بسم الله الرحمن الرحيم

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تم رفع هذه الرسالة بواسطة / سلوي محمود عقل

بقسم التوثيق الإلكتروني بمركز الشبكات وتكنولوجيا المعلومات دون أدنى مسئولية عن محتوى هذه الرسالة.

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Cairo University
Faculty of Veterinary Medicine
Department of Theriogenology

Uncovering the Molecular Aspect of the Pregnancy Maintenance in Dromedary Camels

Thesis presented by
Ola Adel Ahmed Saied
(B.V.Sc. 2018)
As a requirement of master's degree
(Theriogenology)

Under supervision of

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(2022)

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Approval Sheet

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Uncovering the Molecular Aspect of the Pregnancy Maintenance in Dromedary Camels

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Supervision sheet

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Abstract

A proper regulated dialogue between the endometrium and conceptus (embryonic disc and extra-embryonic tissues) is required for successful implantation and pregnancy. The present thesis aimed to (I) investigate the dynamic expression pattern of genes related to implantation and vascularization, and (II) shed light on the molecular interactions among left & right uterine horns, as well as uterine body in pregnant dromedary camels. For this, 40 genital tracts and blood samples were collected from slaughterhouse during the breeding season (November, 2020 to March, 2021). Moreover, total RNA isolation, RT-PCR for candidate genes, and measuring of steroid hormones in serum was performed. Results showed that insulin like growth factor (IGF1), vascular endothelial growth factor A (VEGFA), FOS as well as JUN proto-oncogenes mRNAs were up-regulated (P<0.001) in the pregnant groups compared to non-pregnant ones. Interestingly, integrin subunit beta 4 (ITGB4), FOS, IGF1 and placental growth factor (PGF) transcripts were increased (P<0.001) in the right uterine horn of the pregnant groups compared to non-pregnant. Moreover, JUN, solute carrier organic anion transporter family member 2A1 (SLCO2A1), VEGFA and phosphatase and tensin homolog (PTEN) genes were highly up-regulated (P<0.001) in uterine body, left and right uterine horns of the pregnant groups *vs.* non–pregnant. Platelet derived growth factor subunit A (PDGFA) was up-regulated (P<0.001) in left and right uterine horns of the pregnant groups *vs*. non–pregnant. Apoptosis regulator (BCL2) increased (P<0.001) in the uterine body of the pregnant groups *vs.* non–pregnant. In serum, the levels of progesterone and estradiol 17-β increased in pregnant she-camels compared to non-pregnant ones. In the pregnant she-camels the histological examination revealed hypertrophy of the uterine myometrium, abundant of dilated blood vessels and thickening of the walls. In addition, right and left uterine horn of pregnant she-camels showed normal increasing glands especially in the left one and less fibrous stroma *vs.* the non-pregnant. Taken together, a precise regulation of genes associated with endometrial receptivity and placental formation is required for a proper embryonic implantation in pregnant she-camels.

Keywords: Camel, Pregnancy, Uterine tissue, Gene expression, Serum, Steroids

Dedication

I dedicate this study to my parents and my brother for their, understanding, supporting and helping to succeed.

Acknowledgement

In the name of Allah the almighty who taught man about matter that he does not know and prayers and peace be upon our holy prophet Muhammed and his good followers till the Day of Judgment.

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AI	Artificial Insemination
BCL2	Apoptosis Regulator Gene
CISH	Endometrial cytokine Inducible SH2 Containing Protein
CL	Corpus Luteum
COX-2	Cyclooxygenase2
CVRL	Crown Vertebral Rump Length
E2	Estrogen
EMMPRIN	Extracellular Matrix Metalloproteinase Inducer
ER	Estrogen Receptor
FAO	Food and Agriculture Organization
FOXL2	Fork Head Box L2
GE	Glandular Epithelium
IFN	Interferon
IGF1	Insulin like Growth Factor 1
IRF	Interferon Regulatory Factor
ISGs	Interferon Stimulated Genes
ITG	Integrin
ITGB4	Integrin Subunit Beta 4
LE	Luminal Epithelium
LGMN	Legumain
LUH	Left Uterine Horn
MMP	Matrix Metalloproteinase
MRP	Maternal Recognition of Pregnancy
MUC1	Mucin 1
MX	Myxovirus Resistance Protein
OAS1	Oligoadenylate Synthetase

OTR	Oxytocin Receptor
P4	Progesterone
PDGFA	Platelet Derived Growth Factor Subunit A
PGE2	Prostaglandin E2
PGES	Prostaglandin E2 Synthase
PGF	Placental Growth Factor
$PGF_{2\alpha}$	Prostaglandins F2 Alpha
PGH2	Prostaglandin G/H Synthases 2
PGR	Progesterone Receptor
PGS	Prostaglandins
PTEN	Phosphatase and Tensin Homolog
PTGFR	Prostaglandin F Receptor
RSAD2	Radical S-Adenosyl Methionine Domain Containing2
RUH	Right Uterine Horn
SACs	South American Camelids
SLCO2A1	Solute Carrier Organic Anion Transporter Family Member 2A1
SOCS	Suppressor of Cytokine Signaling
STAT1	Signal Transducer and Activator of Transcription1
TIMPS	Tissue-Derived Matrix Metalloproteinase Inhibitors
VEGFA	Vascular Endothelial Growth Factor A
Vs.	*Versus*