



Introduction



- Injections known to be painful in humans are widely used in veterinary care and research
- Challenge of assessing pain in animals
- Study of motivational shifts through approach-aversion



Methods

- 24 Holstein calves (22 ± 11 days)
- 12 hours feed restriction before testing
- Measure: latency to approach milk reward (Δt)
- Injection methods: 4 treatment groups (n = 6)

Habituation phase (3 days):

- White walls
- No treatment

Treatment phase (12 days):

- Red walls
- Injection when reaching the reward
- Milk reward decreased every 3 days (1L → 0.5L → 0.25L → 0L)

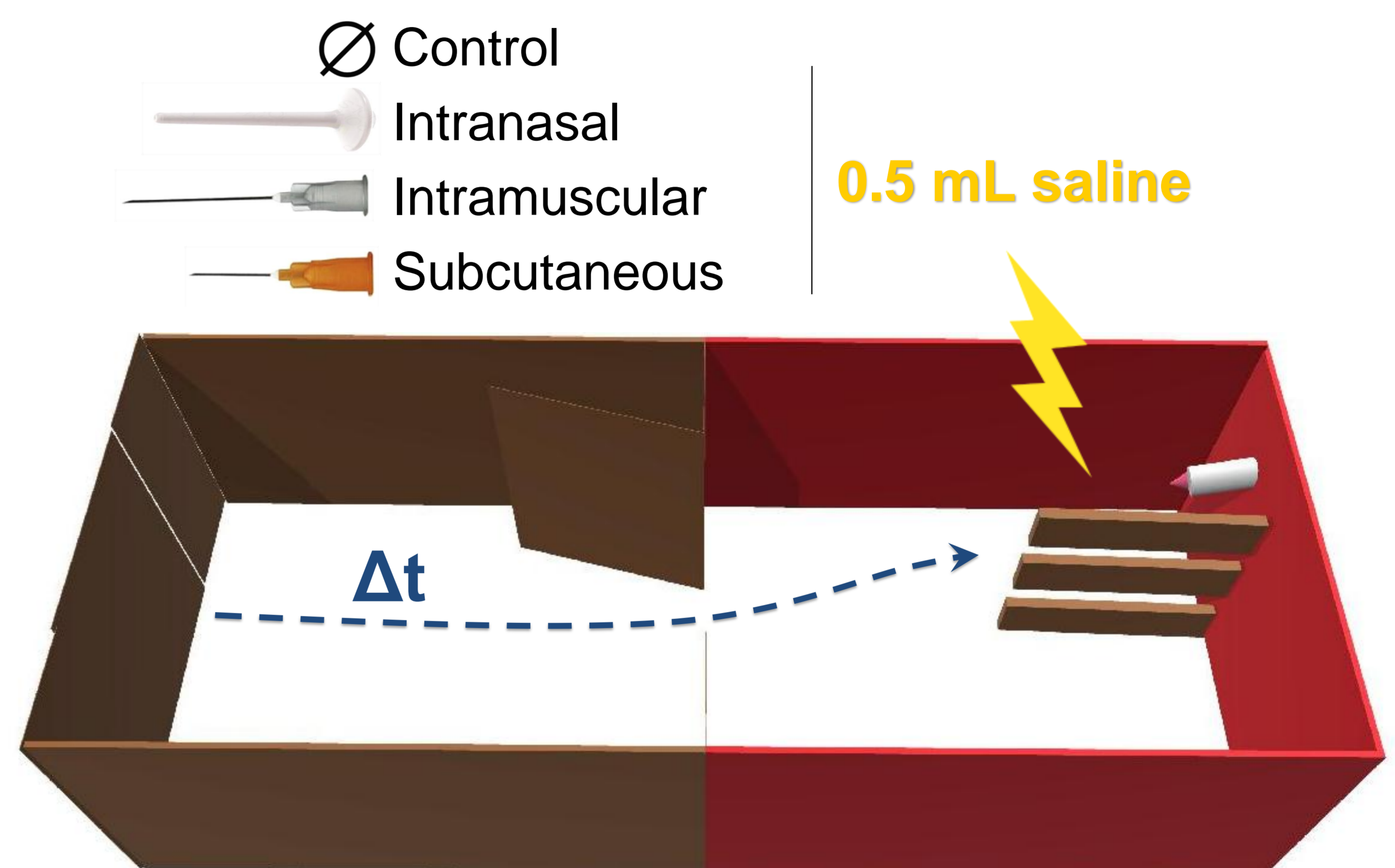


Figure 1. Experimental apparatus

Results

Habituation

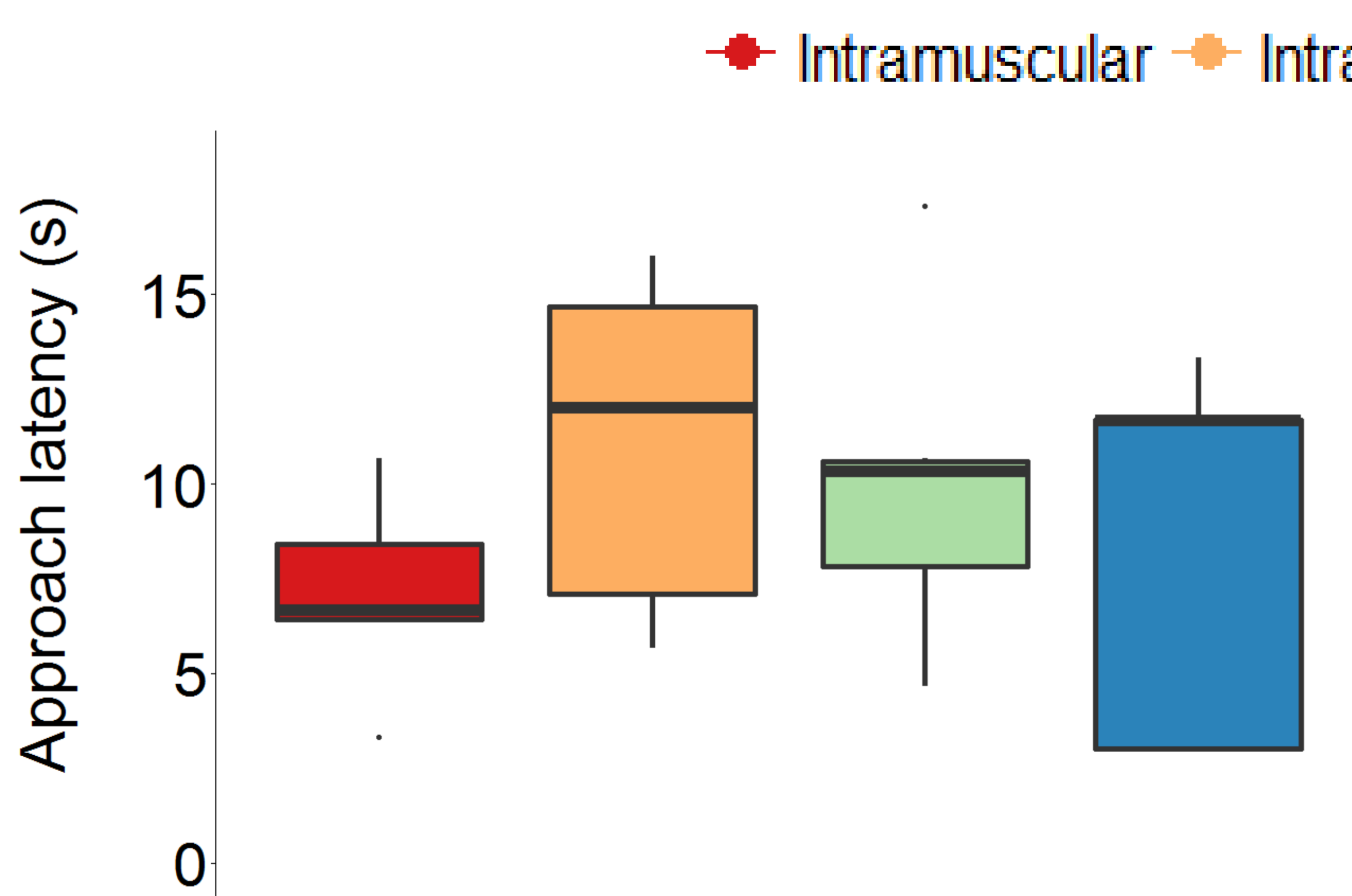


Figure 2. Boxplots of approach latency (s) before the introduction of treatments.

Treatment

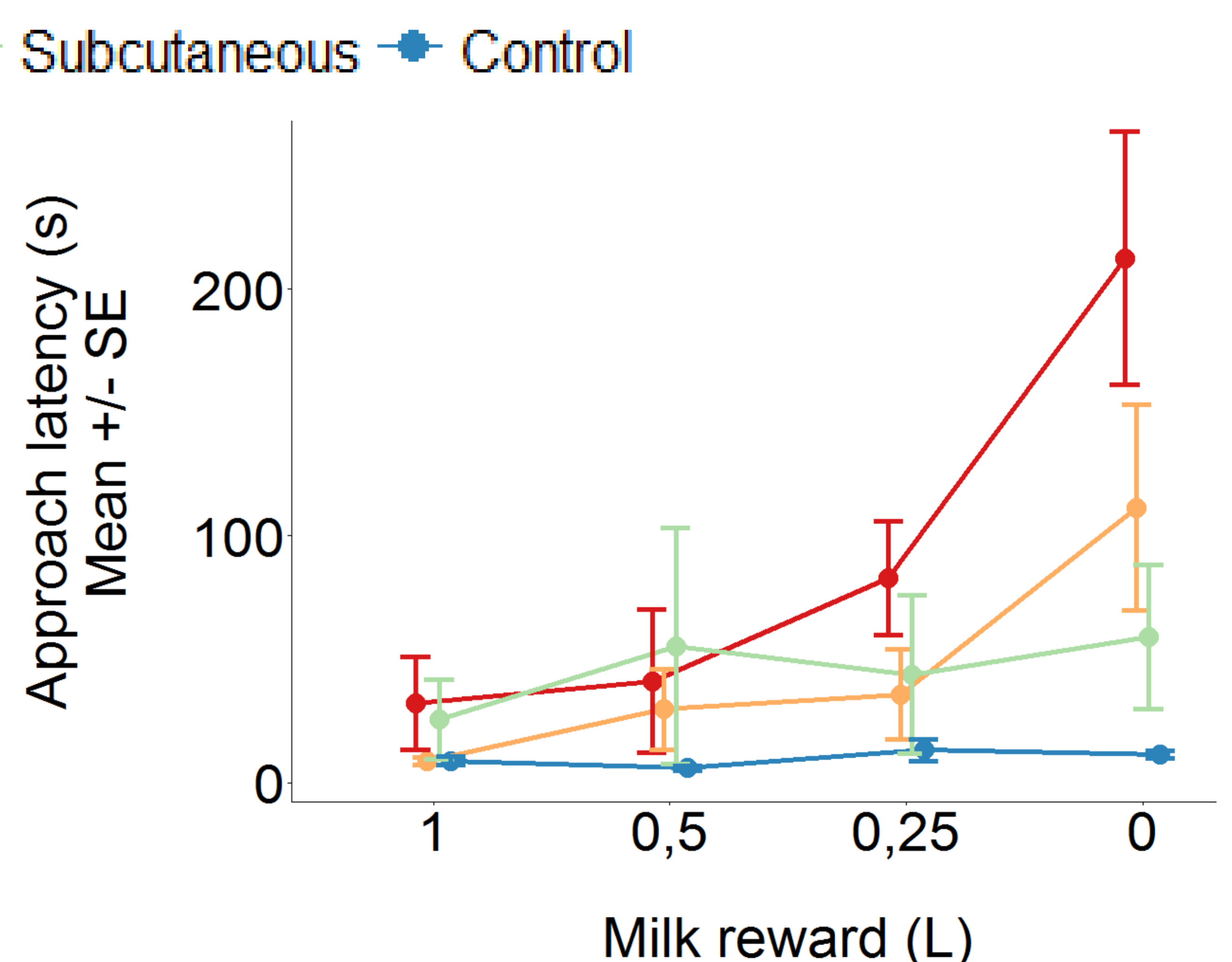


Figure 3. Mean ± S.E. approach latency (s) in relation to treatment received and quantity of milk rewarded

Conclusions

- Intramuscular injections are aversive to calves; subcutaneous and intranasal routes are less aversive and should be considered as refinements when possible
- These results may apply to a wide range of species and be applicable to a range of treatments
- New work is required to assess efficacy of treatments delivered using the different routes