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Regulation of *hPTH* expression *in vitro* using the tetracycline inducible retroviral Vector system

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Endogenous 84 amino acid parathyroid hormone (PTH) is synthesized as a pre-pro hormone by the chief cells of the parathyroid glands. Physiological actions of PTH include regulation of bone metabolism, renal tubular reabsorption of calcium and phosphate, and intestinal calcium absorption. In addition, PTH stimulates new bone formation by extraordinary stimulation of osteoblastic activity and decreasing calcium excretion by the kidney.

In this study, we constructed and tested retrovirus vectors designed to express the *hPTH* (human parathyroid hormone) gene under the control of the tetracycline-inducible promoters. To increase the *hPTH* gene expression at turn-on state, WPRE (woodchuck hepatitis virus posttranscriptional regulatory element) sequence was also introduced into retrovirus vector at downstream region of either the *hPTH* gene or the sequence encoding rtTA (reverse tetracycline-controlled transactivator). Transformed primary culture cells (PFF, porcine fetal fibroblast, CEF, chicken embryonic fibroblast) were cultured in the medium supplemented with or without doxycycline (tetracycline derivative) for 48 hours, and induction efficiency was measured by comparing the *hPTH* gene expression level using two step RT-PCR and ELISA. Higher *hPTH* expression (3×10^4 pg/mℓ, 5.3×10^4 pg/mℓ) and tighter expression control (up to 8 fold) were observed from the vector in which the WPRE sequence was placed at downstream of the *hPTH* gene. The resulting tetracycline inducible vector system may be helpful in solving serious physiological disturbance problems which has continuously hampered successful production of transgenic animals.

Keywords: ***rtTA, WPRE, hPTH, Doxycycline, induction efficiency***