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**Comparison of antibody titres between intradermal  
and intramuscular rabies vaccination using inactivated  
vaccine in cattle in Bhutan**

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## **Abstract**

In developing countries, the cost of vaccination limits the use of prophylactic rabies vaccination, especially in cattle. Intradermal vaccination delivers antigen directly to an area with higher number of antigen-presenting cells. Therefore, it can produce equivalent or higher antibody titres than conventional intramuscular vaccination even when a lower dose is given.

This study aimed to compare the antibody response in cattle vaccinated intramuscularly with 1mL of inactivated rabies vaccine (Raksharab, Indian Immunologicals) against intradermally vaccinated cattle with 0.2mL of the same vaccine. The study was conducted in Haa province of Bhutan where rabies is not endemic. One hundred cattle from 27 farms were selected for the study. Virus neutralising antibody (VNA) response was measured using the fluorescent antibody virus neutralisation test on the day of vaccination (day 0) and 14, 30, 60 and 90 days later.

Overall, 71% of intradermally vaccinated cattle and 89% of the intramuscularly vaccinated cattle produced a protective response ( $\geq 0.5$  IU/mL). This difference was significant ( $P < 0.02$ ) on days 14 and 30 post vaccination with 36 and 56% in the intradermal group having titres  $\geq 0.5$  IU/mL respectively compared to the equivalent figures of 78 and 76% in the intramuscular group. The mean VNA titres were lower for intradermal group than intramuscular group ( $p < 0.001$ ) with the mean difference being greater than 0.6 IU/mL. Although low dose intradermal vaccination did produce a detectable antibody response, it was inferior to intramuscular vaccination. Thus, although, intradermal vaccination has the potential to reduce the cost of vaccination by reducing the dose required, this study showed that a single dose of 0.2mL intradermally was inferior to an intramuscular dose of 1mL. Further research evaluating dose and dose regimen is needed before intradermal vaccination using the Raksharab rabies vaccine can be recommended in cattle.

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