

**Aus dem Leibniz-Institut für Zoo- und Wildtierforschung
(IZW) im Forschungsverbund Berlin e. V.**

**Cloning of IFN γ and IL-4 in zoo animals and an approach
to determine expression levels of these cytokines by
real-time PCR**

**INAUGURAL-DISSERTATION
zur Erlangung des Grades eines
Doktors der Veterinärmedizin
an der
Freien Universität Berlin**

**vorgelegt von
Eman Mohamed Ahmed Abdel-Gawad
Tierärztin, B.V.Sc. und M.V.Sc. aus Kairo/Ägypten**

Berlin 2007

Journal-Nr.: 3145

**Gedruckt mit der Genehmigung
des Fachbereichs Veterinärmedizin
der Freien Universität Berlin**

Dekan: Univ.-Prof. Dr. Leo Brunnberg
Erster Gutachter: PD. Dr. Falko Steinbach
Zweiter Gutachter: PD. Dr. Anja Sterner-Kock
Dritter Gutachter: Univ.-Prof. Dr. Dr. Hafez M. Hafez

Deskriptoren (nach CAB Thesaurus):

Cytokines, Interferon Type II, Interleukins, Interleukin-4, messenger RNA, DNA-cloning, Th1 cells (MeSH), Th2 cells (MeSH), Alternative Splicing (MeSH), Gene Expression, Zoo Animals, Animal models, *Equidae*, Horses, Phylogeny, Pylogenetics, Cell-mediated Immunity, Humoral Immunity, Polymerase Chain Reaction, Flow Cytometry, Antigens, CD3, *Mycobacterium tuberculosis*, *Herpesviruses*, *Equid herpesvirus-1*, RNA, Ribosomal, 18S (MeSH), Tetanus Toxoid, Antigens, CD28

Tag der Promotion: 01-10-2007

For who gave me life, love, help, encouragement and provides care

Allah

Then also to

***My beloved Parents, Siblings, Arwa, Aya,
Sherif, Grandparents and Friends***

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ABBREVIATIONS

aa	amino acid
Ab	antibody
Ag	Antigen
APCs	Antigen Presenting Cells
BCG	Bacillus Calmette Guerin
BLAST	Basic Local Alignment Search Tool
bp	base pairs
BSA	Bovine serum albumin
CD	Cluster of differentiation
CMI	Cell Mediated Immunity
C _t	Threshold cycle
DABCYL	(4'-dimethylamino-phenylazo)-benzene
DC	Dendritic cell
DMSO	Dimethyl sulfoxide
DNA	Deoxyribonucleic acid
cDNA	complementary Deoxyribonucleic acid
dNTPs	Deoxyribonucleoside triphosphate
DOC	Deoxycholate
dR	Baseline-corrected raw fluorescence
dRn	Baseline-corrected normalized fluorescence
<i>E. coli</i>	<i>Escherichia coli</i>
EDTA	Ethylene Diamine Tetra Acetic acid
<i>EHV-1</i>	<i>Equine herpesvirus-1</i>
ELISA	Enzyme linked immunosorbent assay
FACS	Fluorescence-activated cell sorter
FAM	6-carboxyfluorescein
FCS	Fetal calf serum
FITC	Fluorescein isothiocyanate
FRET	Fluorescence resonance energy transfer
H ₂ O	Water
H ₂ O ₂	Hydrogen peroxidase
d.H ₂ O	Distilled water
HEPES	4, (2-hydroxyethyl)-1-piperazine-1-ethanesulfonic acid
HEX	Hexachloro-6-carboxyfluorescein
ICAM-1	Intracellular adhesion molecule-1
IFN	Interferon
IFN α	Interferon alpha
IFN β	Interferon beta
IFN γ	Interferon gamma
Ig	Immunoglobulin
IL	Interleukin
IL-4 δ 2	IL-4 delta2 splice variant
iNOS	inducible Nitric Oxide Synthase
IPTG	Isopropyl- β -D-Thiogalactopyranoside
JAK	Janus Tyrosine Kinase
JOE	2,7 dimethoxy-4,5-dichloro-6-carboxyfluorescein
kDa	kilo Daltons
KO	Knockout
LPS	Lipopolysaccharide
μ	micro
μ M	micromole
M	Mole per litre
M ϕ	Macrophage

mAb	Monoclonal antibody
<i>M. bovis</i>	<i>Mycobacterium bovis</i>
MGB	Minor groove binder
MHC	Major Histocompatibility Complex
min	minute
Mix	mixture
ml	millilitre
M-MLV	Moloney Murine Leukemia Virus
mRNA	messenger RNA
<i>M. tuberculosis</i>	<i>Mycobacterium tuberculosis</i>
NFQ	Non-fluorescent quencher
NK cells	Natural killer cells
nm	nanometer
OD	Optical density
ORF	Open Reading Frame
p	pico
PAGE	Poly Acrylimde Gel Electrophoresis
PBL	Peripheral blood lymphocytes
PBMC	Peripheral blood mononuclear cells
PBS	Phosphate buffered saline
PCR	Polymerase Chain Reaction
PE	phycoerythrin
PFU	Plaque Forming Units
PKC	Protein Kinase C
PMA	Phorbol-12-Myristate-13-Acetate
PPD	Purified protein derivative
R	Receptor
Rec. EqIL-4	Recombinant equine interleukin-4
RFU	Relative fluorescent units
RNA	Ribonucleic acid
18S rRNA	18S subunit ribosomal RNA
RNAse	Ribonuclease
ROI	Reactive Oxygen Intermediates
ROX	6-carboxy-N,N,N,N-tetramethylrhodamine
rpm	round per minute
RT	Reverse transcription
SDS	Sodium Dodecyl Sulphate
TAE	Tris acetate EDTA
TAMRA	carboxytetramethylrhodamine
TB	Tuberculosis (disease)
TBS	Tris buffered saline
Tc	cytotoxic T cell
TCA	Trichloroacetic acid
TCR	T cell receptors
TEMED	Tetramethylethylenediamin
TET	Tetrachloro-6-carboxyfluorescein
TfB	Transformation buffer
Th	T helper cell
TLR	Toll like receptor
T _m	melting temperature
TNF- α	Tumour Necrosis Factor-alpha
TT	Tetanus toxoid
U	Unit
UV	Ultraviolet light
X-Gal	5-bromo-4-chloro-3-indolyl-b-D-galactopyranoside