

Pathophysiology of Human Eye Diseases

**Navneet Nagpal,
Karan Sharma,
Md. Rageeb Md. Usman,
Manisha Arora**

SAS Publishers

(An International Publisher for Academic and Scientific Resources)

PATHOPHYSIOLOGY OF HUMAN EYE DISEASES

© 2017, Authors

All rights reserved.

No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior permission of the publishers.

EDITION

First Edition, 2017

ISBN: 978-81-932299-5-8

First Printed in India, Jan 2017

About the Authors

Dr. Navneet Nagpal

M. Pharm., PhD.

Faculty of Pharmaceutical and Allied Health Sciences
Khalsa University, Amritsar, Punjab, India

Mr. Karan Sharma

(M. Pharm.)

Department of Pharmaceutics
Khalsa College of Pharmacy,
Amritsar, Punjab, India

Md. Rageeb Md. Usman

M. Pharm., FICPHS, FAPP, FSPER, FSRHCP, FRSH

Department of Pharmacognosy
Smt. S. S. Patil College of Pharmacy,
Chopda, Jalgaon, MS, India

Dr. Manisha Arora

M. Pharm., PhD.

Department of Pharmaceutical Chemistry
Khalsa College of Pharmacy,
Amritsar, Punjab, India

Published by

SAS Publishers,

(An International Publisher for Academic and Scientific Resources)

H.No-204, Borhawor, Nagaon,

Assam-782439, India

www.saspublisher.com

Tel & Fax: 03674-261489

Foreword

First edition of this engaging book “Pathophysiology of Human Eye Diseases” has been introduced by skilful authors who are professionally sound in their field has done a masterful job by compiling various data available on eye diseases with their clinical treatment. This is a vital book. Authors give us a compassionate book and it will encourage, guide and liberate you. The authors have clearly learned a lot from their professional experiences. The book containing wide knowledge on pathophysiology of eye diseases will help research scholars, P.G. students, students pursuing their careers in eye specialization, Bachelor of Science in nursing and attending physicians. It is designed in such a way that it covers a vast amount of ocular pathology, diagnosis, symptoms and treatment that is easy to understand throughout the book.

The eyes are important because humans use and rely upon them. We use vision in our day to day lives. Those without that capability face many obstacles in life. Here, contents of this book will help to understand and work around such, substituents, medical treatment to restore the capability.

I strongly hope this venture great success....



Dr. Rajiv Dahiya [M.Pharm, Ph.D, D.Sc, FAPP, FICCE]
President, Association of Pharmacy Professionals (APP)
Director, School of Pharmacy, Faculty of Medical Sciences,
The University of the West Indies, Trinidad & Tobago, WI
Editor-in-Chief, Bulletin of Pharmaceutical Research

About the Authors



Dr. Navneet Nagpal:

He is working as Assistant Professor in Faculty of Pharmaceutical and Allied Health Sciences Khalsa University, Amritsar, Punjab, India. He is graduated from University of Rajasthan, Jaipur, qualified GATE with 322 score, Post Graduate from North Maharashtra University, Jalgaon and obtained PhD. from Bhagwant University, Ajmer in 2012. He has 9.5 years teaching experience and supervised M. Pharmacy and PhD. students. He is more than 20 publications in reputed journals of Pharmacy and one reference book titled 'Poisonous Herbal Plants' to his credit, presented more than 10 posters in national and international conferences and having life time memberships in reputed associations of Pharmacy field.



Mr. Karan Sharma:

He is M. Pharmacy Research Scholar of I.K. Gujral Punjab Technical University, Kapurthala, Punjab. He is graduated from Government Polytechnic College, Amritsar and doing post-graduation from Khalsa College of Pharmacy, Amritsar. He is engaged in research works related to eye diseases and work hard to preparing novel formulations for treatment of eye disorders. Author having sound publication work related to novel eye formulation. He is also engaged in social works, participates in eye camps and educates the people having eye diseases. He has also developed ocusert (novel formulation) of different drugs for better patient compliance and has published the data in reputed journals.



Mohammed Rageeb Mohammed Usman:

B. Pharm, M. Pharm (Pharmacognosy); from North Maharashtra University, Jalgaon; Asst. Prof, Pharmacognosy Dept., Smt. Sharadchandrika Suresh Patil College of Pharmacy, Chopda; Having 8.6 Year Experience, Life Member: APTI, SPER (Joint Secretary, Central Br), APPs (President, Maharashtra State Br.), IHPA, IPGA Indian Pharmacists Assen. (President, Jalgaon Br.), RSH (Maharashtra State Br.), SRHCP (President, Maharashtra State Br), IPA; Member: ISP, AOBP, INHS; Assoc Editor/Editor of several professional journals and magazines; participated in more than 160 national and international conferences/symposia; *publs. Books:* Appraisal on Nephroprotective Herbal Plants (2014),

Anti-Inflammatory and Antipyretic Activity (2015), Traditional System of Herbal Medicines (2015), Practical Hand Book on Systematic Organic Qualitative Analysis (2015), Practical Handbook on Pharmacognosy (2016), Multiple Choice Questions (MCQs) in Pharmacology (2016), Standardization Techniques of Herbal Medicines (2016), Poisonous Herbal Plants (2016)--co-author; 1 book chapter; and more than 55 research papers/articles published in various national and international journals; Awards Fellowship Award 2013 (twice), 2014, 2015 (twice), Appreciation Award for Poster 2013, Young Performer Award 2013, Young Pharmacy Teacher Award 2014, Best Oral Presentation Award 2014, Young Innovative Researcher Award 2014, Appreciation Award for Oral Presentation 2014, Young Talent Award 2014 (twice), 2016, Young Pharmacist Award 2015, Young Excellent Academic Award 2016, Life Time Achievement Award 2016. Recently his Biography has been included in the renowned directory "Who's Who in the World 2016 and published in the 14h Volume, August 2016.



Dr. Manisha Arora:

She is working as Assistant Professor in Khalsa College of Pharmacy, Amritsar. She is graduated from Rajasthan University of Health Science, Jaipur, Post Graduate from Gautam Budh University, Lacknow and obtained PhD. from Bhagwant University, Ajmer in 2013. She has more than 7 years teaching experience. She is more than 10 reputed publications in her field, presented more than 10 posters in national and international conferences and having life time memberships in reputed associations of Pharmacy field.

Preface

This book has been written in such a way that it may equip the readers with the current knowledge of eye disorders and their treatment and make it useful for a wide range of practitioners in any stage of their careers, students, residents, and attending physicians. It is a valuable resource for emergency room physicians, general practitioners, pediatricians, optometrists, pharmaceutical researchers, nurse practitioners, physician assistants, and ophthalmologists.

It has been experienced that there is no complete data available of eye diseases with their clinical treatment. The book provides all clinical information of eye disorders as well as with their specific treatment. The book covers an extensive amount of ocular pathology that is easy to understand and follow. The format is well designed and standard throughout the book. It does an excellent job of walking practitioners through symptoms, signs, work-up, treatment, and follow-up. The images provide visual support to aid in diagnosis.

It is an exceptional book and a wonderful tool for almost any medical professional. It is well written, comprehensive, and easy to understand. This excellent manual stands without peer among its contemporaries

Authors

Acknowledgement

It is our privilege to thank all those people who were behind us in inspiring and giving moral support during this project. We are beholden to the Dr. Ravi Dhawan, Director-Research, Khalsa University, Amritsar and Dr. Sandeep Rahar, HOD, Khalsa College of Pharmacy for their constant patting and encouragement. We wish to thank the Staff of Khalsa College of Pharmacy for helping us shape the first edition of this book. We are thankful to the Management, Smt. Sharadchandrika Suresh Patil College of Pharmacy, Chopda, Maharashtra, India.

We also express our gratitude to others who have, with such good grace, given us their time and energy to supply valuable facts and opinion for this work. We are also thankful to publisher for publishing the book. We extend our thanks to supportive friends, colleagues for bringing out nicely printed book.

At last, final thanks to our family members who always inspire, bless and support us and never let us down.

Authors

Abbreviations

ADA: American Diabetes Association

AIDS: Acquired immunodeficiency syndrome

AION: Anterior Ischemic Optic Neuropathy

ALT: Argon laser trabeculoplasty

AMD: Age-related macular degeneration

ANA Antinuclear antibody

ARMD: Age-related macular degeneration

BCVA: Best corrected visual acuity

BEAT-ROP: Bevacizumab Eliminates the Angiogenic Threat of Retinopathy of Prematurity

BRVO: Branch retinal vein occlusion

BW: Birth weight

CMV: Cytomegalovirus

CNS: Central nervous system

CNS: Central nervous system

CNV: Choroidal neovascularization

CNVM: Choroidal Neo Vascular Membrane

CRAO: Retinal artery occlusion

CRVO: Central retinal vein occlusion

CRYO-ROP: Multicenter Trial of Cry therapy for Retinopathy of Prematurity

CSF: Cerebrospinal fluid

CT scan: Computerized tomography

CTGF: Connective tissue growth factor

DED: Dry eye disease

DEWS: International Dry Eye Workshop

DEX: Dexamethasone

DM: Diabetes mellitus

FAZ: Foveal avascular zone

FDA: Food and Drug Administration

GA: Gestational age

GI: Gastrointestinal

GP: General Practitioner

HBOT: Hyperbaric oxygen therapy

HIV: Human immunodeficiency virus

HSV: Herpes simplex virus
HZO: Herpes zoster ophthalmicus
IOL: Intraocular Lens
IOP: Intraocular pressure
ISK: Immune stromal keratitis
KCS: Keratoconjunctivitis sicca
LASIK: Laser in situ keratomileusis
LFU: Lacrimal functional unit
LHON: Leber's hereditary optic neuropathy
MIF: Multiple innervated fibers
MMP: Matrix metalloproteinases
MRI: Magnetic resonance imaging
MTX: Methotrexate
NEI: National Eye Institute
NICU: Neurologic intensive care unit
NSAIDs: Non-steroidal anti-inflammatory drugs
NTG: Normal-tension Glaucoma
ONTT: Optic Neuritis Treatment Trial
PCR: Polymerase chain reaction
PDGF: Platelet-derived growth factor
PDR: Proliferative diabetic retinopathy
PDT: Photodynamic therapy
PHN: Post herpetic neuralgia
PO: By mouth
PVD: Posterior vitreous detachment
PVR: Proliferative vitreo retinopathy
PXE: Pseudoxanthomaelasticum
RA: Rheumatoid arthritis
RAPD: Relative Afferent Pupillary Defect
RD: Retinal detachment
RF: Risk factor
ROP: Retinopathy of prematurity
ROP: Retinopathy of prematurity
RPE: Retinal pigment epithelium

RPE: Retinal pigment epithelium
RRD: Rhegmatogenous Retinal detachment
SCORE; Standard Care vs. Corticosteroid for Retinal Vein Occlusion
SIF: Single innervated fibers
SINS: Surgery induced scleritis
SLE: Systemic lupus erythematosus
SLT: Selective laser trabeculopalsty
TGF- β : Transforming growth factor beta
TRD: Tractional retinal detachment
UKPDS: The United Kingdom Prospective Diabetes Study
VEGF: Vascular endothelial growth factor
VEGFR-2: Vascular endothelial growth factor receptor 2
VEP: Visual Evoked Potentials
VKH: Vogt–Koyanagi– Harada
VLBW: Very low Birth Weight
VZIG: Varicella-zoster immune globulin
VZV: Varicella-zoster virus
YAG: Yttrium aluminum garnet
ZEST: Zostavax Efficacy and Safety Trial
