

EFFECT OF SHEEP ANTIBODIES ON ENGULFMENT OF BACTERIA BY RUMEN PROTOZOA

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Rumen protozoa prey heavily on rumen bacteria (Coleman 1964). This predatory activity reduces bacterial protein supply to the host. It was hypothesized that the predatory activity of rumen ciliates in sheep could be inhibited by antibodies raised against these organisms.

Heat-inactivated sheep serum (56°C for 30 minutes) was mixed with freshly strained rumen fluid (SRF) containing ciliates (Entodinia- $4-6 \times 10^5/\text{mL}$; Holotrichs- $2-4 \times 10^4/\text{mL}$) in a 1:1 (50 $\mu\text{L}/50 \mu\text{L}$) ratio in 1 mL vials and incubated for 20 minutes under anaerobic conditions at 39°C. A mixture of SRF containing ciliates at the above concentrations in McDougall's buffer served as the standard. After 20 minutes of incubation, 10 μL ^{35}S -labelled *Escherichia coli* ($10^8/\text{mL}$) were inoculated into the vials and further incubated for 0, 5, 10, 20 and 40 minutes. Separate duplicate vials were used for each time point. Incubated samples were immediately centrifuged at 4°C, first at 300g for 1 minute to separate all protozoa and then at 2000g for 3 minutes to recover the residual free bacteria. The protozoa and residual bacteria were washed in phosphate buffered saline (pH 7.2). Each sample was suspended in 1 mL scintillant.

No non-specific association was observed between killed (boiled) ciliates and the labelled bacteria at either 4°C or 39°C. Uptake by viable ciliates did not occur at 4°C. Ciliates incubated in the standard buffer and in the presence of non-immune serum demonstrated a linear uptake of bacteria (Figure 1). However, incubation of ciliates in immune serum markedly reduced uptake of labelled bacteria. The inhibition by serum did not require serum complements.

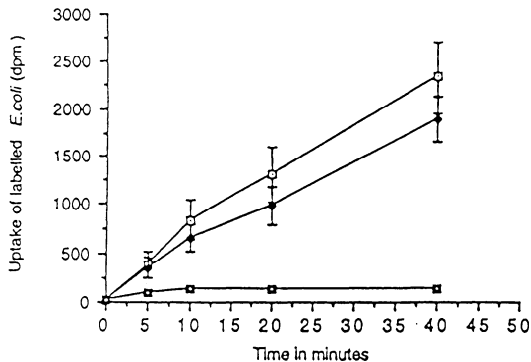


Figure 1. Effect of immune serum on predation of radio-labelled bacteria. Standard buffer (open squares), non-immune (closed circles) and immune (closed squares) sera. The profile represents predatory pattern exhibited by rumen ciliates when they were pre-incubated in serum samples diluted 1/64 and thereafter exposed to ^{35}S *E. coli* for different periods of time

The findings support the hypothesis that predatory activity of rumen protozoa can be inhibited by antibodies raised against these organisms. They raise the possibility that productivity in ruminants might be increased if immunisation strategies can be developed that deliver specific anti-protozoan antibodies to the rumen.

COLEMAN, G.S. (1964). *J. Gen. Microbiol.* 37: 209-23.