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Identification, molecular characterization, and tissue expression of parathyroid hormone-related protein gene (*PTHrP*) from water buffalo (*Bubalus bubalis*)

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ABSTRACT. Parathyroid hormone-related protein (PTHrP) is involved in the deposition of milk calcium in mammal lactation, but its role in buffalo is unclear. In this study, the full-length coding sequence of the water buffalo *PTHrP* gene was first isolated using reverse transcription-polymerase chain reaction. The protein was then subjected to molecular

characterization using bioinformatic methods, and the tissue expression pattern was further assayed by semi-quantitative reverse-transcription polymerase chain reaction. The water buffalo *PTHrP* gene contains an open reading frame of 534 base pairs encoding a polypeptide of 177 amino acid residues, a theoretical molecular weight of 20.32 kDa, and an isoelectric point of 10.00. In addition, water buffalo PTHrP was predicted to contain a signal peptide, a typical hydrophobic region with no hydrophobic transmembrane regions, and to exert its function in the cell nucleus. A conserved domain of parathyroid superfamily from amino acids 34-114 was observed in the polypeptide. Sequence comparison and the phylogenetic analysis showed that the sequence of the water buffalo PTHrP protein shared high homology with that of other mammals, particularly cattle and goat. Among the 16 tissues examined, the *PTHrP* gene was only expressed in adipose tissue, placenta, uterine wall, hypophysis, and mammary gland tissue, but gene expression levels were higher in the uterus wall and adipose tissue. The results of this study suggest that the *PTHrP* gene plays an important role in the deposition of milk calcium of water buffalo.

Key words: Bioinformatic analysis; cDNA cloning; Water buffalo; Parathyroid hormone-related protein; Tissue expression analysis

