UPDATE OF IMMUNOLOGY AND MOLECULAR BIOLOGY IN HEAD AND NECK CANCER

Essay

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The Master Degree
In
Otolaryngology

By

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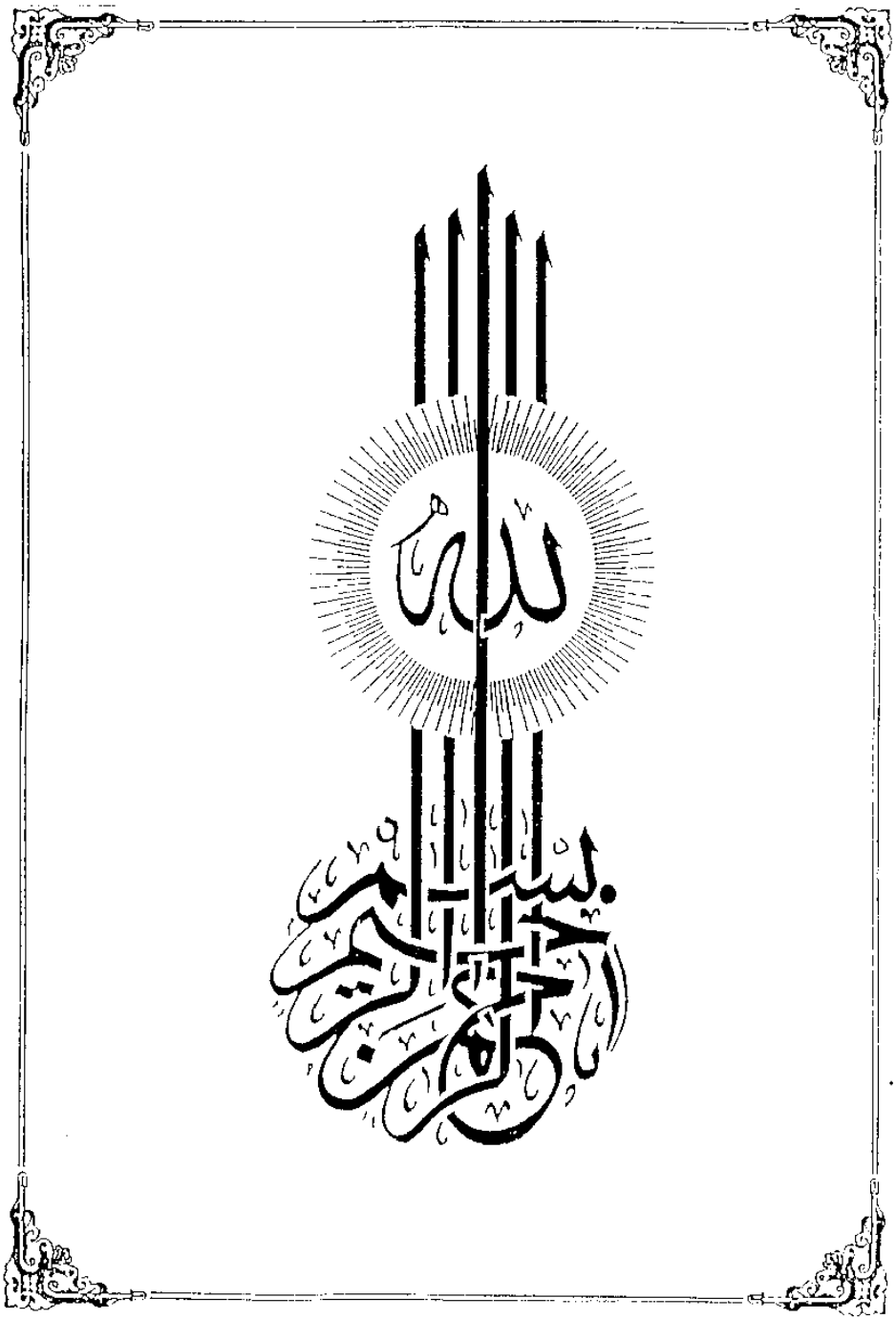
بسم الله الرحمن الرحيم

﴿سنريهم آياتنا في الآفاق وفي أنفسهم حتى يتبين
لهم أنه الحق ، أولم يكف بربك أنه على كل شئ شهيد﴾

فصلت (٥٣)



Aknowledgement

Thanks to God first, who guides me throughout my life and inspite of my shortening who never left me alone.

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Mabrouk Abou Khelewa

CONTENTS

LIST OF ABBREVIATIONS

Antibody dependent cell mediated cytotoxicity	*(ADCC)*
Carcino-embryonic antigen	*(CEA)*
Cellular adhesion molecule	*(CAM)*
Cellular oncogene	*(C-ONC)*
Complement 9	*(C9)*
Cytotoxic T cell	*(TC)*
Epestein Barr virus	*(EBV)*
Epidermal Growth Factor Receptor	*(EGFR)*
Guanisin triphosphatase Z	*(GTP- ase)*
Human leukocyte Antigen System	*(HLA)*
Human T lymphocyte virus	*(HTLV)*
Immunoglobulin	*(IgG)*
Intercellular adhesion molecule I	*(ICAM1)*
Interferon gamma	*(IFN-γ)*
Interleukin **I, II, III, IV, V**	*(IL-1)*
Long arm of chromosome	*(q)*
Lymphocyte Function associated antigen	*(LEA-1)*
Lymphokin 4	*(CD4)*
Lymphokine Activated Killer cell	*(LAK)*
Macrophage Activating Factor	*(MAF)*
Major histocompetability complex	*(MHC)*
Messenger RNA	*(mRNA)*
Monoclonal antibody	*(MOB)*
Natural Killer cells	*(NK)*
Platelet derived growth Factor	*(PGF)*
Polymerase chain Reaction techniqu	*(PCR)*

Restriction Fragement Length Polymorphism	***(RELP)***
Short arm of chromosome	***(p)***
Squamous cell carcinoma of head and neck.	***(SCCHN)***
T cell Receptor gene	***(TCR)***
T heleper cells 0,1,2	***(TH 0,1,2)***
Transforming Growth Factor	***(TGF-B)***
Tumour infiltrating lymphocyte	***(TIL)***
Tumour Necrosis Factor Alpha	***(TNFα)***
Tumour Necrosis Factor Beta	***(TNF-B)***
Viral oncogene	***V-onc)***

FOREWORD AND AIM OF THE WORK

Cancer is the second most frequent cause of death in the world. Enormous amount of money has been spent to find ways to cope with different disease (Berlinger, 1974).

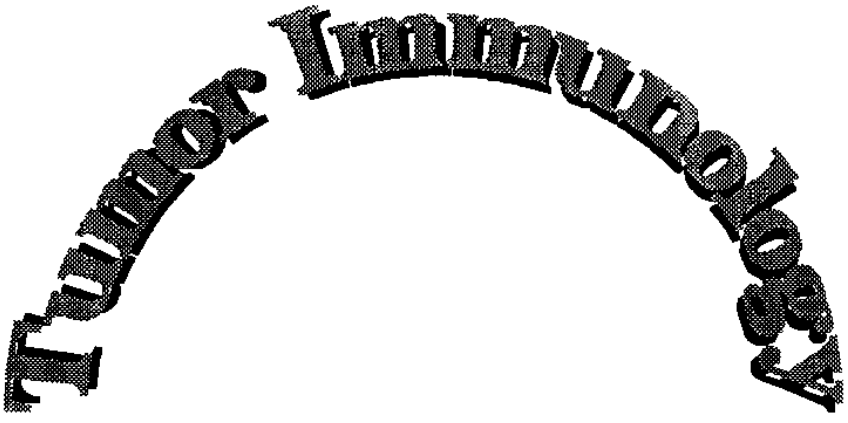
One of the most recent ways is the study of tumour immunology role in tumour pathogenesis. Tumour immunology is the study of the antigenic properties of the trasformed cells, the host immune response to these tumour cells, the immunologic consequences of the growths of malignant cells in the host, and the means by which the immune system can be modulated to recognize tumour cells, promote tumour eradication and prevent outgrowth of malignant cells (Berlinger, 1974).

Aim Of The Work:

The aim of this essay is to review the recent literature about immunology and molecular biology in head and neck malignancy which will be discussed under the following two parts:

Part 1: Tumour Immunology; including: tumour antigens, immunologic effector mechanisms against tumour cells, and escape mechanism.

Part 2: Molecular Biology; including: protein synthesis, proto-oncogene and oncogene, peptide growth factors, tumour markers, and gene therapy.



Chapter One :_

TUMOUR IMMUNOLOGY

INTRODUCTION:

Tumour immunology is the study of :

1- The antigenic properties of transformed cells .

2- The host immune response to tumour cells .

3- The immunologic consequence of the growth of malignant cells on the host.

4- The means by which the immune system can be modulated to recognize tumour cells and promote tumour eradication.

One potentially important function of the immune system is to promote protection from the outgrowth of malignant cells (Bishob, 1985).

This represents a formidable task because tumour cells have many similarities to normal cells, despite exhibiting abnormal properties to proliferate, to spread in the host, and to interfere with normal organ function, thus, these tumour cells present a special problem to the host immune system (Bishob, 1985).

Elucidating the process that renders the cancerous cells different from normal cells should aid in understanding how these transformed cells might be amenable to destruction and regulation by the immune system (Boon et al., 1992).

The transformation of normal cells to malignant cells can result from a variety of different causes, the particular nature of which may help determine whether the immune system can control the outgrowth of the tumour cells or not. These transforming events may occur spontaneously by random mutation or gene rearrangement, alternatively they may be induced by chemical, physical or viral carcinogens. (Klein et al., 1966)

A- Chemeical Carcinogens:

Tumours induced by chemical carcinogens were initially described in 18th century, when chimney sweepers were observed to have an unusually high incidence of cancer scrotum. Polycyclic aromatic hydrocarbons in soot and tar have since then been considered to be a major class of carcinogens, and retention of tar in the wrinkles of scrotum was apparently responsible for these tumours. The aromatic amines are also a major class of carcinogens. This was identified following the observation of high frequency of bladder cancer among factory workes

using aniline dyes. The mutagenic activity of these compounds is the possible mechanism of carcinogenesis (Bishob, 1985).

B- Physical carcinogens:

Physical carcinogenesis was discovered in the late 19th century following the discovery of X-ray and radioactivity. Many of the early radiologists developed skin cancer but the most dramatic evidence of radiation-induced carcinogenesis is in survivors of the atomic bomb explosions in Japan who demonstrated an increased incidence of a wide range of tumours for more than twenty years after the nuclear holocaust . Such ionizing radiation directly injures cellular DNA resulting in mutation, chromosomal breaks, and abnormal rearrangement (Klein et al., 1966).

C- Viral Carcinogens:

Viral oncogenesis is of particular interest in tumour immunology because of the great likelihood that cells transformed by the introduction of viral genes will express new virus associated antigen that can be recognized by the immune system (Urban et al., 1992).