

Assessing the impact on transmission of an experimental live vaccine against Bovine Leukaemia Virus (BLV), in dairy cattle

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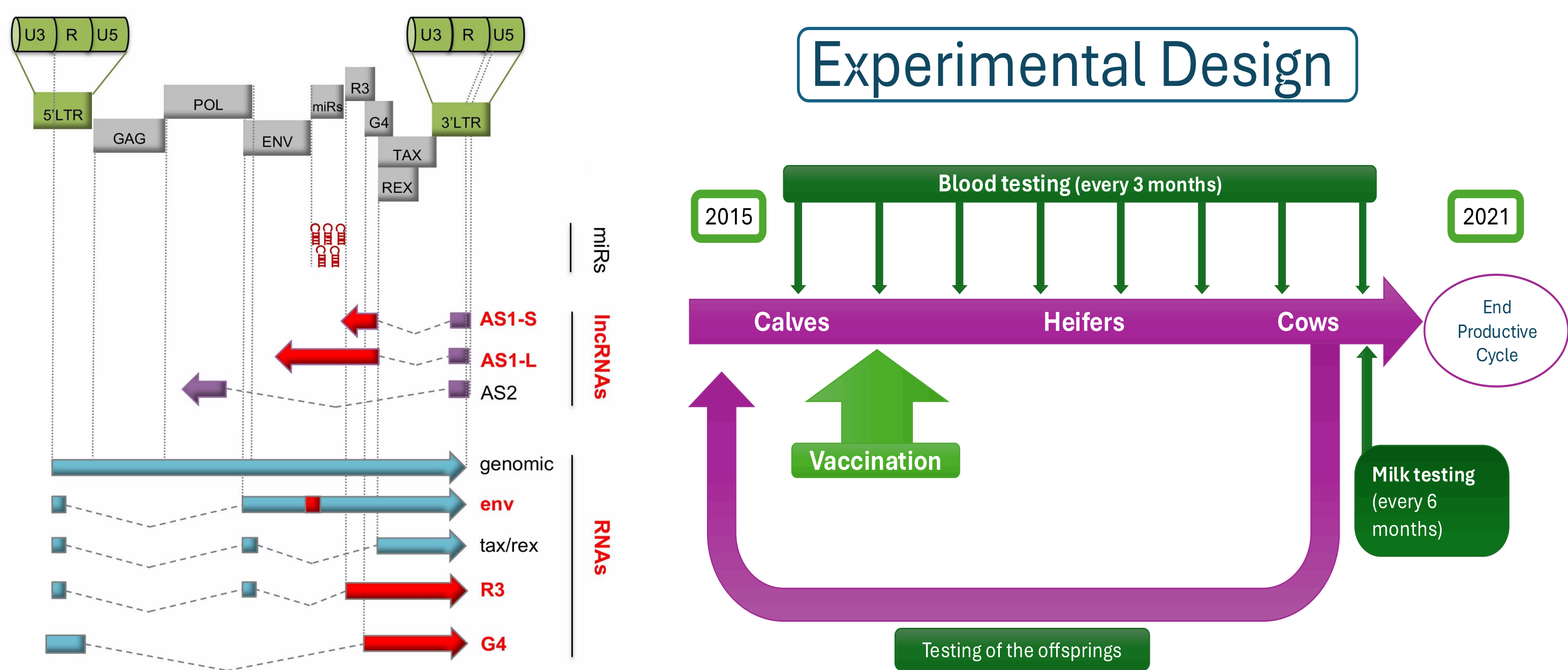
Introduction

BLV is a widespread retrovirus that causes lymphoma and other diseases in cattle. Countries that successfully eradicated the disease implemented a test-and-cull strategy for infectious animals. However, this approach is only feasible when the prevalence of infection is low. No commercial BLV-vaccine is available. Vaccination can affect susceptibility and infectivity, thus affecting transmission.

Aim

To assess the impact of an experimental vaccine on BLV transmission among herd mates -both vaccinated and unvaccinated- who are naturally exposed to infectious animals with varying levels of infectivity.

Material & Methods



proviral loads = Infectivity

Low (LI)

High (HI)

Data analysed by a generalised linear model (GLM) based on a SI transmission model, complementary log-log link function, a binomial error term and the log I/N as an offset variable.

This GLM model estimated the infection parameter (β) for each combination of susceptibility (vaccination status: vaccinated (V) or unvaccinated (nV)), infectivity ((high infectivity (HI) or low infectivity (LI)), and age group (young or adult).

We estimate only six distinct β values for each age group, as no highly infectious (HI) vaccinated animals were observed.

Results

Transmission rates of V vs nV animals, either from HI or LI individuals, are lower

- this proves that vaccination influences susceptibility by decreasing the number of infected animals.

In the vaccinated group, only one animal became infectious, but LI and no individual was HI.

Transmission rate of LI between V and nV is much lower.



Table 1. Transmission rates estimates and 95% Confidence Intervals.

Transmission rates (β) between	Adult	Young
S_{nv} and I_{nv}^{LI}	0.009 (0.001; 0.114)	0.002 (5.5 e-05; 0.07)
S_{nv} and I_{nv}^{HI}	0.100 (0.0003; 31.7)	0.020 (2.4 e-05; 20.0)
S_v and I_{nv}^{LI}	7.5 e-05 (5.0 e-07; 0.01)	1.7e-05 (4.1 e-08; 0.007)
S_v and I_{nv}^{HI}	0.001 (2.2 e-07; 3.2)	0.0002 (1.8 e-08; 2.0)
S_{nv} and I_v^{LI}	3.4 e-268 (0.0; inf.)	7.9 e-269 (0.0; inf.)
S_v and I_v^{LI}	3.0 e-270 (0.0; inf.)	5.9 e-270 (0.0; inf.)

Conclusions

- Vaccinated individuals** are **less likely to become infected** under the same infection exposure than non-vaccinated individuals.
- pBLV6073DX is a crucial strategic tool for controlling BLV.



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