

Institutional Partners

Faculdade de Medicina da Universidade do Porto;
Centro Hospitalar São João, E.P.E.

This is an open access journal: all articles will be immediately and permanently free for everyone to read and download. Permitted third party (re) use is defined by the Creative Commons user license CC BY-NC-ND (Creative Commons Attribution-NonCommercial-NoDerivatives, <http://creativecommons.org/licenses/by-nc-nd/4.0/>): for non-commercial purposes, lets others distribute and copy the article, and to include in a collective work (such as an anthology), as long as they credit the author(s) and provided they do not alter or modify the article.

This journal and the individual contributions contained in it are protected under copyright, and the following terms and conditions apply to their use in addition to the terms of any Creative Commons or other user license that has been applied by the publisher to an individual article:

Photocopying

Single photocopies of single articles may be made for personal use as allowed by national copyright laws. Permission is not required for photocopying of articles published under the CC BY license nor for photocopying for noncommercial purposes in accordance with any other user license applied by the publisher. Permission of the publisher and payment of a fee is required for all other photocopying, including multiple or systematic copying, copying for advertising or promotional purposes, resale, and all forms of document delivery. Special rates are available for educational institutions that wish to make photocopies for non-profit educational classroom use.

Derivative Works

Permission of the publisher is required for derivative works, including translations.

Storage or Usage

Except as outlined above or as set out in the relevant user license, 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 prior written permission of the publisher.

Notice

No responsibility is assumed by the publisher 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.

Published every 2 months (6 issues per year).
www.portobiomedicaljournal.com
[pjb@elsevier.com](mailto:pbj@elsevier.com)



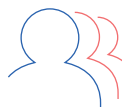
ELSEVIER

Av. Josep Tarradellas, 20-30, 1º
08029 Barcelona (Spain)
Phone: +34 932 000 711

Zurbano, 76, 4º Izq.
28010 Madrid (Spain)
Phone: +34 914 021 212

Subscriptions of print version free of charge, subject to availability. For more information contact us at:
subscriptions@portobiomedical.com

Editorial Staff



EDITOR-IN-CHIEF:

André Moreira
Porto, Portugal

MANAGING EDITOR:

Bárbara Peleteiro
Porto, Portugal

JOURNAL MANAGER:

Elisabete Alvarez
Barcelona, Spain

ASSOCIATE EDITORS:

Idalina Beirão
Porto, Portugal
John Preto

Porto, Portugal
Rafaela Rosário
Braga, Portugal

PORTO BIOMEDICAL JOURNAL

WHERE SCIENCE MEETS KNOWLEDGE

Raquel Soares
Porto, Portugal

Rita Ferreira
Porto, Portugal
Susana Irving
London, UK

STATISTIC EDITOR:

Milton Severo
Porto, Portugal

LINGUISTIC CONSULTANT:

Samantha Morais
Porto, Portugal

Thematic Editors

Albertino Damasceno

Maputo, Mozambique

Álvaro Almeida

Porto, Portugal

Amândio Rocha Sousa

Porto, Portugal

Amélia Ricon Ferraz

Porto, Portugal

Ana Azevedo

Porto, Portugal

Carla Lopes

Porto, Portugal

Carla Sá Couto

Porto, Portugal

Carlos Martins

Porto, Portugal

Carlos Monteiro

São Paulo, Brazil

Carmen Lisboa

Porto, Portugal

Catarina Aguiar Branco

Porto, Portugal

Duarte Nuno Vieira

Coimbra, Portugal

Eduardo Muñoz Diaz

Barcelona, Spain

Elísio Costa

Porto, Portugal

Fátima Carneiro

Porto, Portugal

Fernando Abelha

Porto, Portugal

Fernando Araújo

Porto, Portugal

Fernando Magro

Porto, Portugal

Filipe Almeida

Porto, Portugal

Filippo M. Santorelli

Pisa, Italy

Francisco Baldaque

Stockholm, Sweden

Fred Witjes

Nijmegen, The Netherlands

Guilherme Macedo

Porto, Portugal

Joana Marques

Braga, Portugal

João Bernardes

Porto, Portugal

João Frazão

Porto, Portugal

João Massano

Porto, Portugal

Joaquim Murta

Coimbra, Portugal

José Artur Paiva

Porto, Portugal

José Melo Cristiano

Lisbon, Portugal

José Paulo Andrade

Porto, Portugal

Laura Vilarinho

Porto, Portugal

Liane Costa

Porto, Portugal

Marcus Zanetti

São Paulo, Brazil

Mário Santos

Porto, Portugal

Marta Drummond

Porto, Portugal

Matteo Bonini

Rome, Italy

Miguel Gonçalves Ferreira

Porto, Portugal

Nélson Puga

Porto, Portugal

Patrícia Padrão

Porto, Portugal

Paulo Bettencourt

Porto, Portugal

Paulo Diniz

Porto, Portugal

Pedro Granja

Porto, Portugal

Pedro Martins

Lisbon, Portugal

Rajesh Kumar

Mysuru, India

Rute Santos

Wollongong, Australia

Sandra Martins

Braga, Portugal

Satish Tulsidas

Maputo, Mozambique

Sérgio Sampaio

Porto, Portugal

Tiago Reis Marques

London, UK

Vicente Riambau

Barcelona, Spain

Walter Frontera

Nashville, USA

Advisory Board

Adelino Leite Moreira

Porto, Portugal

Agostinho Marques

Porto, Portugal

Alcino Silva

California, USA

Altamiro Costa Pereira

Porto, Portugal

António Ferreira

Porto, Portugal

António Sousa Guerreiro

Lisbon, Portugal

Celso Carvalho

São Paulo, Brazil

Henrique Barros

Porto, Portugal

Javier Belda Nacher

Valencia, Spain

Kai-Håkon Carlsen

Oslo, Norway

Luís Taborda Barata

Covilhã, Portugal

Manuel Sobrinho Simões

Porto, Portugal

Maria Amélia Ferreira

Porto, Portugal

Maria Carmo Fonseca

Lisbon, Portugal

Pedro Moreira

Porto, Portugal

Tari Haahela

Helsinki, Finland

Vanessa Garcia Larsen

London, UK

Administration Board

EXECUTIVE DIRECTOR:

João Madureira

MARKETING AND COMMUNICATIONS DIRECTOR:

Jorge Jorge

FULL TEAM:

Adriana Mendes

Ana Cunha

Ana Valente

Ana Margarida Ribeiro

José Miguel Diniz

Lídia Alves Ribeiro

EDITORIAL DIRECTOR:

Sofia Rosas

FINANCIAL DIRECTOR:

Jorge Félix Cardoso

Manuel Gonçalves Pinho

Maria Freitas Domingues

Maria Macedo

Sílvia Fernández

Publishing and Business Contacts

EDITORIAL INQUIRIES:

editor@portobiomedical.com

SUPPLEMENTS AND ADVERTISING:

services@portobiomedical.com

SPONSORSHIPS:

sponsorships@portobiomedical.com

SCIENTIFIC EVENTS:

events@portobiomedical.com

Official Journal of:



FACULDADE DE MEDICINA
UNIVERSIDADE DO PORTO



SÃO JOÃO