

Luteinizing hormone receptor mediated proliferation of isolated canine T lymphoma cells

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Luteinizing hormone receptor (LHR) have been identified in nonreproductive tissues, including in canine lymphoma and isolated canine T lymphoma cells.¹ The objective was to determine if the LHR in canine T lymphoma cells was functional. It was hypothesized that stimulation of the LHR by human chorionic gonadotropin (hCG) or canine LH (cLH) induces proliferation of canine T lymphoma cells in vitro. Immortalized T cell lines from 3 dogs with multicentric T cell lymphoma donated from Dr. Takuya Mizuno at Yamaguchi University, Japan were plated in 96 well plates in RPMI 1640 (phenol and protein free) media (#02-0105, VWR Life Science, Sanborn, NY) at 37°C with 5% CO₂. For each cell line, standard curves from 10 to 500 x 10³ cells/well were plated in triplicate. Increasing concentrations of hCG (4 - 40,000 u/ml, Chorulon®, Merck Animal Health, Madison, NJ) or canine LH (0.002 to 20 ng/ml, #QP604-EC, EnQuire BioReagents, Denver, CO) were added to wells containing 100 x 10³ cells plated in triplicate. Plates were incubated for 24, 48, and 72 hours for hCG or 48, 72, 96, and 120 hours for cLH before cells were counted using an MTT cell proliferation assay kit (#10009365, Cayman Chemical, Ann Arbor, MI) following manufacturer's instructions. Average ± SD cell number was compared among hormone concentrations using one way ANOVA. Significance was defined as $p < 0.05$. Activation of LHR in isolated canine T lymphoma cells induced significant cell proliferation in all 3 cell lines with both hCG and cLH, but varied among concentrations and incubation times. Greatest proliferation from hCG occurred with 40,000 u/ml after 72 hours of incubation in all 3 cell lines. Greatest proliferation from cLH occurred with 2 ng/ml after 96 hours of incubation in all 3 cell lines. However, there was a significant decrease in cell counts following administration of cLH at the highest concentration (20 ng/ml) at all times of incubation. To the author's knowledge, this was the first study to provide evidence that LHR in nonreproductive tissues is functional. These findings provided an explanation for why gonadectomized dogs are 3 - 4 times more likely to develop lymphoma.^{2,3} Clinical trials are planned to include LH downregulation with conventional chemotherapy in efforts to prolong survival times in dogs.

Keywords: Cancer, dog, human chorionic gonadotropin, lymphocyte, MTT assay

References

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