

Biomaterials Science

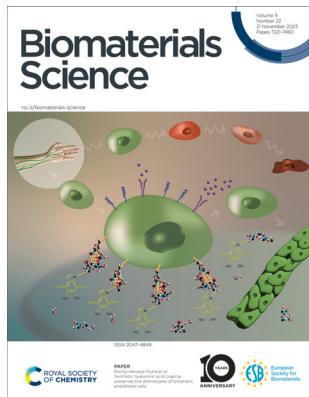
An international high impact journal exploring the underlying science behind the function, interactions and design of biomaterials

rsc.li/biomaterials-science

The Royal Society of Chemistry is the world's leading chemistry community. Through our high impact journals and publications we connect the world with the chemical sciences and invest the profits back into the chemistry community.

IN THIS ISSUE

ISSN 2047-4849 CODEN BSICCH 11(22) 7221-7460 (2023)



Cover

See Donny Hanjaya-Putra et al., pp. 7346–7357.

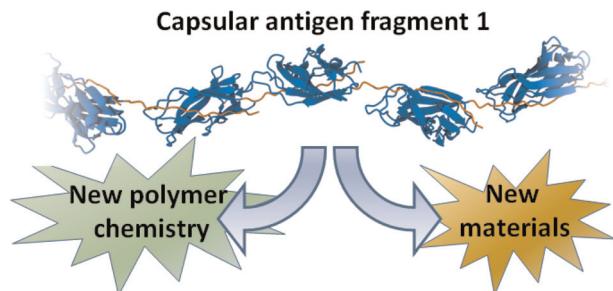
Image reproduced by permission of Fransisca Puspa Dewi from *Biomater. Sci.*, 2023, 11, 7346.

REVIEWS

7229

The polymer and materials science of the bacterial fimbriae Caf1

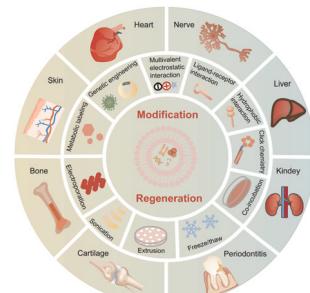
David A. Fulton,* Gema Dura and Daniel T. Peters



7247

Engineered exosomes for tissue regeneration: from biouptake, functionalization and biosafety to applications

Mu Zhang, Lei Wan, Ruiqi Li, Xiaoling Li, Taifu Zhu and
Haibin Lu*



Editorial Staff**Executive Editor**

Maria Southall

Deputy Editor

Laura Ghandhi

Editorial Production Manager

Cara Sutton

Assistant Editors

Sean Browner, Molly Colgate, Paul Scott, Alison Winder

Editorial Assistant

Basita Javeed

Publishing Assistant

Allison Holloway

Publisher

Sam Keltie

For queries about submitted papers, please contact Cara Sutton, Editorial Production Manager in the first instance.

E-mail: biomaterialsscience@rsc.org

For pre-submission queries please contact

Maria Southall, Executive Editor.

E-mail: biomaterialsscience-rsc@rsc.org

Biomaterials Science (electronic: ISSN 2047-4849) is published 24 times a year by the

Royal Society of Chemistry, Thomas Graham House, Science Park, Milton Road, Cambridge, UK CB4 0WF.

All orders, with cheques made payable to the Royal Society of Chemistry, should be sent to the Royal Society of Chemistry Order Department, Royal Society of Chemistry,

Thomas Graham House, Science Park, Milton Road, Cambridge, CB4 0WF, UK

Tel +44 (0)1223 432398; E-mail orders@rsc.org

2023 Annual (electronic) subscription price: £2450, \$4518.

Customers in Canada will be subject to a surcharge to cover GST. Customers in the EU subscribing to the electronic version only will be charged VAT.

If you take an institutional subscription to any Royal Society of Chemistry journal you are entitled to free, site-wide web access to that journal. You can arrange access via Internet Protocol (IP) address at www.rsc.org/ip

Customers should make payments by cheque in sterling payable on a UK clearing bank or in US dollars payable on a US clearing bank.

Whilst this material has been produced with all due care, the Royal Society of Chemistry cannot be held responsible or liable for its accuracy and completeness, nor for any consequences arising from any errors or the use of the information contained in this publication. The publication of advertisements does not constitute any endorsement by the Royal Society of Chemistry or Authors of any products advertised. The views and opinions advanced by contributors do not necessarily reflect those of the Royal Society of Chemistry which shall not be liable for any resulting loss or damage arising as a result of reliance upon this material. The Royal Society of Chemistry is a charity, registered in England and Wales, Number 207890, and a company incorporated in England by Royal Charter (Registered No. RC000524), registered office: Burlington House, Piccadilly, London W1J 0BA, UK, Telephone: +44 (0) 207 4378 6556.

Advertisement sales:

Tel +44 (0) 1223 432246; Fax +44 (0) 1223 426017;

E-mail advertising@rsc.org

For marketing opportunities relating to this journal, contact marketing@rsc.org

Biomaterials Science

rsc.li/biomaterials-science

An international high impact journal exploring the science of biomaterials and their translation towards clinical use.

Editorial Board

Editor-in-chief

Jianjun Cheng, Westlake University, China

Associate Editors

Khuloud Al-Jamal, King's College London, UK
Nasim Annabi, University of California, Los Angeles, USA

Lino Ferreira, UC-Biotech, Portugal

Jöns Hilborn, Uppsala University, Sweden

Won Jong Kim, POSTECH, Korea

Shyni Varghese, Duke University, USA

Fu-Jian Xu, Beijing University of Chemical Technology, China

Lichen Yin, Soochow University, China

Chuan Zhang, Shanghai Jiao Tong University

Editorial Board Members

Pamela Habibovic, Maastricht University, Netherlands

Xinyuan Zhu, Shanghai Jiao Tong University, China

Advisory Board

Lihi Adler-Abramovich, Tel Aviv University, Israel

Kazunari Akiyoshi, iCeMS, Japan

Cameron Alexander, University of Nottingham, UK

Edmondo Benetti, ETH Zürich, Switzerland

Mark Bradley, University of Edinburgh, UK

Jayanta Chatterjee, IISc, India

Arabinda Chaudhuri, CSIR-Indian Institute of Chemical Technology, India

Guoping Chen, National Institute for Materials Science (NIMS), Japan

Yiyun Cheng, East China Normal University, China

Joel Collier, Duke University, USA

Justin Cooper-White, University of Queensland, Australia

Honggang Cui, Johns Hopkins University, USA

Jianwu Dai, Institute of Genetics and Developmental Biology of CAS, China

Cole DeForest, University of Washington, USA

Andrew Dove, University of Birmingham, UK

Yizhou Dong, The Ohio State University, USA

Hongwei Duan, Nanyang Technological University (NTU), Singapore

Christine Dufes, University of Strathclyde, UK

Nicholas Dunne, Dublin City University, Ireland

Jennifer Elisseeff, Johns Hopkins University, USA

Elisabeth Engel Lopez, IBEC, Spain

Shaoqin Sarah Gong, University of Wisconsin-Madison, USA

Dong Keun Han, Cha University, Korea

Ngan Huang, Stanford, USA

Chris Jewell, University of Maryland, USA

Jian Ji, Zhejiang University, China

Ali Khademhosseini, Terasaki Institute for Biomedical Innovation, USA

April Kloxin, University of Delaware, USA

Veeva Koul, IIT Delhi, India

Christine Le Maître, University of Sheffield, UK

Haeshin Lee, KAIST, Republic of Korea

Khoon Lim, University of Sydney, Australia

Matthias Lutolf, Ecole Polytechnique Fédérale de Lausanne, Switzerland

Atsushi Maruyama, Tokyo Institute of Technology, Japan

Philip Messersmith, University of California, Berkeley, USA

Aline Miller, University of Manchester, UK

Hyejung Mok, Konkuk University, Korea

Steve Oh, A*STAR, Singapore

Shaunak Pandya, Prolong Pharmaceuticals, USA

Ling Peng, Aix-Marseille University, France

Nicholas Peppas, University of Texas at Austin, USA

Catherine Picart, Grenoble INP, France

Tilo Pompe, University of Leipzig, Germany

Suzie Pun, University of Washington, USA

Shun Shen, Tongji University, China

Heungssoo Shin, Hanyang University, Korea

Molly Shiochet, University of Toronto, Canada

Xintao Shuai, Sun Yat-Sen University, China

Aasheesh Srivastava, IISER, India

Patrick Stayton, University of Washington, USA

Marcus Textor, ETH Zurich, Switzerland

Takafumi Ueno, Tokyo Institute of Technology, Japan

Jun Wang, South China University of Technology, China

Tanja Weil, Max Planck Institute for Polymer Research, Germany

Stephanie Willerth, University of Victoria, Canada

Zimei Wu, University of Auckland, New Zealand

Evelyn Yim, Waterloo, Canada

Can Zhang, China Pharmaceutical University, China

Information for Authors

Full details on how to submit material for publication in Biomaterials Science are given in the Instructions for Authors (available from <http://www.rsc.org/authors>). Submissions should be made via the journal's homepage: rsc.li/biomaterials-science.

The journal welcomes submissions of manuscripts for publication as Full Papers, Communications, Minireviews and Reviews. Full Papers and Communications should describe original work of high quality and impact.

Additional details are available from the Editorial Office or <http://www.rsc.org/authors>

Authors may reproduce/republish portions of their published contribution without seeking permission from the Royal Society of Chemistry, provided that any such republication is accompanied by an acknowledgement in the

form: (Original Citation)–Reproduced by permission of the Royal Society of Chemistry.

This journal is © The Royal Society of Chemistry 2023.

Apart from fair dealing for the purposes of research or private study for non-commercial purposes, or criticism or review, as permitted under the Copyright, Designs and Patents Act 1988 and the Copyright and Related Rights Regulation 2003, this publication may only be reproduced, stored or transmitted, in any form or by any means, with the prior permission in writing of the Publishers or in the case of reprographic reproduction in accordance with the terms of licences issued by the Copyright Licensing Agency in the UK. US copyright law is applicable to users in the USA.

Registered charity number: 207890

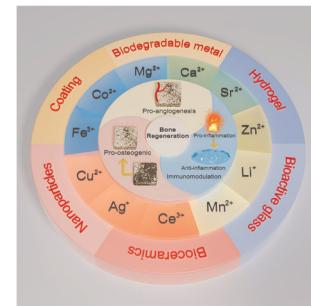


REVIEWS

7268

Metal ions: the unfading stars of bone regeneration –from bone metabolism regulation to biomaterial applications

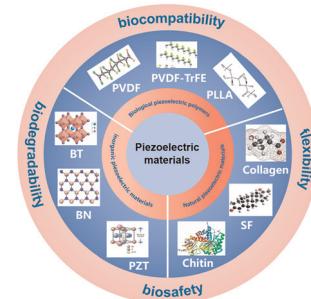
Yankun Luo, Hanghang Liu, Yaowen Zhang, Yao Liu, Shibo Liu, Xian Liu* and En Luo*



7296

Piezoelectric materials for neuroregeneration: a review

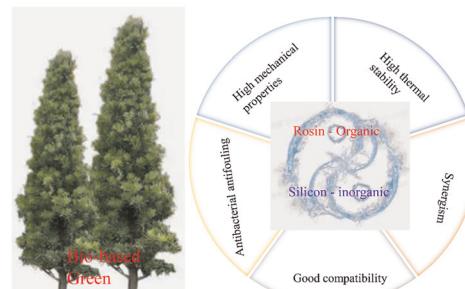
Linliang Wu, Hongxia Gao, Qi Han, Wenchao Guan, Shaolan Sun, Tiantian Zheng, Yaqiong Liu, Xiaolu Wang, Ran Huang and Guicai Li*



7311

From rosin to novel bio-based silicone rubber: a review

Qiaoguang Li, Yuxin He, Jie Yan, Yongquan Li,* Junfeng Feng* and Zhihong Wang*

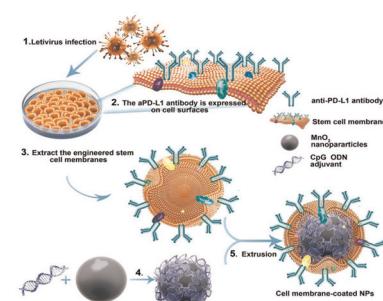


COMMUNICATIONS

7327

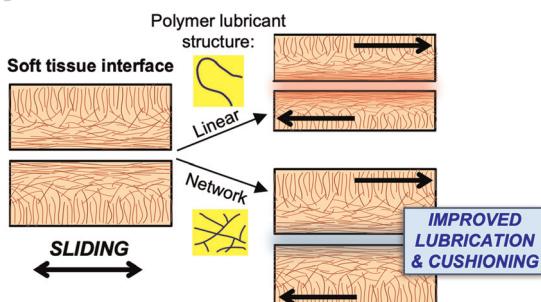
Bioinspired immuno-radio-enhancers toward synergistic nanomedicine through radiation-induced abscopal effects and immunocheckpoint blockade therapies

Pengfei Zhang, Hu Chen, Chuan Chen, Xuan Liu, Hongwei Cheng, Yaming Wu, Xiaoyong Wang, Gang Liu* and Yun Zeng*



COMMUNICATIONS

7339

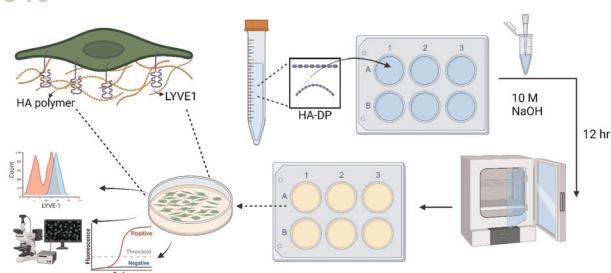


A polymer network architecture provides superior cushioning and lubrication of soft tissue compared to a linear architecture

Benjamin G. Cooper, Christian D. DeMoya, Katie J. Sikes, David D. Frisbie, Nikki Phillips, Brad B. Nelson, C. Wayne McIlwraith, Chris E. Kawcak, Laurie R. Goodrich,* Brian D. Snyder* and Mark W. Grinstaff*

PAPERS

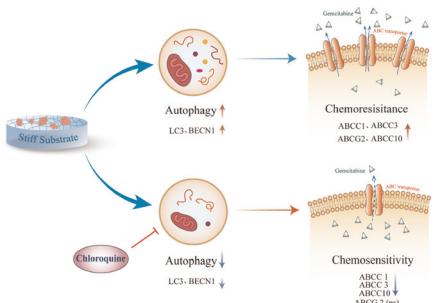
7346



Synthetic hyaluronic acid coating preserves the phenotypes of lymphatic endothelial cells

Sanjoy Saha, Fei Fan, Laura Alderfer, Francine Graham, Eva Hall and Donny Hanjaya-Putra*

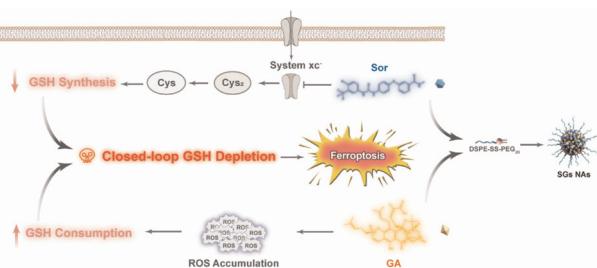
7358



Matrix stiffness triggers chemoresistance through elevated autophagy in pancreatic ductal adenocarcinoma

Haopeng Pan, Shajun Zhu, Tiancheng Gong, Di Wu, Yahong Zhao, Jiashuai Yan, Chaolun Dai, Yan Huang, Yumin Yang* and Yibing Guo*

7373



Self-engineered binary nanoassembly enabling closed-loop glutathione depletion-amplified tumor ferroptosis

Jin Lei, Shenwu Zhang, Zehua Wu, Xinxin Sun, Binghong Zhou, Peiqi Huang, Mingzhu Fang, Lin Li,* Cong Luo* and Zhonggui He*

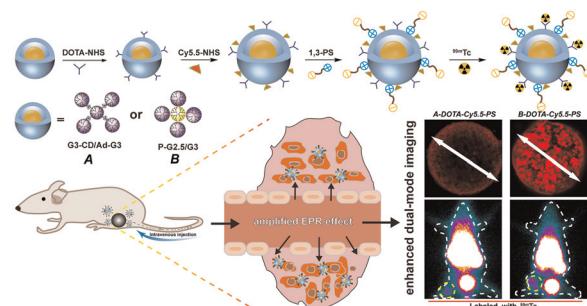


PAPERS

7387

Phosphorus core–shell tecto dendrimers for enhanced tumor imaging: the rigidity of the backbone matters

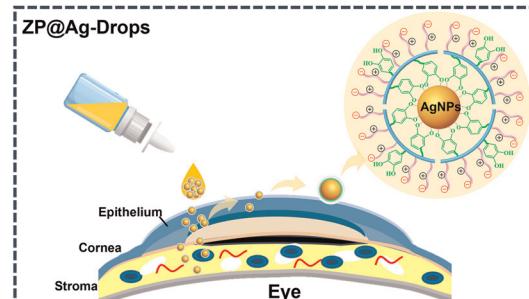
Mengsi Zhan, Dayuan Wang, Lingzhou Zhao, Liang Chen, Zhijun Ouyang, Serge Mignani, Jean-Pierre Majoral, Jinhua Zhao,* Guixiang Zhang,* Xiangyang Shi* and Mingwu Shen*



7397

Zwitterionic silver nanoparticle based antibacterial eye drops for efficient therapy of bacterial keratitis

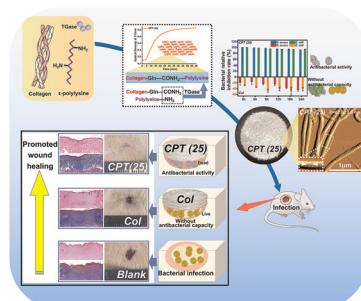
Yangjing Bai, Li Ma, Yingchun Huang, Shiying Lang, Wenjie Fan* and Gongyan Liu*



7408

An antibacterial and healing-promoting collagen fibril constructed by the simultaneous strategy of fibril reconstitution and ϵ -polylysine anchoring for infected wound repair

Xiaoxia Zhang, Changkai Yang, Xin Guo, Chun Yang and Guoying Li*



7423

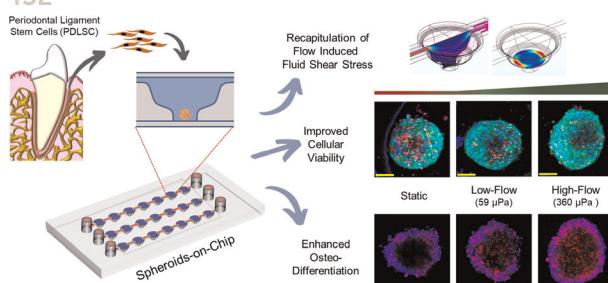
Carbon network-hosted porphyrin as a highly biocompatible nanophotosensitizer for enhanced photodynamic therapy

Min Wang, Yanlin Zheng, Huaming He, Tong Lv, Xin Xu, Xiao Fang, Chunhua Lu* and Huanghao Yang



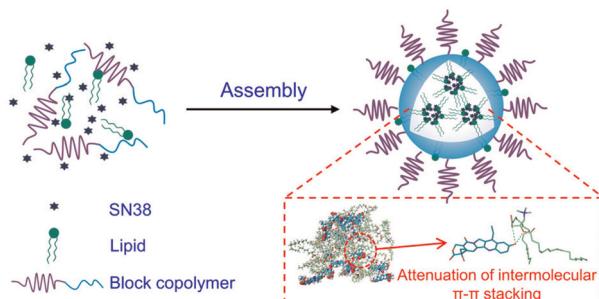
PAPERS

7432


Fluid flow-induced modulation of viability and osteodifferentiation of periodontal ligament stem cell spheroids-on-chip

Apurva Mishra, Ren Kai, Srividya Atkuru, Yichen Dai, Filippo Piccinini, Philip M. Preshaw and Gopu Sriram*

7445


Lipid-assisted PEG-*b*-PLA nanoparticles with ultrahigh SN38 loading capability for efficient cancer therapy

Xiaoyi Huang, Jieyi Li, Yanfang Yang, Zi-Lu Wang, Xian-Zhu Yang, Zi-Dong Lu* and Cong-Fei Xu*

RETRACTION

7458

Retraction: Construction of a temperature-responsive terpolymer coating with recyclable bactericidal and self-cleaning antimicrobial properties

Bailiang Wang, Zi Ye, Qingwen Xu, Huihua Liu, Quankui Lin, Hao Chen* and Kaihui Nan*

