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بسم الله الرحمن الرحيم

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

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بالرسالة صفحات لم ترد بالاصل

HEARING LOSS AND GENETICS IN HUMANS

AN ESSAY

Submitted in partial fulfillment of Master's Degree In Audiology

BY

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القسم العلمي

محضر

اجتماع لجنة الحكم على الرسالة المقدمة من

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في [illegible]

عنوان : باللغة الانجليزية : Hearing Loss & Genetics in Humans

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بناء على موافقة الجامعة بتاريخ ٢٠ / ٢ / ٢٠٠٢ تم تشكيل لجنة الفحص والمناقشة للرسالة المذكورة أعلاه على النحو التالي :-

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وقد فحص الرسالة بواسطة كل منهم منفردا وكتابة تقارير منفردة لكل منهم ثم انعقدت اللجنة مجتمعة في يوم الاثنين بتاريخ ٢٠ / ٣ / ٢٠٠٢ بقسم السمعيات مدينة العباسية القاهرة كلية الطب – جامعة القاهرة وذلك لمناقشة الطالب في جلسة علنية في موضوع الرسالة والنتائج التي توصل اليها وكذلك الأسس العلمية التي قام عليها البحث .

قرار اللجنة : [illegible]

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Abstract

The academic basis of Mandel's inheritance patterns, chromosomes, molecular biology science and technology were the basis to decipher causes and types of genetic mutations, prospectives of the international gene project as well as gene mapping. The clinical aspect of the study included definition of genetic hearing loss, prevalence and the clinical presentation in all ages with special details of the commonest classifications. Combined clinical biology and biomolecular technology aspects in identifying genes with special details about connexin 26 expression and functions were detailed. The last chapter included clinical and laboratory diagnosis and Future insight in gene therapy.

Key Words

Gene – Extrons – Introns – Mutations – Hearing loss – Nucleic Acid – Molecular Biology Technology – Molecular Biology Diagnosis – Chromosomes – Genetic Engineering – Deafness – Syndrome – Genetic counseling – Gene therapy – Connexines

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LIST OF ABBREVIATIONS

A	Adenine
ASHG	American Society of Human Genetics
Bp	Base pair
C	cytosine
COL IA2	Collagen type I, -2 chain
COL	Collagen
D	Deaf (moderate)
d	Deaf (severe to profound)
DNA	deoxyribonucleic acid
EEG	Electroencephalogram
FAD	Flavine adenine dinuclotide
G	Guanine
HL	Hearing loss
HSCR	Hirshsprung Disease
IDEA	Individual with disability education acts
IRP	Institutional Review Board
Kbp	Kilo pair
LINES	Long interspersed
m RNA	Messenger RNA
NAD	Nicotineamide dinuclotide
P	Long arm of chromosomes
PCR	Polymerase chain reaction
PPR	Progressive pigmentary retinopathy
q	short arm of chromosomes
r RNA	ribosomal RNA
RFLP	Restriction fragment length polymorphism
RNA	ribonucleic acid
SINES	Short interspersed repeats
SNHL	Sensorineural hearing loss
STL	Stickler syndrome
t RNA	transfer RNA
T	Thymine
USH	Usher
VNTRs	variable number tandem repeats
WS	Waardenburg syndrome

INTRODUCTION

Genetic hearing loss approximately accounts for fifty percent of all childhood deafness. A large size of genetic cases is reported, as the cause is unknown because the pedigree may not be obvious.

Hearing loss may cause infants and toddlers to be at risk for speech and language impediments. This makes them feel frustrated, angry, or isolated from their family, peers, and community.

The clinical spectrum of inherited deafness is broad and ranges from simple deafness without other clinical abnormalities to genetically determined syndromes affecting several different body systems in which deafness is only one of many signs, which together comprise the syndrome *(Willems, 2000).*

Understanding of the academic basis of biochemistry molecular biology together with appropriate investigation may be of great help to reach diagnosis to choose the specific investigation needed and hence therapy.

AIM OF THE WORK

To study

1- the biochemical basis for genetic diseases for hearing loss.

2- the applications of molecular genetics to understand heritable hearing loss and to use these advances in the practice of medicine.

3- to focus on the approaches to diagnosis, genetic counseling.

4- screening of individuals at risk for genetic diseases which have been revolutionized by the application of molecular genetics.

HISTORICAL BACKGROUND OF INHERITANCE (GENETICS)

There has been a growing recognition of the influence of genetic factors in human diseases. At the same time revolutionary developments have occurred in the basic science of genetics.

Principles of hereditary, Mandel's law, were first declared 1903 sixteen years after his death. He described dominant and recessive traits as well as the laws of homozygous and heterozygous. The pairing and splitting of chromosomes at cell division was proposed in 1903. The materials of chromosomes were found to be composed of DNA and protein. Tatium and Leadcerberg discovered that the genetic information was carried and transmitted through DNA protein, deoxynucleoprotein, in 1946. Franklin invited X-ray crystallography for DNA was invited in 1950 by Franklin. Crick and Watson received Nobel Prize in 1962 for their proposal of the double helical structural formula and the base pairing role of DNA in 1953, while RNA has only one strand.

Chromosome duplication and cell division was further discovered to be caused by DNA replications. This DNA replication is a complex biochemical process involving many enzymes including DNA polymerase and RNA polymerase [discovered in 1958 and 1966] respectively. Another Nobel Prize for molecular biologists was awarded in 1978 for Hamilton and Daniel for their discovery of restriction endo-nucleases and ligases enzymes.

Important steps in molecular biology (biomedical engineering), was the laboratory ability to determine the base sequence of RNA [Northern blot] and the amino acid sequence of proteins [Western blot]. These sequences in terminology because DNA leads to 3 RNAs synthesis which in turn lead to protein synthesis *(Sandra et al.,1999).*

Thus human genetic studies had been involved through three complementary systems.