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***IMMUNOLOGICAL ROLE OF ORAL MUCOSA AGAINST CANDIDIASIS
IN HUMAN AND DOMESTICATED CATS***

A Thesis

Submitted to the Council of College of Veterinary Medicine at the
University of Diyala in partial of the requirements for the degree of
Master of Sciences in Microbiology

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

{ فَتَعَالَى اللَّهُ الْمَلِكُ الْحَقُّ وَلَا تَعْجَلْ بِالْقُرْآنِ مِنْ قَبْلِ
أَنْ يُقْضَىٰ إِلَيْكَ وَحْيُهُ وَقُل رَّبِّ زِدْنِي عِلْمًا }

صدق الله لعظيم

Dedications

To my parents who are generous enough to provide me with all kinds of support and love.....

To my brother the ever best companions

To my lovely sister, Meissaa for all her gentle support ...

Finally, I dedicate this thesis to all who have given me hand throughout my studying career.....

Teeba

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Teeba

Supervisor Certification

We certify that this thesis entitled (**Immunological Role of Oral Mucosa against Candidiasis in Human and Domesticated Cats**) was prepared by (**Teeba Muthana Mohamed**) under our supervision at Department of Microbiology / College of Veterinary Medicine / University of Diyala in as partial fulfillment of the requirements for the Degree of Master of Science in Veterinary Microbiology.

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ABSTRACT

Candida albicans is an opportunistic fungus that infects the mucosa of oral cavity. Oral candidiasis remains one of the most common forms of *Candida* infections. This study is carried out in the laboratory of microbiology department, College of Veterinary Medicine- Diyala University to compare density of *C. albicans* infection between cats and human. Oral samples were collected from human oral mucosa and domestic cats oral mucosa during December 2018- February 2019 to isolate *C.albicans* . The results of study based on the analysis of three groups ,six mice in each group: control (not infected), mice injected with human candida and mice group with cats candida respectively. These groups are divided depends on the time of blood serum and tissue biopsy collection (6 ,24 hours and 10 days) after the mice were injected with *Candida*.

The study measures levels of IL-17, HMGB1 and G-CSF level in blood sampels and tissue biopsy. The concentration of IL-17 in a group of mice injected with isolated *Candida* from mouth of human (G2) shows a significant increase at ($P\leq 0.05$) and this elevation is shown in the two times of draw (24h and 10 days), while The concentration of IL-17 in the mice injected with isolated *Candida* from mouth of human (G2) shows significant increase at ($P\leq 0.05$) and this elevation is shown in the two times periods of tissue biopsy collection (6h and 24h).While the higher increase in the levels of serum HMGB-1 recorded in mice at 6h and 24h (636.41 ± 321.04 and 616.69 ± 240.26) ng/mL after being injected with isolated *Candida* from mouths of cats. On the other hand the result of the concentration of G-CSF in tissue biopsy shows decrease at 10 days compared with control group. In conclusion there are different effects of candida in immunity stimulation of mice injected with *Candida albicans*.

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List of Abbreviations

Abbreviation	Meaning
GIT	Gastrointestinal tract candidiasis
OPC	Or opharyngeal candidiasis
DCs	Dendritic cells
VVC	Vulvovaginal candidiasis
PAMPs	associated molecular patterns -Pathogen
PMNLs	polymorphonuclear leukocytes
SAD	Sabouraud agar media
PBS	Phosphate buffer saline
H&E	Hematoxylin and Eosin stain
HMGB-1	High mobility group protein Box-1
IL-17	Interleukin 17
G-CSF	Granulocyte colony stimulating factor
D. w.	Distal water

Contents

OD	Optical density
ICUs	intensive care units
PRRs	pattern-recognition receptors
PCR	polymerase chain reaction
RT-PCR	real-time polymerase chain reaction
REA	restriction endonuclease enzyme analysis
RFLP	restriction fragment length polymorphism
MLST	multilocus sequence typing
SAPS	secretory aspartate proteases
PFGE	pulsed field gel electrophoresis
TLR2	Toll-like receptor-2
TLR4	Toll-like receptor-4
NADPH	Nicotinamide adenine dinucleotide phosphate
ELISA	Enzyme Linked Immune Sorbent Assay technique

CHAPTER ONE

INTRODUCTION

Chapter one: Introduction

1.1.Introduction

The oral cavity is a place where different type of microorganisms be found as viruses, bacteria, fungus, and protozoa. This area provide a good environment for growing of different microorganisms. These microorganisms could cause disease, when they have opportunities (Olsen *et al*, 2010).

One of the microorganisms is *Candida albicans* which found normally in mouth, upper respiratory tract, female genital tract and gastrointestinal tract, d (Coronado-Castellote *et al*, 2013). Oral candidiasis is the disease that caused by opportunity of *C.albicans*. The Oral candidiasis lesion differ in size, colour and shape in oral cavity . It can cause superficial and serious systemic disease in immune compromised patients (Alka Nerurkar *et al* , 2012).

From 1995, *Candida* species was the fourth most common to cause nosocomial blood stream infection related with highest mortality (Anurage *et al*, 2005). *Candida* has effective virulence factored (biofilms) made it to colonize and cause an infection by damaging membrane and extracellular proteins and enhancing entrance of *Candida* to the host and coating with platelet in this impaired immune system (Ramage *et al*, 2005), it is found in about 70% in human leading to cause disease for immune compromised patients as diabetic patients, HIA patients and chemotherapy patients (Sudbery *et al.*, 2004).

1.2. Aim of the study :

The aim of the study was to compare density of infection and virulence, histopathological changes and level of IL-17, HMGB-1 and G-CSF of *C.albicans* isolates from human and cats oral cavity and injected in mice.