



شبكة المعلومات الجامعية  
التوثيق الإلكتروني والميكروفيلم

# بسم الله الرحمن الرحيم



**MONA MAGHRABY**



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# جامعة عين شمس التوثيق الإلكتروني والميكروفيلم

## قسم

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**MONA MAGHRABY**



# **Expression of BECN1 gene in Acute Myeloid Leukemia: Association with Hematological and Clinical Parameters**

A Thesis

Submitted for Partial Fulfillment of Doctorate Degree  
in Clinical Pathology

By

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

# قالوا

لسببناك لا علم لنا  
إلا ما علمتنا إنك أنت  
العليم العظيم

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*✍ **Mohamed Moustafa Ahmed Abdelhamid***

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## List of Abbreviations

<b>Abbr.</b>	<b>Full-term</b>
<b>ACD</b>	: Autophagic cell death
<b>ALL</b>	: Acute lymphoblastic leukemia
<b>AML</b>	: Acute myeloid leukemia
<b>AML-RGA</b>	: AML with recurrent genetic abnormalities
<b>AMPK</b>	: AMP-activated protein kinase
<b>ANAE</b>	: Alpha-naphthyl acetate esterase
<b>APC</b>	: Antigen-presenting cell
<b>APL</b>	: Acute promyelocytic leukemia
<b>APTT</b>	: Activated partial thromboplastin time
<b>As<sub>2</sub>O<sub>3</sub></b>	: Arsenic trioxide
<b>ATG</b>	: Autophagy
<b>ATO</b>	: Arsenic trioxide
<b>ATRA</b>	: All-trans retinoic acid
<b>BARAD</b>	: $\beta$ - $\alpha$ repeat autophagy domain
<b>BCL10</b>	: B-cell CLL/lymphoma 10
<b>BCR</b>	: Breakpoint cluster region
<b>BH3D</b>	: BCL2 Homology 3 Domain
<b>BM</b>	: Bone marrow
<b>CBC</b>	: Complete blood count
<b>CBFB</b>	: Core-binding factor beta subunit
<b>CCD</b>	: Coiled-Coil Domain
<b>CD</b>	: Cluster of differentiation
<b>cDNA</b>	: Complementary DNA
<b>CEBP<math>\alpha</math></b>	: CCAAT-enhancer-binding protein alpha
<b>CMA</b>	: Chaperone-mediated autophagy
<b>CML</b>	: Chronic myeloid leukemia

<b>CNS</b>	: Central nervous system
<b>CR</b>	: Complete remission
<b>CRi</b>	: CR with incomplete recovery
<b>CRM1</b>	: Chromosomal maintenance protein 1
<b>CT</b>	: Cycle threshold
<b>CTL</b>	: Cytotoxic T lymphocyte
<b>D28</b>	: Day 28 of induction chemotherapy
<b>DAPK</b>	: Death-associated protein kinase
<b>del</b>	: Deletion
<b>DIC</b>	: Disseminated intravascular coagulation
<b>DNA</b>	: Deoxyribonucleic acid
<b>DNMT3A</b>	: DNA methyltransferase 3 alpha
<b>DRP-1</b>	: DAPK related protein kinase
<b>EMT</b>	: Epithelial-to-mesenchymal transition
<b>ENL</b>	: Eleven nineteen leukemia
<b>ER</b>	: Endoplasmic reticulum
<b>ERGIC</b>	: ER-Golgi intermediate compartment
<b>FAB</b>	: French American British classification
<b>FCM</b>	: Flow cytometry
<b>FHD</b>	: Flexible Helical Domain
<b>FISH</b>	: Fluorescence in situ hybridization
<b>FITC</b>	: Fluorescein isothiocyanate
<b>FLT3</b>	: FMS-like tyrosine kinase-3
<b>FPD</b>	: Familial platelet disorder
<b>GCs</b>	: Glucocorticoids
<b>gDNA</b>	: Genomic DNA
<b>GR</b>	: Glucocorticoid receptor
<b>Hb</b>	: Hemoglobin
<b>HIF-1</b>	: Hypoxia inducible factor-1
<b>HLA-DR</b>	: Human leukocyte antigen- antigen D related

<b>HPV</b>	: Human papilloma virus
<b>HS</b>	: Highly significant
<b>HSCs</b>	: Hematopoietic stem cells
<b>HSPCs</b>	: Hematopoietic stem and progenitor cells
<b>IDR</b>	: Intrinsically disordered region
<b>inv</b>	: Inversion
<b>IPT</b>	: Immunophenotyping
<b>IQR</b>	: Interquartile range
<b>ITD</b>	: Internal tandem duplication
<b>K2-EDTA</b>	: Ethylene diamine tetra-acetic acid dipotassium salt
<b>KRAS</b>	: Kirsten RAS oncogene
<b>LC3</b>	: Light Chain 3
<b>LDH</b>	: Lactate dehydrogenase enzyme
<b>LKB1</b>	: Liver kinase B1
<b>LSI</b>	: Locus specific identifier
<b>MCL1</b>	: Induced myeloid leukemia cell differentiation protein
<b>MDR-1</b>	: Multidrug resistance-1
<b>MDS</b>	: Myelodysplastic syndrome
<b>MLL</b>	: Mixed lineage leukemia gene
<b>MM</b>	: Multiple myeloma
<b>MoAbs</b>	: Monoclonal antibodies
<b>MPAL</b>	: Mixed phenotype acute leukemia
<b>MPNs</b>	: Myeloproliferative neoplasms
<b>MPO</b>	: Myeloperoxidase
<b>MRD</b>	: Minimal residual disease
<b>mRNA</b>	: Messenger RNA
<b>mtDNA</b>	: Mitochondrial DNA
<b>mTORC1</b>	: Mammalian target of rapamycin complex 1
<b>MYH11</b>	: Myosin heavy chain 11 gene
<b>Na F</b>	: Sodium fluoride

<b>NEC</b>	: Non-erythroid cells
<b>NES</b>	: Nuclear export signal
<b>NOS</b>	: Not otherwise specified
<b>NPM</b>	: Nucleophosmin
<b>NRAS</b>	: Neuroblastoma RAS oncogene
<b>NS</b>	: Non- significant
<b>NSE</b>	: Non-specific esterase
<b>OICD</b>	: Oncogene-induced cell death
<b>OIS</b>	: Oncogene-induced senescence
<b>p</b>	: Short arm of chromosome
<b>PAS</b>	: Periodic acid Schiff
<b>PB</b>	: Peripheral blood
<b>PCD</b>	: Programmed cell death
<b>PCR</b>	: Polymerase chain reaction
<b>PE</b>	: Phycoerythrin
<b>PI3K</b>	: Phosphatidyl-inositol-3 kinase
<b>PLT</b>	: Platelet
<b>PML</b>	: Promyelocytic leukemia
<b>PR</b>	: Partial remission
<b>PT</b>	: Prothrombin time
<b>PTMs</b>	: Post-translational modifications
<b>PTPN11</b>	: Protein tyrosine phosphatase non-receptor type 11
<b>PVDF</b>	: Polyvinylidene difluoride
<b>q</b>	: Long arm of chromosome
<b>qRT-PCR</b>	: Real-time quantitative polymerase chain reaction
<b>RARA</b>	: Retinoic acid receptor alpha
<b>Rb</b>	: Retinoblastoma gene
<b>RBC</b>	: Red blood cell
<b>RD</b>	: Resistant disease
<b>RHOA</b>	: Ras homolog family member

<b>RNA</b>	: Ribonucleic acid
<b>ROS</b>	: Reactive oxygen species
<b>rpm</b>	: Revolution per minute
<b>RQ</b>	: Relative quantification
<b>RT</b>	: Reverse transcriptase enzyme
<b>RUNX1</b>	: Runt-related transcription factor 1
<b>S</b>	: Significant
<b>SBB</b>	: Sudan Black B
<b>SD</b>	: Standard deviation
<b>SDS- PAGE</b>	: Sodium dodecyl sulfate polyacrylamide gel electrophoresis
<b>SPSS</b>	: Statistical package for Social Science
<b>STAT5</b>	: Signal transducer and activator of transcription 5
<b>t</b>	: Translocation
<b>TAM</b>	: Transient abnormal myelopoiesis
<b>t-AML</b>	: Therapy-related acute myeloid leukemia
<b>TdT</b>	: Terminal deoxynucleotidyl transferase
<b>TLC</b>	: Total leukocytic count
<b>TP53<sup>mut</sup></b>	: Mutant tumor protein p53
<b>TSC</b>	: Tuberous sclerosis complex
<b>UVRAG</b>	: UV radiation resistance-associated gene
<b>WBCs</b>	: White blood cells
<b>WHO</b>	: World health organization

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