



شبكة المعلومات الجامعية  
التوثيق الإلكتروني والميكروفيلم

# بسم الله الرحمن الرحيم



**MONA MAGHRABY**



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# شبكة المعلومات الجامعية التوثيق الإلكتروني والميكروفيلم



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# جامعة عين شمس

## التوثيق الإلكتروني والميكروفيلم

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**MONA MAGHRABY**



# **Evaluation of Retinal Toxicity by SD-OCT Due to Long-Term Exposure to Hydroxychloroquine among Rheumatoid Arthritis Patients**

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*Submitted for Partial Fulfillment of  
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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قالوا

سبحانك لا علم لنا  
إلا ما علمتنا إنك أنت  
العليم الحكيم

صدق الله العظيم

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# List of Abbreviations

Abb.	Full term
AAO .....	<i>American Academy of Ophthalmology</i>
ABW .....	<i>Actual body weight</i>
AMD .....	<i>Age-related macular degeneration</i>
AO-cSLO .....	<i>Adaptive optics confocal scanning laser ophthalmoscopy</i>
BCVA.....	<i>Best corrected visual acuity</i>
BMI.....	<i>Body mass index</i>
CCD .....	<i>Charged-coupled device</i>
CMT.....	<i>Central macular thickness</i>
COST.....	<i>Cone outer segment tip</i>
COX.....	<i>Cyclooxygenase</i>
cpRNFL .....	<i>Corresponding circumpapillary retinal nerve fiber</i>
cpTR .....	<i>Circumpapillary total retinal</i>
CQ.....	<i>Chloroquine</i>
CYP.....	<i>Cytochrome P450</i>
DCGI .....	<i>Drug Controller General of India</i>
DCP .....	<i>Deep capillary plexuses</i>
DMARDs .....	<i>Disease-modifying antirheumatic drugs</i>
EDI-OCT .....	<i>Enhanced depth imaging optical coherent tomography</i>
ELM.....	<i>External limiting membrane</i>
ERG .....	<i>Electroretinogram</i>
ETDRS .....	<i>Early treatment diabetic retinopathy study</i>
EZ .....	<i>Ellipsoid zone</i>
FAF .....	<i>Fundus autofluorescence</i>
FAZ.....	<i>Foveal avascular zone</i>
FDA .....	<i>Food drug administration</i>
FFA.....	<i>Fundus fluorescein angiography</i>
FLS.....	<i>Fibroblast-like synoviocytes</i>
GCIPL.....	<i>Ganglion cell inner plexiform layer</i>
GCL .....	<i>Ganglion cell layer.</i>
GFR .....	<i>Glomerular filtration rate</i>

# List of Abbreviations cont...

Abb.	Full term
HCQ.....	<i>Hydroxychloroquine</i>
HD-OCT .....	<i>High definition optical coherent tomography</i>
HEK .....	<i>Human embryonic kidney cells</i>
HLF .....	<i>Henle fiber layer</i>
HVF .....	<i>Humphrey visual field</i>
IBW.....	<i>Ideal body weight</i>
ICP.....	<i>Intermediate capillary plexuses</i>
ILM .....	<i>Internal limiting membrane</i>
INL .....	<i>Inner nuclear layer</i>
INL .....	<i>Inner nuclear layer</i>
IOP .....	<i>Intraocular Pressure Measurement</i>
IPM.....	<i>Interphotoreceptor matrix</i>
IRL.....	<i>Inner retinal layer</i>
IS/OS.....	<i>Inner segment \outer segment</i>
IZ .....	<i>Interdigitation zone</i>
mf-ERG.....	<i>Multifocal electroretinogram</i>
mGCC .....	<i>Macular ganglion cell complex</i>
mPGES1.....	<i>Microsomal prostaglandin E2 synthase 1</i>
mTR .....	<i>Macular total retinal</i>
MTX.....	<i>Methotrexate</i>
NAD .....	<i>No abnormality detected</i>
NIR.....	<i>Near-infrared reflectance</i>
OATP1A2 .....	<i>Organic anion transporting polypeptide 1A2</i>
OCTA.....	<i>Optical coherent tomography angiography</i>
ONL .....	<i>Outer nuclear layer</i>
OPL .....	<i>Outer plexiform layer</i>
ORL .....	<i>Outer retinal layer</i>
PGE2 .....	<i>Prostaglandin E2</i>
PR.....	<i>Projection resolved</i>
RA.....	<i>Rheumatoid arthritis</i>
RCO .....	<i>Royal Colleague of Ophthalmology</i>

# List of Abbreviations cont...

Abb.	Full term
<i>RGC</i> .....	<i>Retinal gangilion cell</i>
<i>ROS</i> .....	<i>Rod outer segment</i>
<i>RPCP</i> .....	<i>Radial peripapillary capillary plexus</i>
<i>RPE</i> .....	<i>Retinal pigment epithelium</i>
<i>RPE</i> .....	<i>Retinal pigment epithelium</i>
<i>SD</i> .....	<i>Standard deviation</i>
<i>SD-OCT</i> .....	<i>Speceral domain optical coherence tomography</i>
<i>SLE</i> .....	<i>Systemic lupus erthromatosis</i>
<i>SLO</i> .....	<i>Scanning-laser ophthalmoscopy</i>
<i>SVP</i> .....	<i>Superficial vascular plexus</i>
<i>T2DM</i> .....	<i>Type2Diabetes milliteus</i>
<i>TD-OCT</i> .....	<i>Time domain optical coherence tomography</i>
<i>TLRs</i> .....	<i>Toll-like receptors</i>
<i>TNF</i> .....	<i>Tumor Necrosis Factor</i>
<i>TR</i> .....	<i>Total retina</i>
<i>UCVA</i> .....	<i>Uncorrected visual acuity</i>
<i>UK</i> .....	<i>United Kingdum</i>
<i>US</i> .....	<i>United state</i>
<i>WHO</i> .....	<i>World Health Organisation</i>



# INTRODUCTION

Hydroxychloroquine is used increasingly in the management of a variety of autoimmune disorders, with well-established roles in dermatology and rheumatology and emerging roles in oncology. Hydroxychloroquine has demonstrated a survival benefit in patients with rheumatoid arthritis and systemic lupus erythematosus; some clinicians advocate its use in all such patients. However, Hydroxychloroquine and chloroquine (CQ) have been associated with irreversible visual loss due to retinal toxicity (*Yusuf et al., 2017*).

The prevalence of retinopathy in the studies using less advanced methods as fundoscopy, visual acuity, Amsler grid, and/or color vision assessments, had an estimated risk of hydroxychloroquine retinopathy ranging from 0.4% to 1.9%. In the studies that used modern standard screening modalities, the prevalence of hydroxychloroquine retinopathy ranged from 1.6% to 8.0% and was 5.2–7.5% in patients who were treated with hydroxychloroquine for >5 years. (*Eo et al., 2017*)

The prevalence of hydroxychloroquine retinopathy was 5.7-fold higher among patients whose average hydroxychloroquine daily dose was >5.0 mg/kg actual body weight (ABW) than in patients whose average daily dose was ≤5.0 mg/kg ABW (*Melles and Marmor, 2014*).