Journal of Laboratory Physicians

Official Publication of The Indian Association of Laboratory Physicians

Editor-in-Chief

Sarman Singh, MD, FRCP, FRSC

Former Director

All India Institute of Medical Sciences Bhopal, India Mentor MEDSER Centre, Indian Institute of Science Education and Research, Bhopal, India

Email: editorinchief.jlp2020@gmail.com ORCID: 0000-0002-0749-9647

Associate Editors

Bacteriology

Sumit Rai, MD

Professor and Head

Dept of Clinical Microbiology & Infectious Diseases

All India Institute of Medical Sciences Mangalagiri, Andhra Pradesh, India Email: sumit_rai@yahoo.com

Meher Rizvi, MD

Department of Microbiology and Immunology,

College of Medicine and Health sciences, Sultan Qaboos University,

Muscat, Oman

Email: rizvimeher@squ.edu.om

Padma Das, MD

Professor and Head, All India Institute of Medical Sciences, Raipur, India

Email: dr.daspadma@gmail.com

Enoka Corea, MD

Professor, Medical Microbiology and Immunology Faculty of Medicine, University of Colombo Kynsey Road, Colombo 00800, Sri Lanka Email: enokacorea@hotmail.com

Biochemistry

Sudip Kumar Datta, MD

Associate Professor Department of Laboratory Medicine All India Institute of Medical Sciences New Delhi, India

Deshratn "Desh" Asthana, PhD

Director, Laboratory for Clinical and Biological Studies

Univ. of Miami - Miller School of Medicine, PO Box 019132 (M-864), Miami, FL 33101, USA Email: deshj91@qmail.com

Clinical Virology

Amita lain, MD

Professor & Head, Department of Microbiology, King George's Medical University, Lucknow, India

Debasis Biswas, MD

Professor & Head, Department of Microbiology, All India Institute of Medical Sciences, Bhopal, India

Gynaecology & Obstetrics, Genitourinary Tuberculosis

Dr. Jia Bhagwan Sharma, MD

Professor, Department of Obstetrics and Gynaecology, All India Institute of Medical Sciences, New Delhi, India

Hematology & Blood Transfusion

Arulselvi Subramanian, MD

Professor of Pathology Department of Laboratory Medicine JPN Apex Trauma Centre, All India Institute of Medical Sciences New Delhi, India

Histopathology

Siddhartha Dattagupta, MD

Former Professor of Pathology All India Institute of Medical Sciences New Delhi, India

Jen-Fan Hang, MD

Professor, Department of Pathology and Laboratory Medicine, Taipei Veterans General Hospital, Taipei,

Taiwan School of Medicine, National Yang-Ming University, Taipei, Taiwan

Hari S. Sharma, PhD

Department of Pathology & Clinical Bioinformatics Erasmus MC, University Medical Centre 3015 GD Rotterdam The Netherlands

E-mail: drhssharma@gmail.com/h.sharma@erasmusmc.nl

Laboratory Medicine

Jen-Fan Hang, MD

Department of Pathology and Laboratory Medicine, Taipei Veterans General Hospital, Taipei, Taiwan School of Medicine, National Yang-Ming University, Taipei, Taiwan

Deshratn "Desh" Asthana, PhD

Director, Laboratory for Clinical and Biological Studies Univ. of Miami - Miller School of Medicine, PO Box 019132 (M-864) Miami, FL 33101, USA Email: deshj91@gmail.com

Sudip Kumar Datta, MD

Associate Professor
Department of Laboratory Medicine
All India Institute of Medical Sciences
New Delhi, India

Metabolic Disorders

Sanjay Kumar Agarwal, MD, DM

Professor and Head Department of Nephrology All India Institute of Medical Sciences New Delhi, India

Microbiology

Debasis Biswas, MD

Professor and Head, Department of Microbiology, All India Institute of Medical Sciences, Bhopal. India

Sumit Rai

Professor and Head
Dept of Clinical Microbiology & Infectious
Diseases, All India Institute of Medical
Sciences
Mangalagiri, Andhra Pradesh, India
Email: sumit_rai@yahoo.com

Meher Rizvi, MD

Department of Microbiology and Immunology,
College of Medicine and Health sciences,
Sultan Qaboos University,
Muscat, Oman
Email: rizvimeher@squ.edu.om

Padma Das, MD

Professor and Head, All India Institute of Medical Sciences, Raipur, India Email: dr.daspadma@gmail.com

Enoka Corea, MD

Professor, Medical Microbiology and Immunology Faculty of Medicine, University of Colombo Kynsey Road Colombo 00800, Sri Lanka Email: enokacorea@hotmail.com

Parasitology

K.P. Chang, PhD

Professor of Microbiology and Immunology Chicago Medical School, School of Graduate and Postdoctoral Studies Roalind Franklin University, North Chicago, IL, USA Email: kwang-poo.chang@rosalindfranklin.

Molecular Biology

Amita Jain, MD

Professor and Head, Department of Microbiology, King George's Medical University, Lucknow, India

Debasis Biswas

Head, Department of Microbiology, All India Institute of Medical Sciences, Bhopal, India

K.P. Chang, PhD

Professor of Microbiology and Immunology Chicago Medical School, School of

Graduate and Postdoctoral Studies Roalind Franklin University,

North Chicago, IL, USA

Email: kwang-poo.chang@rosalindfranklin.

M.R. Shivaprakash, MD

Professor

Department of Microbiology Post Graduate Institute of Medical **Education and Research** Chandigarh, India

Sudip Kumar Datta, MD

Associate Professor Department of Laboratory Medicine All India Institute of Medical Sciences New Delhi, India

Mycology

lagdish Chander, MD

Professor & Head Department of Microbiology Chandigarh Medical College Chandigarh, India

M.R. Shivaprakash, MD

Professor Department of Microbiology Post Graduate Institute of Medical Education and Research

Chandigarh, India

Nephrology

Sanjay Kumar Agarwal, MD, DM

Professor and Head Department of Nephrology All India Institute of Medical Sciences New Delhi, India

Pathology

Arulselvi Subramanian, MD

Professor of Pathology Department of Laboratory Medicine JPN Apex Trauma Centre, All India Institute of Medical Sciences New Delhi, India

Jen-Fan Hang, MD

Department of Pathology and Laboratory Medicine, Taipei Veterans General Hospital, Taipei, Taiwan School of Medicine, National Yang-Ming University, Taipei, Taiwan Email: jfhang@vghtpe.gov.tw

Semir Vranic, MD

Professor of Pathology College of Medicine Qatar University, Doha, Qatar Email: svranic@qu.edu.qa/semir.vranic@ bosnianpathology.org

Siddhartha Dattagupta, MD

Former Professor of Pathology All India Institute of **Medical Sciences** New Delhi, India

Editorial Board Members

Virology

Ashima Amin, MD

Department of Virolgy father muller medical college, Mangalore, India Email: dr_ashim13@yahoo.com

Pathology/Cytopathology

B.N. Kumarguru, MD

Department of Pathology PES Institute of Medical Sciences and Research, Kuppam, Andhra Pradesh, India Email: 78kumarguru@gmail.com

Microbiology/Virology

Vijeta Bajpai, MD

MPMMCC/HBCH (Tata Memorial Cancer center), Microbiology, Banaras Hindu University, Varanasi, Uttar Pradesh, India Email: vijetabajpaikgmu@gmail.com

Laboratory Medicine/ Microbiology/ Tuberculosis

Mithu Banerjee, MD

Department of Biochemistry All India Institute of Medical Sciences, Jodhpur, India Email: mithu.banerjee.3@gmail.com

Microbiology

Priyam Batra, MD

Department of Microbiology All India Institute of Medical Sciences, New Delhi, India

Email: dr.priyambatra@gmail.com

Microbiology

Bijayini Behera, MD

Department of Microbiology All India Institute of Medical Sciences, Bhubaneswar, India Email: drbinny2004@gmail.com

Pathology

Shubha P. Bhat, MD

Department of Pathology K S Hegde Medical Academy, Pathology, Deralakatte, Manglore, India

Microbiology

Kiran Chawla, MD

Department of Microbiology Kasturba Medical College of Manipal,

Email: arunkiranchawla@yahoo.com

Laboratory Medicine/ Haematology Gauray Chhabra, MD

Department of Lab Medicine & Pathology, All India Institute of Medical Sciences. Bhubaneswar, India Email: gauravchhabra2001@gmail.com

Radiotherapy/Cancer

Saikat Das, MD, PhD

Department of Radiotherapy All India Institute of Medical Sciences, Bhopal, India Email: saikat.radiotherapy@aiimsbhopal. edu.in

Paediatrics/Nutrition/ Tuberculosis

Bhavna Dhingra, MD

Department of Paediatrics All India Institute of Medical Sciences, Bhopal, India

Email: bhavna.pediatrics@aiimsbhopal. edu.in

Microbiology/ Infection Control

Shashank Purwar, MD

Department of Microbiology All India Institute of Medical Sciences, Bhopal, India Email: shashank.microbiology@ aiimsbhopal.edu.in

Parasitology/ Microbiology/ Infection control

Ayush Gupta, MD

Department of Microbiology All India institute of Medical Sciences, Bhopal, India Email: ayush.microbiology@aiimsbhopal. edu.in

Microbiology/Virology

Ekta Gupta, MD

Department of Clinical Virology Institute of Liver and Biliary Sciences, Vasant Kunj, Delhi, India Email: ektagaurisha@gmail.com

Biochemistry

Shubha Jayaram, PhD

Department of Biochemistry Mysore Medical College and Research Institute, Mysore, India Email: drshubhajaysree@rediffmail.com

Tuberculosis/Molecular Biology

Syed Beenish Rufai, PhD

McGill University Health Centre, Montreal,

Email: beenish.aiims@gmail.com

Pathology

Deepti Joshi, MD

Department of Pathology All India Institute of Medical Sciences, Bhopal, India Email: deepti.patho@aiimsbhopal.edu.in

Pathology

Vaishali Walke, MD

Department of Pathology & Lab Medicine, All India Institute of Medical Sciences, Bhopal, India Email: vaishali.patho@aiimsbhopal.edu.in

Biochemistry

Jemil Makadia, PhD

Department of Biochemistry Smt NHL Municipal Medical College, VS Hospital Campus, Ahmedabad, India Email: jemil_sjm@yahoo.com

Laboratory Medicine/ Microbiology/ **Immunology**

Sunita Meena, MD

Bijay Ranjan Mirdha (Parasitology) Department of Microbiology All India Institute of Medical Sciences. New Delhi, India Email: mirdhabr@hotmail.com

Microbiology

Chinmoy Sahu, MD

Department of Microbiology Sanjay Gandhi Postgraduate Institute of Medical Sciences. Lucknow, India

Email: csahu78@rediffmail.com

Laboratory Medicine/ Heamatology Tushar Sehgal, MD

Laboratory Medicine & Heamatology All India Institute of Medical Sciences, New Delhi, India Email: doctusharsehgal@yahoo.co.in

Biochemistry

Archana Singh, MD

Department of Biochemistry All India Institute of Medical Sciences, New Delhi, India

Email: archanasinghaiims@gmail.com

Microbiology

Vibhor Tak, MD

Department of Microbiology

All India Institute of Medical Sciences, Jodhpur, India

Email: vibhortakaiims@gmail.com

Biochemistry

Sufian Zaheer, PhD

Department of Biochemistry Vardhman Mahavir Medical College is a medical college & Safdarganj Hospital, New Delhi. India Email: sufianzaheer@gmail.com

Medicine

Sagar Khadanga, MD

Section of Infectious diseases & Department of General Medicine All India Institute of Medical Sciences, Bhopal, India Email: drsagarkhadanga@gmail.com

Emergency Medicine

Sagar Galwankar, MD

Department of Medicine & Executive Director of The American College of Academic International Medicine, Florida State University Email: gcsagar@yahoo.com

Mycology

Tadepalli Karuna, MD

Department of Microbiology All India Institute of Medical Sciences, Bhopal, India Email: karuna.microbiology@aiimsbhopal. edu.in

© 2023. The Indian Association of Laboratory Physicians. All rights, including the rights of publication, distribution, and sales, as well as the right to translation, are reserved. No part of this work covered by the copyrights hereon may be reproduced or copied in any form or by any means - graphic, electronic, or mechanical, including photocopying, recording, taping, or information and retrieval systems - without written permission of the publisher.

Journal of Laboratory Physicians is published 4 times a year in March, June, September, and December by Thieme Medical and Scientific Publishers Pvt. Ltd., A-12, 2nd Floor, Sector 2, Noida-201301 UP, India Tel: +91-120-4556600, Fax: +91-120-455-6649.

Subscription: Open access journals available online for free at http://open.thieme.com.

Advertisers contact: Marketing, Thieme Medical and Scientific Publishers Pvt. Ltd., A-12, 2nd Floor, Sector 2, Noida-201301 UP, India, marketing@thieme.in. Journal of Laboratory Physicians is indexed in DOAJ, ESCI, Indian Science Abstracts, IndMed, PubMed Central, Web of Science, EBSCO Publishing's Electronic Databases, ProQuest, and National Science Library. Thieme Medical Publishers is a member of the CrossRef initiative.

 $Editorial\ comments\ should\ be\ sent\ to\ journals@thieme.com.\ The\ content\ of\ this$ journal is available online at www.thieme-connect.com/products. Visit our Web site at www.thieme.com and the direct link to this journal at www.thieme.com/jlp. Typesetting: Thomson Digital, Noida, India

Printing and Binding: Replika Press Pvt. Ltd. Printed in India