CELL ADHESION MOLECULES

THESIS

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M.Sc. Degree in Dermatology and Venereology

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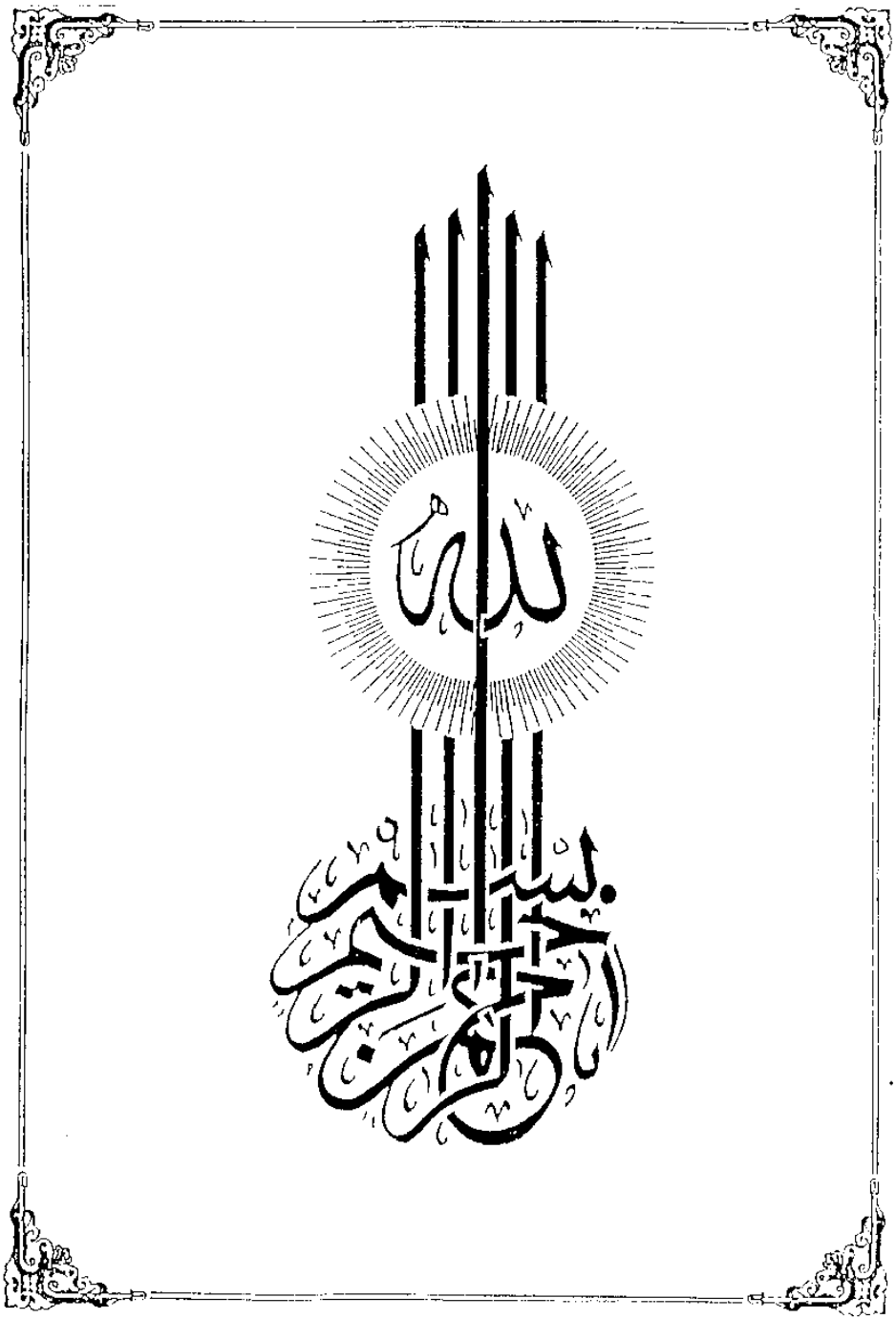
بسم الله الرحمن الرحيم

« ربِّ أوْزِعنى أن أشْكُرَ نِعـمْتَكَ الَّتى أنـعـمتَ علىَّ وعلى والدىّ وأن أعـمل صـالحًا ترضـاهُ وأدْخلنى برحمتكَ فى عبادِكَ الصَّالحين »

صدق الله العظيم

سورة النمل ، آية (١٩)



To ...

My parents,

My husband,

My lovely son.

ACKNOWLEDGEMENT

*First I thank "**ALLAH**" for granting me the power to accomplish this work.*

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Hala Sobhy

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LIST OF ABBREVIATIONS

ACAM	Adherens junction-specific cell adhesion molecule
BCCs	Basal cell carcinomas
BL	Burkitt's lymphoma
CAM	Cell adhesion molecule
CD_2	Common differentiation antigen 2
CFx	Coagulation factor X
CO	Collagen
EBV	Epstein-Barr virus
EC	Endothelial cells
E-cadherin	Epithelial cadherin
ELAM-1	Endothelial leukocyte adhesion molecule-1
FB	Fibrinogen
FDEs	Fixed drug eruptions
FN	Fibronectin
GMP-140	Granule membrane protein 140
GP	Glycoprotein
GVHD	Graft-vs-host disease
HCL	Hairy cell leukemia
HEV	High endothelial venule
ICAM	Intercellular adhesion molecule
IFN-α	Interferon alpha
IFN-γ	Interferon gamma
IL-1	Interleukin-1
LAD	Leukocyte adhesion deficiency disease
LAK	Lymphokine-activated killer cells
LCAM	Liver cell adhesion molecule
LFA-1	Leukocyte function antigen 1

LM	Laminin
LPS	Lipopolysaccharide
mAb	Monoclonal antibodies
Mac-1	Macrophage activation antigen 1
MAG	Myelin-associated glycoprotein
N-cadherin	Neural cadherin
NCAM	Neural cell adhesion molecule
NK	Natural killer
P	Polypeptide
P-cadherin	Placental cadherin
PG	Platelet glycoprotein
RGD	Tripeptide sequence arginine-glycine-aspartic acid
SICAM-1	Soluble intercellular adhesion molecule-1
SLE	Systemic lupus erythematosus
SSc	Systemic sclerosis
TAG-1	Transient axonal glycoprotein-1
TNF	Tumor necrosis factor
VCAM	Vascular cell adhesion molecule
VLA	Very late activation
VN	Vitronectin
vWF	von Willebrand factor

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Introduction and Aim of the Work

INTRODUCTION AND AIM OF THE WORK

Multicellular organisms require efficient mechanisms by which information can be transmitted between cells. In order to exchange information, cells interact in a variety of ways. Often intercellular communication is mediated by soluble factors. Such factors can regulate the transmission of information between cells situated close to each other or even between widely separated cells. A variety of cellular interaction, including some interactions of the immune system, require direct, intimate contact between cells (*Katz et al.*, 1991). Recently, a class of molecules collectively known as cell adhesion molecules, have been shown to be a principal mechanism of both cell-cell and cell-matrix interactions. Cell adhesion molecules are cell surface proteins possessing unique specificities that allow them to interact selectively with ligands. Such ligands may be other CAMs or matrix proteins.

Cell adhesion molecules can be broadly grouped into four distinct families: integrins, the immunoglobulin gene family, cadherins, and the more recently identified family of lectin-like glycoproteins (*Konter et al.*, 1989). Cell adhesion molecules are implicated in various pathologic conditions as systemic sclerosis, vitiligo, rhinovirus infection and

leukocyte adhesion deficiency disease. Cell adhesion molecules are important in the initiation and maintenance of inflammatory responses in allergic contact dermatitis, lichen planus, Pemphigus vulgaris and viral exanthema (*Vejlsgaard et al.*, 1989). Although no direct link between cell adhesion molecules and malignancy has been established, the ability of the immune system to destroy neoplastic cell is partly dependent on cytotoxic events that require CAMs for effector cell-target cell binding. CAMs may also play a role in the localization and behavior of neoplastic cell. Moreover, it has been suggested that CAMs are an important factor in determining the site-specificity of metastatic disease (*Zetter*, 1990).

The aim of this thesis is to spotlight on the structural and functional properties of the major cell adhesion molecules, as they pertain to immunoregulation and to describe how certain cell adhesion molecules are implicated in various malignancies, inflammatory dermatoses and other pathologic conditions.

Review of Literature

DEFINITION AND CLASSIFICATION

The attachment of cells to their surrounding is important in determining cell shape and in maintaining proper cell function and tissue integrity. Such binding positional signals that direct cellular traffic and differentiation. Most cells posses multiple mechanisms for binding to the structures that surround them. For example they can bind extracellular matrices or to other cells (*Ruoslahti and Pierschbacher*, 1987).

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