

HEMATOLOGY, TRANSFUSION AND CELL THERAPY



ISSN 2531-1379 print version

ISSN 2531-1387 online version

EDITOR IN CHIEF

Fernando Ferreira Costa – Campinas, SP, Brazil

DEPUTY EDITOR

Eduardo Magalhães Rego – Ribeirão Preto, Brazil

ASSOCIATE EDITORS

Alfredo Mendrone Junior – São Paulo, Brazil

Belinda Pinto Simões – Ribeirão Preto, Brazil

Behnaz Bayat – Giessen, Germany

Carla Luana Dinardo – São Paulo, Brazil

Carlos Sérgio Chiattonne – São Paulo, Brazil

Cármio Antonio de Souza – Campinas, Brazil

Dante Mário Langhi Junior – São Paulo, Brazil

Dimas Tadeu Covas – Ribeirão Preto, Brazil

Elvira Deolinda Rodrigues Pereira Velloso – São Paulo, Brazil

Fabiola Traina – Ribeirão Preto, Brazil

Helio Moraes de Souza – Uberaba, Brazil

Irene Lorand-Metze – Campinas, Brazil

José Orlando Bordin – São Paulo, Brazil

Luis Fernando S. Bouzas – Rio de Janeiro, Brazil

Marcelo Pasquini – Wisconsin, USA

Márcio Nucci – Rio de Janeiro, Brazil

Marcos Borato Viana – Belo Horizonte, Brazil

Marcos de Lima – Cleveland, USA

Margareth Castro Ozelo – Campinas, Brazil

Maria Helena Pitombeira – Fortaleza, Brazil

Maria Stella Figueiredo – São Paulo, Brazil

Marilda de Souza Gonçalves – Salvador, Brazil

Nelson Hamerschlag – São Paulo, Brazil

Nelson Spector – Rio de Janeiro, Brazil

Nicola Conran – Campinas, Brazil

Paulo Sérgio da Silva Santos – São Paulo, Brazil

Roberto Passetto Falcão – Ribeirão Preto, Brazil

Rodrigo Tocantins Calado – Ribeirão Preto, Brazil

Sara Teresinha Olalla Saad – Campinas, Brazil

Silvia Maria Meira Magalhães – Fortaleza, Brazil

Suely Meireles Rezende – Belo Horizonte, Brazil

Valder Arruda – Philadelphia, USA

Vanderson Rocha – São Paulo, Brazil

Vania Tietsche de Moraes Hungria – São Paulo, Brazil

Editorial Board

Alois Gratwöhl – Basel, Switzerland

Álvaro Urbano-Ispizua – Barcelona, Spain

Andrea Bacigalupo – Genoa, Italy

Ângelo Maiolino – Rio de Janeiro, Brazil

Antonio Fabron Júnior – Marília, Brazil

Christian Gisselbrecht – Paris, France

Corrado Tarella – Turin, Italy

Daniel Tabak – Rio de Janeiro, Brazil

David Gómez Almaguer – Mexico City, Mexico

Elbio A. D'Amico – São Paulo, Brazil

Enric Carreras – Barcelona, Spain

Eugenia Maria Amorim Ubiali – Ribeirão Preto, Brazil

Frederico Luiz Dullely – São Paulo, Brazil

Gino Santini – Genoa, Italy

Guillermo Dighiero – Montevideo, Uruguay

Guillermo Ruiz-Argüelles – Puebla, Mexico

Jesus Fernando San Miguel – Salamanca, Spain

João Carlos Pina Saraiva – Belém, Brazil

João Carlos Pina Saraiva – Belém, Brazil

Laércio de Melo – Belo Horizonte, Brazil

Lílian Maria Castilho – Campinas, Brazil

Linamara Rizzo Batistella – São Paulo, Brazil

Lucia Mariano da Rocha Silla – Porto Alegre, Brazil

Marcos Antonio Zago – Ribeirão Preto, Brazil

Maria de Lourdes L. F. Chauffaile – São Paulo, Brazil

Maria do Socorro P. de Oliveira – Rio de Janeiro, Brazil

Mario Cazolla – Pavia, Italy

Mary Evelyn Flowers – Seattle, USA

Nelson Abrahin Fraiji – Manaus, Brazil

Nelson J. Chao – Durham, USA

Paul M. Ness – Baltimore, USA

Paulo César Naoum – São José do Rio Preto, Brazil

Raul C. Ribeiro – Memphis, USA

Raul Gabus – Montevideo, Uruguay

Ricardo Pasquini – Curitiba, Brazil

Richard K. Burt – Chicago, USA

Sergio Giral – New York, USA

Vânia Tietsche Hungria – São Paulo, Brazil

Vicente Odone Filho – São Paulo, Brazil

PAST EDITORS

Antonio P. Capanema – 1973-1981; Milton A. Ruiz – 1981-1990; Carlos S. Chiattonne – 1991-1994; Milton A. Ruiz – 1995-2014.

The Hematology, Blood Transfusion and Cell Therapy succeeded the Revista Brasileira de Hematologia e Hemoterapia (Brazilian Journal of Hematology and Hemotherapy), ISSN 1516-8484, which succeeded the Boletim da Sociedade Brasileira de Hematologia e Hemoterapia (Bulletin of the Brazilian Society of Hematology and Hemotherapy) ISSN 0102-7662, which was published from 1973 to 1998 with 179 issues in 20 volumes.

ABHH

Rua Diogo de Faria, 775/conjunto 133
04037-002

Vila Clementino - São Paulo/SP - Brazil

(11) 2369-7767 / (11) 2338-6764 (WhatsApp)

E-mail: abhh@abhh.org.br www.abhh.org.br

HTCT

Internal Editorial Committee

Executive Secretary: Luciana de Souza
secretaria@rbhh.org | www.htct.com.br

The Hematology, Transfusion and Cell Therapy is the official publication of the Associação Brasileira de Hematologia, Hemoterapia e Terapia Celular (ABHH), the Associazione Italo-Brasiliana di Ematologia (AIBE) and the Sociedade Brasileira de Oncologia Pediátrica (SOBOPE), published by Elsevier Editora Ltda. The journal is indexed to the Literatura Latino-Americana e do Caribe em Ciências da Saúde (Lilacs), SciELO Brazil, PubMed/PMC, Ex-tramed and Scopus. It is distributed for free to regional libraries and Medical, Pharmacy and Biochemistry Schools in Brazil and sister societies in South, Central and North America and Europe. © 2021 Associação Brasileira de Hematologia, Hemoterapia e Terapia Celular. Published by Elsevier Editora Ltda. All rights reserved.

All rights reserved and protected by law 9.610 - 19/02/98. No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording or any information storage and retrieval system, without permission in writing from ABHH and the Publisher.



ELSEVIER

Editorial production by Elsevier España, SLU
Avinguda Josep Tarradellas, 20-30, 1er piso
08029, Barcelona
DL: B-26732-2017

No responsibility is assumed by Elsevier for any injury and/or damage to persons or property as a matter of products liability, negligence or otherwise, or from any use or operation of any methods, products, instructions, or ideas contained in the material herein. Because of rapid advances in the medical sciences, in particular, independent verification of diagnoses and drug dosages should be made. Although all advertising material is expected to conform to ethical (medical) standards, inclusion in this publication does not constitute a guarantee or endorsement of the quality or value of such product or of the claims made of it by its manufacturer.

Associação Brasileira de Hematologia, Hemoterapia e Terapia Celular



Board Of Directors – 2020-2021

President Dante Mário Langhi Júnior	Director of Communications Angelo Maiolino
Vice-President José Francisco Comenalli Marques Júnior	Vice-Director of Communications Renato Sampaio Tavares
Administrative Director Dimas Tadeu Covas	Director of Institutional Relations Carlos Sérgio Chiattonne
Vice Administrative Director Leny Nascimento da Motta Passos	Vice-Director of Institutional Relations Silvia Maria Meira Magalhães
Scientific Director Eduardo Magalhães Rego	Director of Professional Practice Alfredo Mendrone Junior
Vice-Scientific Director Jorge Vaz Pinto Neto	Vice-Director of Professional Practice Glaciano Nogueira Ribeiro
Financial Director Hélio Moraes de Souza	Committee Coordinator Carmino Antonio de Souza
Vice Financial Director Denys Eiti Fujimoto	Emeritus Scientific Director Roberto Passetto Falcão

Deliberative Committee

Elected – 2018-2021

Aderson da Silva Araújo	Eduardo Magalhães Rego	Rodolfo Delfini Cançado
Angelo Maiolino	João Paulo de Oliveira Guimarães	Sheila Soares da Silva
Cláudio Galvão de Castro Júnior	Otávio César Baiocchi	Silvia Maria Meira Magalhães
Denys Eiti Fujimoto	Renato Sampaio Tavares	Tor Gunnar Hugo Onsten
Edgard de Barros Nascimento	Rodolfo Daniel de Almeida Soares	Vanderson Rocha

Elected – 2020-2023

Alfredo Mendrone Junior	Glaciano Nogueira Ribeiro	Leny Nascimento da Motta Passos
Ana Clara Kneese Virgílio do Nascimento	Gustavo Henrique Silveira	Rodrigo do Tocantins Calado de Saloma Rodrigues
Celso Arrais Rodrigues da Silva	Jorge Vaz Pinto Neto	Vânia Tietsche de Moraes Hungria
Edvan de Queiroz Crusóe	José Eduardo Bernardes	Violete Petitto Laforga
Fabiana Akil	José Francisco Comenalli Marques Júnior	
	Katia Borgia Barbosa Pagnano	

Lifelong Deliberative Committee

Carlos Sergio Chiattonne	Hélio Moraes de Souza	Milton Artur Ruiz	Roberto Passetto Falcão
Carmino Antonio de Souza	Hélio Ramos	Nelson Ibrahim Fraiji	Romeu Ibrahim de Carvalho
Dante Mário Langhi Júnior	João Carlos Pina Saraiva	Nelson Hamerschlag	Sara Teresinha Olalla Saad
Dimas Tadeu Covas	José Orlando Bordin	Nelson Spector	Therezinha Verrastro de Almeida
Eurípedes Ferreira	José Kerbauy	Orion de Bastos	Ubiratan Ouwina Peres
Fernando Ferreira Costa	Marco Antonio Zago	Ricardo Pasquini	

Finance Committee – 2018-2021

Members: Adriana Seber, Lucia Mariano da Rocha Silla, Álvaro Pontes Langhi
Substitutes: James Farley Rafael Maciel, Marcos Borato Viana, Suelly Meireles Rezende

Past Presidents of

Sociedade Brasileira de Hematologia e Hemoterapia

1950 Walter Oswaldo Cruz	1965 Orion Bastos	1983 Luiz Gastão M. Rosenfeld	1998 Celso Carlos de C. Guerra
1951 Michel Abujamra	1967 Ubiratan Ouwina Peres	1985 Augusto Luiz Gonzaga	2000 Dante Mário Langhi Junior
1954 Darcy Lima	1970 Oswaldo Mellone	1987 Helio Ramos	2002 Dante Mário Langhi Junior
1955 José Candido C. Villela	1973 Pedro Clóvis Junqueira	1988 Milton Artur Ruiz	2004 Carlos Sérgio Chiattonne
1957 Joaquim M. Barreto	1975 Pedro Clóvis Junqueira	1990 Nelson Hamerschlag	2006 Carlos Sérgio Chiattonne
1959 Oswaldo Kessler Ludwig	1977 Maria Nazareth Petrucci	1992 Eurípedes Ferreira	2008 Carlos Sérgio Chiattonne
1961 Walter Hupsel	1979 Celso Carlos de C. Guerra	1994 João Carlos Pina Saraiva	
1963 Rui Faria	1981 Jacob Rosenblit	1996 João Pedro E. M. Pereira	

PAST PRESIDENTS OF

COLÉGIO BRASILEIRO DE HEMATOLOGIA

1965 Hildebrando M. Marinho	1973 Romildo Lins	1985 Eurico Coelho	2005 José Orlando Bordin
1967 Michel Abujamra	1975 Renato Rego Failance	1989 Romeu Ibrahim de Carvalho	
1969 Romeu Ibrahim de Carvalho	1977 Dilson José Fernandes	1993 José Kerbauy	
1971 Paulo Barbosa da Costa	1981 José Kerbauy	1997 Roberto Passetto Falcão	

PAST PRESIDENTS OF

ASSOCIAÇÃO BRASILEIRA DE HEMATOLOGIA, HEMOTERAPIA E TERAPIA CELULAR

2009 Carlos Sérgio Chiattonne	2010-2013: Carmino Antonio de Souza	2014-2017: Dimas Tadeu Covas
José Orlando Bordin		2018: Dante Langhi Jr



Associazione Italo-Brasiliana di Ematologia

Board of Directors – 2020-2021

President Massimo Federico

Vice-President Carlos Sérgio Chiattonne

Scientific Director – Brazil Carmino Antonio de Souza

Treasurer – Brazil Sergio Augusto Buzian Brasil

Honorary Presidents Gino Santini and Angelo Maiolino

Scientific Director – Italy Maurizio Martelli

Treasurer – Italy Stefano Luminari and Adolfo Porcellini

Directore – Brazil

Milton Artur Ruiz, Ricardo Pasquini,

Irene de Almeida Biasoli, Eduardo Magalhães Rego,

Marcia Torresan Delamain, Eliana Cristina Martins Miranda,

Bruno Kosa Lino Duarte

Directore – Italy

Gian Luca Gaidano, Angelo Michelle Carella, Corrado Tarella,

Ignazio Majolino, Robin Foà, Teodoro Chisesi

Associazione Italo-Brasiliana di Ematologia
Viale Benedetto XV 16100 - Genoa – GE – Italy



Sociedade Brasileira de Oncologia Pediátrica

Board of Directors – 2019-2020

President Claudio Galvão de Castro Junior

1st Vice-President Lilian Maria Cristofani

1st Secretary Vicente Odone Filho

1st Treasurer Marcelo Milone da Silva

2nd Vice-President José Henrique Silva Barreto

2nd Secretary Karla Emília de Sá Rodrigues

2nd Treasurer Alayde Vieira Wanderley

Members of Advisory Board

Luiz Gonzaga Tone, Maria do Socorro Pombo de Oliveira, Nubia Mendonça, Rosana Cipolotti, Denise Bousfield da Silva

Sociedade Brasileira de Oncologia Pediátrica
www.sobope.org.br - sobope@uol.com.br / sobope@sobope.org.br
94/53 – 04077-020 – São Paulo-SP – Phone: 55 11 5052-7537