

# Characterization and functional analysis of two novel 3-hydroxy-3-methylglutaryl-coenzyme A reductase genes (*GbHMGR2* and *GbHMGR3*) from *Ginkgo biloba*

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-868 ACTATAGGGCACGCGTGGTCGACGGCCCGGGCTGGTATTTGATGGTTATATTTATTTATG  
 -808 AATCATAGCTTTATAAGATTATGATAGATTGATGACTTATAAAGCACAGATTAAGAAAGTG  
 -748 CACTCAAAGTAAAGTACTCATCAACATGCATATAAACTTAAACGATAAAGAAAGTCTA  
 -688 TTTCAAATCGAACCATGCCATGATTCTCTCCA TTAATTGATAGATGTTGAAGCTCTCTC  
**ERE** **TC-rich repeats**  
 -628 TTGTTGAGCTACTAAGGATAAAATTAGTCTAA TGACG ACATGAAAGTTATATTGCTCCTA  
**TGACG-motif**  
 -568 CCACATTTGATATATGCACGAAGCCCTCATTGTTTTATGAAATACATCTTGATATATAC  
 -508 ATTACCTTGTTAGGTCAGCATAATAAATTAAGGCAAGCAATCCACCAATCAACACTTAC  
 -448 TCA CAATCCTC ACTCATGGAT TTTCAA TTATCTTTATGGAAAACATCTC ATCATTTACA  
**ATCC-motif** **Box I** **Box III**  
 -388 CT TTGATCGAAAAGTGCTTAATGAATAATAAAA AAAACATTTA ATGCTAGCCCCAATTA  
**ACE**  
 -328 TGTGACTACATGGTGAATATCA CAAACAACCTCC CTAGAATTAGGCCTTTTAGGAACTAA  
**CAAT-box**  
 -268 TCTTGGTAAACAAGATAACAAACCCTCTTCGTAGCATTATGGTCCCAAAAGCGGA AAC  
**TGA-element**  
 -208 GAC CATATTCTCTTAGGCATCCAACCTCTCGGAACCGCGT GTGCCCTCCTGTTCGA ACA  
**MNF1**  
 -148 CCTGTCAAAGGTAACATTGTTGTTTATTAGTTGGCAGAGTTTATATTAGTAAGTGG  
 -88 TGTCTTTATGTCTAGGCAGAGG GAAAGAA CAGTACGATAGAGACGAGAGCCTGACAAA  
**AAGAA-motif**  
 -28 TATA TGTAGAATAGATCAAGTTATAATC TGGGCGTTGCATGCAGTTCCTCTCTTTTT  
**TATA-box** **+1 Transcription Start**  
 +33 TATTTCTATTTTACTTGAATGCTATTCAGGCTAGATTTGTTCTGTAATCCTGATCATC  
 +93 ATG GCATTGATGAATGCGTGTATGCAACGTGAGAA

Supplementary Fig. S2. Promoter sequence of GbHMGR3. Cis-acting regulatory element, Transcription Start Site and initiation codon were marked with box.

Supplementary **Table S1**. Primers used in this study.

Primer	Description	Sequence (5'→3')
GbHMGR2-UP	GbHMGR2 forward primer for cDNA amplification	CATGAATGGTGTGGGGTGA
GbHMGR2-DN	GbHMGR2 reverse primer for cDNA amplification	TCGGTCTCAGGCGGTTGT
GbHMGR3-UP	GbHMGR3 forward primer for cDNA amplification	CCTGATCATCATGGCATTG
GbHMGR3-DN	GbHMGR3 reverse primer for cDNA amplification	CCATCAGCCTAAGAAAAGCA
GbHMGR2-qd1	GbHMGR2 primer for promoter 1st round amplification	TCTTCTCCCCTATCTTTGGTTTTCTCA
GbHMGR2-qd2	GbHMGR2 primer for promoter 2nd round amplification	TCACATTCTCCACCATTCTTTGTCTTC
GbHMGR3-qd1	GbHMGR3 primer for promoter 1st round amplification	TTCTCACGTTGCATACACGCATTCATC
GbHMGR3-qd2	GbHMGR3 primer for promoter 2nd round amplification	CTTGTTGGTAAAGGCGACGGGCAGAG
AP1	Adapter primer, 1st round	GTAATACGACTCACTATAGGGC
AP2	Adapter primer, 2nd round	ACTATAGGGCACGCGTGGT
GbHMGR2-gnup	GbHMGR2 forward primer for yeast verification	CGAGTACTCATGAATGGTGTGGGGTGA
GbHMGR2-gndn	GbHMGR2 reverse primer for yeast verification	CGTCTAGATCGGTCTCAGGCGGTTGT
GbHMGR3-gnup	GbHMGR3 forward primer for yeast verification	CGAGTACTCCTGATCATCATGGCATTG
GbHMGR3-gndn	GbHMGR3 reverse primer for yeast verification	CGTCTAGACCATCAGCCTAAGAAAAGCA
GbHMGR2-dIF	GbHMGR2 forward primer for qRT-PCR	GCAATGGGAGTGTGGCTTCTTA
GbHMGR2-dIR	GbHMGR2 reverse primer for qRT-PCR	ATCTGCCGGTCATCAACTCCA
GbHMGR3-dIF	GbHMGR3 forward primer for qRT-PCR	TGATACAGAGGTGGAGGGAGAAGA
GbHMGR3-dIR	GbHMGR3 reverse primer for qRT-PCR	TGAAGGAAGCAAGGAGAATGACC
GAPDH-F	Reference gene forward primer for qRT-PCR	GGTGCCAAAAAGGTGGTCAT
GAPDH-R	Reference gene reverse primer for qRT-PCR	CAACAACGAACATGGGAGCAT
M13F	Forward primer for bacterium solution PCR	TGTAAAACGACGGCCAGT
M13R	Rorward primer for bacterium solution PCR	CAGGAAACAGCTATGACC