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Expression and immunological characterization of peptides from the N-terminus of the Hepatitis C Virus polyprotein

**A thesis submitted in partial fulfillment of the requirements for
M.Sc. degree in Biochemistry**

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

﴿ قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا إِلَّا مَا عَلَّمْتَنَا

إِنَّكَ أَنْتَ الْعَلِيمُ الْحَكِيمُ ﴾

صلی اللہ العظیم
الآیہ (32) سورہ البقرہ

DEDICATION

**This thesis is proudly dedicated to my
beloved family
(my mother, my father and my brother)**

**Thanks for your endless love, prayers,
sacrifices and support**

Alyaa Saher Abd El Halim

*This thesis has not been submitted
to this or any other university*

Alyaa Saher Abd El Halim

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LIST of ABBREVIATIONS

Abbreviation	Full name
A	Adenine
ALT	Alanine transaminase
AP	Alkaline phosphatase
ARF	Alternate reading frame
Asp	Aspartic
BCA	Bicinchoninic acid
BCIP	5-Bromo-4-chloro-3-indolyl phosphate
B-DNA	Branched DNA
Bp	Base pair
BSA	Bovine serum albumin
CD 81	Cluster of differentiation 81
CD4+ T-cells	CD4-positive helper T cells
CD8+ T-cells	CD8-positive cytotoxic T cells
cDNA	Complementary deoxyribonucleic acid
CHC	Chronic hepatitis C
Chisam	Chloroform-iso-amyl alcohol
CIAP	Calf intestinal alkaline phosphatase
CLDN1	Claudin-1
DAAs	Direct acting antiviral agents
dGTP	Deoxyguanosine-5'-triphosphate
DNA	Deoxyribonucleic acid
DNase I	Deoxyribonuclease I
dNTP	2'-deoxyribonucleoside 5'-triphosphate
E	Envelope
<i>E. coli</i>	<i>Escherichia coli</i>
EDTA	Ethylene diamine tetra acetic acid
EIA	Enzyme immunoassay
EIF	Eukaryotic initiation factor
ELISA	Enzyme linked immunosorbent assay

EMBL	European molecular biology laboratory
ER	Endoplasmic reticulum
EVR	Early virological response
F	Frame shift
FDA	Food and drug administration
FP	Forward primer
GAG	Glycosaminoglycan
Gly	Glycine
GST	Glutathione-S-transferase
GTP	Guanosine-5'-triphosphate
HBV	Hepatitis B virus
HCC	Hepatocellular carcinoma
HCV	Hepatitis C virus
HIV	Human immunodeficiency virus
HLA	Human leukocyte antigen
HVR	Hypervariable region
IFN	Interferon
IFN- α	Interferon alpha
Ig	Immunoglobulin
IL	Interleukin
IPTG	Isopropylthio- β -D-galactoside
IRES	Internal ribosome entry site
JAK	Janus-activated kinase
Kb	Kilo base
kDa	Kilo Dalton
LB medium	Lauria-Bertani medium
LDL	Low-density lipoprotein
LDL-R	Low-density lipoprotein receptor
LVL	Low viral load
mRNA	Messenger RNA
MW	Molecular weight
NBT	Nitro blue tetrazolium
NIH	National institutes of health

NP-40	Nonidet p-40
NPC1L1	Niemann–Pick C1-like 1
NS	Non-structural
nt	Nucleotide
NTRs	Non translated regions
OCLN	Occludin
OD	Optical density
ORF	Open reading frame
PAGE	Polyacrylamide gel electrophoresis
PBS	Phosphate buffered saline
PBS-T20	Phosphate buffered saline tween 20
PCR	Polymerase chain reaction
PEG	Polyethylene glycol
PEG-IFN	Polyethylene glycol interferon
PM	Plasma membrane
PMSF	Phenylmethylsulfonyl fluoride
PNPLA3	Patatin-like phospholipase domain-containing protein 3
PNPP	P-nitrophenyl phosphate
QRT-PCR	Quantitative reverse transcriptase polymerase chain reaction
RBV	Ribavirin
RDP	Ribavirin 5'-diphosphate
RdRp	RNA dependent RNA polymerase
RMP	Ribavirin 5'-monophosphate
RNA	Ribonucleic acid
RnaseA	Ribonuclease A
RP	Reverse primer
rpm	Revolution per minute
RTKs	Receptor tyrosine kinases
RTP	Ribavirin 5'-triphosphate
RVR	rapid virological response
SD	Standard deviation

SDS	Sodium dodecyl sulfate
<i>Sj</i>	<i>Schistosoma japonicum</i>
SoC	Standard of care
SR-BI	Scavenger receptor B type I
SS	Single strand
STAT	Signal transducers and activators of transcription
STE	Saline-Tris-EDTA
SVR	Sustained virological response
TAE	Tris-Acetate-EDTA
TGF B1	Transforming growth factor B1
TH	T-helper
TMA	Transcription mediated amplification
TMD	Transmembrane domain
tRNA	Transfer RNA
U	Uracil
UTRs	Untranslated regions
V/V	Volume per volume
W/V	Weight per volume
WHO	World health organization
X-gal	5-Bromo-4-Chloro-3-indolyl- β -D-galactoside

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