this study indicate that the serological response induced by the neuraminotoxin is comparable to the response elicited by the active toxoid. The pigs immunized with the toxoid showed a negative neuraminotoxin response following the three vaccination schemes similar to that produced by the active toxoid. These data are in line with those obtained in mice using the same type of toxoid.  

2. The relationship between anti-neuraminotoxin antibodies and protection against an experimental neuraminotoxin challenge was investigated. For this purpose, pigs were separated into four age groups: 5 to 6 weeks and 1 to 2 weeks old pigs. Pigs were vaccinated twice using different neuraminotoxin or toxoid preparations. Control animals were not vaccinated. One to two weeks after the second vaccination, the animals were challenged by the intravenously route with a standard neuraminotoxin preparation using 2.32 mg/kg body weight. All pigs were examined during the appearance of characteristic E. coli symptoms. Pigs were killed before vaccination and before challenge inoculation and neuraminotoxin titrations performed by the "in vitro" hemagglutination test technique described.  

The results indicate that there is a strong correlation between the seroconversion rate and the protection rate observed against a neuraminotoxin challenge, which killed all the control animals.

The protection rates are highly significant when compared to the controls (p<0.01). Evidence also indicates that a modert anti-neuraminotoxin titre is nevertheless sufficient to protect.  

3. Several vaccination schemes were evaluated in young pigs of 7 and 14-days of age. Control and vaccinated animals were challenged by the intravenous route using 2.32 mg/kg body weight of neuraminotoxin. The results show that the lower vaccination dose (10^6 in) failed to protect both age groups, whereas a larger antigenic mass corresponding to 10^6 in, succeeded in protecting both age groups to a similar degree. This finding was reflected in similar seroconversion rates in both groups. In a comparison of different vaccination intervals (7 and 14 days) conducted in 7 day old pigs, it was shown that the 14 days interval was superior to the 7 days interval with regard to stimulating anti-neuraminotoxin antibodies. It is also clear that by using a two week vaccination interval, significant protection has been achieved by four weeks of age.  

In conclusion, the results of our study show that by using a glutaraldehyde neuraminotoxin, the immunogenicity of the neuraminotoxin has been preserved, with the result that very young pigs can be protected against an overwhelming challenge of E. coli Disease Principle.  

References:  
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