Cairo University
Faculty of Veterinary Medicine

Cloning and characterization of the novel *CYP2J2* gene in *Camelus dromedarius*

A thesis submitted by

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For the degree of the Ph.D

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Abstract: Despite its economic, cultural and biological importance, many genes haven't been depicted, sequenced or analyzed to date for *Camelus dromedarius*. The *CYP2J2* had been described in different mammalian species; however, no studies have described this gene in *Camelus dromedarius*. In the present study, the full-length c-DNA of the novel *CYP2J2* (GenBank accession number MH511989) was cloned from the liver, heart, and kidney mRNA by the RACE-PCR. The full-length cDNA of the cloned *CYP2J2* was sequenced and analyzed using bioinformatics methods. The full-length cDNA sequence was 2135 bp with no introns. The open reading frame (ORF) had 1341 nucleotides which coded for a putative protein of 446 amino acids. The deduced protein is located in the endoplasmic reticulum. It has two transmembrane regions. The nucleotides and deduced amino acids sequences of the cloned *CYP2J2* were 1400 nucleotides and 47 amino acids shorter than the predicted homolog, respectively. This study is considered the first report investigating the differential expression profiles of the CYP2J2 mRNA and protein in the liver, heart, and kidney of *Camelus dromedarius*. A total of 30 samples were used to determine the expression of both CYP2J2 mRNA and protein using the qRT-PCR and western blotting methods, respectively. The mRNA level of the *CYP2J2* was significantly elevated in the liver compared to that in the heart and kidney. The tissue distribution of the CYP2J2 protein was coherent to its transcript level in the kidney, but not in the liver and heart samples. The difference between the CYP2J2 mRNA and protein distributions in the three studied organs may be attributed to the mechanism by which the CYP2J2 might be involved in the adaptability of the camel to the arid environment. This study is the first description of the putative *CYP2J2* gene, which opens the way to a new investigation-so far-never accomplished in *Camelus dromedarius*.

Keywords: camel; *Camelus dromedarius*; CYP2J2; epoxygenase; EETs; expression; cloning; sequencing; bioinformatics; liver; kidney; heart.

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LIST OF ABBREVIATIONS

19(S)-HETE	19(S)-hydroxy-eicosatetraenoic acid
2-AG	2-Arachidonoylglycerol
BKCa	Calcium-sensitive potassium channels
CNIs	Calcineurin inhibitors
CO	Carbon monoxide
CRP	C-reactive protein
CYP2J2	Cytochrome P450 family 2 subfamily J member 2
CYPs	Cytochromes P450
DHA	Docosahexaenoic acid
DHETs	Dihydroxyeicosatrienoic acids
DiHOME	Dihydroxyoctadecaenoic acid
EDHFs	Endothelium-derived hyperpolarizing factors
EDPs	Epoxydocosapentaenoic acids
EEQs	Epoxyeicosatetraenoic acids
EET-G	Epoxyeicosatrienoic glycerol
EETs	Epoxyeicosatrienoic acids
EGF	Epidermal growth factor
eNOS	Endothelial nitric-oxide synthase
EPA	Eicosapentaenoic acid