



**Study of the Effect of LHRH  
Analogue in Autistic Children and  
Adolescents; Diagnostic and  
Therapeutic Implications**

*Thesis*

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Pediatrics*

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

# قالوا

لسبب أنك لا تعلم لنا  
إلا ما علمتنا إنك أنت  
العليم العظيم

صدق الله العظيم

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## *List of Abbreviations*

<b>Abb.</b>	<b>Full term</b>
µIU .....	Milli-international units
2D:4D .....	second and fourth digit
5-HT1A.....	serotonin type 1A
ABA .....	Applied behavior analysis
ACC .....	anterior cingulate cortex
ADDM .....	Autism and Developmental Disabilities Monitoring
ADHD.....	attention-deficit hyperactivity disorder
AMH .....	Anti-Mullerian Hormone
APA .....	American Psychiatric Association
AS .....	Asperger's syndrome
ASD .....	Autism spectrum disorder
ATEC.....	Autism Treatment Evaluation Checklist
atm .....	atmosphere
BA.....	Bone age
BMI .....	Body mass index
CAH.....	congenital adrenal hyperplasia
CAM .....	Complementary and Alternative Medicine
CARS.....	Childhood Autism Rating Scale
CARS-2.....	Childhood Autism Rating Scale - Second Edition
CBT .....	<u>Cognitive Behavioral Therapy</u>
CDC.....	Centers for Disease Control and Prevention
CMA .....	chromosomal microarray
D2 .....	dopamine type 2
DHEA.....	dehydroepiandrosterone
DHT.....	Dihydrotestosterone
DNA.....	Deoxyribonucleic acid

DSM-5 ..... Diagnostic and Statistical Manual, Fifth Edition

## *List of Abbreviations Cont...*

<b>Abb.</b>	<b>Full term</b>
DSM-IV .....	Diagnostic and Statistical Manual, fourth edition
DSM-IV-TR .....	Diagnostic and Statistical Manual, fourth edition text revised
EEG .....	electroencephalography
ESAT .....	Early Screening of Autistic Traits
FBA .....	functional behavioral analysis
FDA .....	Food and Drug Administration
fE .....	Fetal estrogen
FG .....	fusiform gyrus
fMRI .....	functional MRI
FSH .....	follicle-stimulating hormone
fT .....	fetal testosterone
G .....	Genital
GABA .....	Gamma aminobutyric acid
GARS-3.....	Gilliam Autism Rating Scale Third Edition
GFCF .....	Gluten free casein free
GI.....	Gastr0intestinal
GnRH .....	gonadotropin-releasing hormone
HBOT .....	Hyperbaric oxygen treatment
HPG.....	hypothalamic-pituitary-gonadal
HS.....	Highly significant
IFG .....	inferior frontal gyrus
IgA.....	Immune globulin A
IgG.....	Immune globulin G
IL .....	Interleukin
IQ.....	Intelligence quotient

IQR ..... Interquartile range  
ISB..... inappropriate sexual behavior

*List of Abbreviations Cont...*

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Abb.	Full term
KSA .....	Kingdom of Saudi Arabia
Lab .....	Laboratory
LH.....	luteinizing hormone
LHRH.....	luteinizing hormone releasing hormone
LKS .....	Landau-Kleffner syndrome
M-CHAT-R/F.....	Modified Checklist for Autism in Toddlers, Revised with Follow-Up
MECP2 gene .....	methyl CpG binding protein 2
MEG .....	magnetoencephalography
ml.....	millilitre
MNS .....	mirror neuron system
MOAS.....	modified overt aggression scale
mPFC .....	medial prefrontal cortex
MPH .....	Methylphenidate
MRI .....	Magnetic Resonance Image
NA .....	Not applicable
NCBRF.....	Nisonger Child Behavior Rating Form
NLD.....	Nonverbal learning disorder
NMDA .....	N-methyl-D-aspartate
NS.....	Non-significant
NT-3 .....	neurotrophin-3
OCD.....	Obsessive-compulsive disorder
PDD-NOS.....	Pervasive developmental disorder not otherwise specified
pg.....	picogram
PH.....	Pubic hair
S.....	Significant

SD..... Standard deviation  
SDS..... Standard deviation score

*List of Abbreviations Cont...*

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Abb.	Full term
SMR.....	sexual maturity ratings
SNRI.....	serotonin norepinephrine reuptake inhibitors
SSRI .....	Selective serotonin reuptake inhibitors
STAT .....	The Screening Tool for Autism in Toddlers and Young Children
STS .....	superior temporal sulcus
TEACCH .....	Treatment and Education of Autistic and Related Communication Handicapped Children
TMS .....	Transcranial magnetic stimulation
ToM .....	theory of mind
TSC.....	Tuberous sclerosis complex

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## INTRODUCTION

**A**utism spectrum disorder (ASD) is a biologically based neuro developmental disorder characterized by impairments in two major domains; deficits in social communication and social interaction and restricted repetitive patterns of behavior, interests and activities (*American Psychiatric Association, 2013*).

The pathogenesis of autism is still not fully understood and is still a subject for research. Symptoms of ASD most commonly are recognized in the second year of life (*Landa et al., 2013*).

Aggression and self-injurious behaviors (SIB) are among the manifestations of behavioral impairment in autism and are often the cause for urgent psychiatric referral. When present, aggression and SIB may be both dangerous and distressing for affected children and their families (*Parikh et al., 2008*).

Approximately 75% of people with ASD display some kind of sexual behavior and most masturbate (*Sullivan & Caterino, 2008*).

A male predominance has been found in the diagnosis of autism (*Fombonne, 2005*), with male: female ratios of 4.5:1 (*Baio et al., 2018*). This has been explained by structural brain differences associated with high levels of fetal testosterone (*Herbert et al., 2005*). Also patients may have lower than