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Intramuscular and Intradermal Vaccination of Swine for Swine Influenza Virus and *Mycoplasma hyopneumoniae* Using a Needle-Free Device

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Introduction & Objectives

A needle-free device has been shown to be as effective as needle vaccination for delivery of swine influenza virus (SIV) and *Mycoplasma hyopneumoniae* (M. hyo).¹ The purpose of this study was to test the effectiveness of a different needle-free injector and compare intramuscular (IM) to intradermal (ID) routes of vaccination.

Materials and Methods

Vaccine A contained inactivated M. hyo and SIV (H1N1 & H3N2) in Emunade adjuvant in a 2 ml dose. Vaccine B was a similar formulation used for ID vaccination, except that it did not contain M. hyo and was formulated to contain a similar level of SIV in a 0.2 ml dose. Pigs, 5-6 weeks of age, were used. Groups 1-3 were inoculated with Vaccine A: Group 1 (n=10) received 2 ml IM with a needle, Group 2 (n=10) received 2 ml IM by jet and Group 3 (n=10) received 1 ml IM by jet using the Agri-Jet device (MIT, Montreal, Canada). Group 4 (n=10) received Vaccine B, 0.2 ml ID with Agri-Jet at reduced pressure. Group 5 was unvaccinated controls. Animals were vaccinated on Day 0 and 14. Injection sites were palpated on Days 1, 3 and 7 after each dose and post-mortem analysis on 2 pigs per group was done at 21 days post-vaccination 2 (21DPV2). Antibody titers were measured at first vaccination (0DPV1), second vaccination (0DPV2), and weekly until 21DPV2. Antibodies to M. hyo. were measured by DAKO ELISA (DAKO Corp. Carpinteria, CA) and reported as percent inhibition relative to the control. Antibodies to SIV were measured by hemagglutination inhibition (HI) assay.

Results and Discussion

All pigs were seronegative to *M. hyo.* and SIV (H1N1 and H3N2) at 0DPV1. There were no differences in the antibody titers in pigs receiving 2 ml by needle or by needle-free injection. Jet injection of 1 ml resulted in somewhat lower antibody levels. Intradermal vaccination (0.2 ml) induced similar antibody levels for SIV H1N1 and superior titers to H3N2 when compared to IM needle or needle-free injection of a similar amount of antigen in 2 ml. This confirms previous work showing an excellent response in pigs to ID vaccination.² Transient injection site swellings were observed in all pigs vaccinated with the jet injector; but there were no gross lesions at necropsy 21DPV2. These data suggest

that this jet injector may effectively immunize pigs by both IM and ID routes. The potential advantages of the reduced volume and amount of adjuvant given with ID vaccination warrants further investigation.

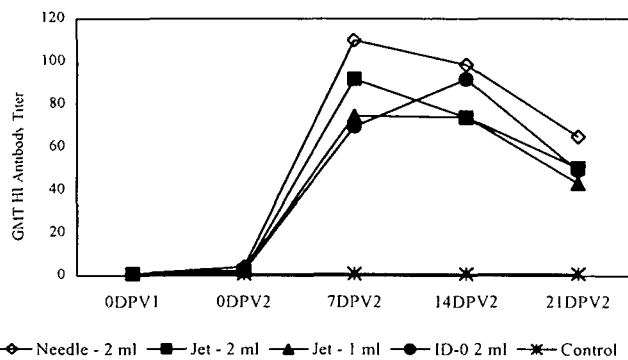


Figure 1. Serological Response to SIV H1N1

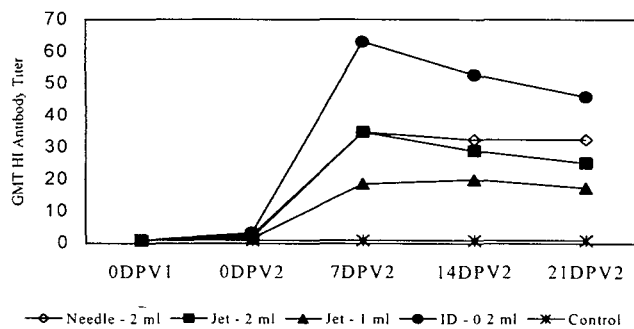


Figure 2. Serological Response to SIV H3N2

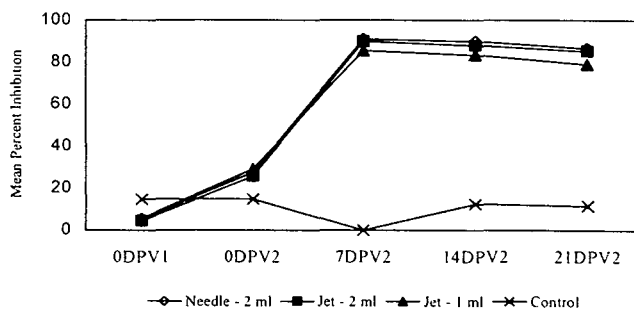


Figure 3. Serological Response to M. hyo.

References

1. Gergen L, et al. IPVS Proceedings 2002, pp288.
2. Jones, G et al IPVS Proceedings 2002, pp290.