Molecular cloning, sequence characterization, and gene expression profiling of a novel water buffalo (Bubalus bubalis) gene, AGPAT6

S. Song1*, J.L. Huo1*, D.L. Li2,3*, Y.Y. Yuan1, F. Yuan1 and Y.W. Miao1

1Faculty of Animal Science and Technology, Yunnan Agricultural University, Kunming, Yunnan, China
2Domestic Animal Breeding and Crossbreed-improvement Station of Yunnan Province, Kunming, Yunnan, China
3Yunnan Institute of BAFULE Buffalo Science and Technology, Kunming, Yunnan, China

*These authors contributed equally to this study.
Corresponding author: Y.W. Miao
E-mail: yongwangmiao999@163.com / miaoyw1@ynau.edu.cn

Received March 3, 2013
Accepted August 15, 2013
Published October 1, 2013
DOI http://dx.doi.org/10.4238/2013.October.1.2

ABSTRACT. Several 1-acylglycerol-3-phosphate-O-acyltransferases (AGPATs) can acylate lysophosphatidic acid to produce phosphatidic acid. Of the eight AGPAT isoforms, AGPAT6 is a crucial enzyme for glycerolipids and triacylglycerol biosynthesis in some mammalian tissues. We amplified and identified the complete coding sequence (CDS) of the water buffalo AGPAT6 gene by using the reverse transcription-polymerase chain reaction, based on the conversed sequence information of the cattle or expressed sequence tags of other Bovidae species. This novel gene was deposited in the NCBI database (accession No. JX518941). Sequence analysis revealed that the CDS of this AGPAT6 encodes a 456-amino acid enzyme (molecular mass = 52 kDa; pI = 9.34). Water buffalo AGPAT6 contains three hydrophobic transmembrane regions and a signal 37-amino acid peptide, localized...
in the cytoplasm. The deduced amino acid sequences share 99, 98, 98, 97, 98, 97, 95% identity with their homologous sequences from cattle, horse, human, mouse, orangutan, pig, rat, and chicken, respectively. The phylogenetic tree analysis based on the AGPAT6 CDS showed that water buffalo has a closer genetic relationship with cattle than with other species. Tissue expression profile analysis shows that this gene is highly expressed in the mammary gland, moderately expressed in the heart, muscle, liver, and brain; weakly expressed in the pituitary gland, spleen, and lung; and almost silently expressed in the small intestine, skin, kidney, and adipose tissues. Four predicted microRNA target sites are found in the water buffalo AGPAT6 CDS. These results will establish a foundation for further insights into this novel water buffalo gene.

**Key words:** Water buffalo; Isolation; Bioinformatic analysis; 1-Acylglycerol-3-phosphate-O-acyltransferase 6 (AGPAT6); Tissue expression profile