Dedication

This thesis is dedicated to
my family, Changlu Liu, Shuqin Jia, Tai Liu,
and my dearest husband, Zhiping Wang
With my deepest love and gratitude.
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List of Abbreviation

bp  base pair
CFU  Colony forming units
CMI  Cell mediated immunity
ELISA  Enzyme-linked immunosorbant assay
EM  Electron microscopy
Hsp(s)  Heat shock protein(s)
Ig  Immunoglobulin
IFN  Interferon
i.p.  intraperitoneal
kDa  kilodalton
LPS  lipopolysaccharide
MHC  Major histocompatibility complex
PBS  Phosphate buffered saline
PCR  Polymerase chain reaction
SDS-PAGE  Sodium eodecyl sulfate polyaclylamyde gel electrophoresis
SOD  Superoxide dismutase
TBS  Tris buffered saline
TSA  Trypticase soy agar
TSB  Trypticase soy broth
Tween-20  Polyoxyethylene 20 - sorbitan monolaurate
µm  micrometer
µl  microliter