

Biomaterials Science

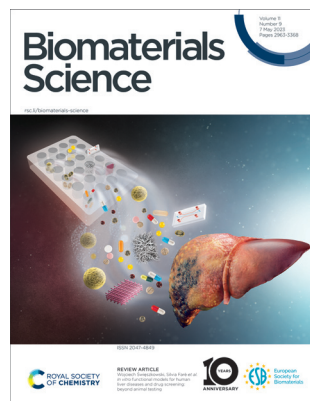
An international high impact journal exploring the underlying science behind the function, interactions and design of biomaterials

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

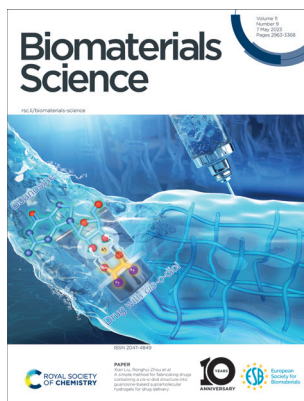
ISSN 2047-4849 CODEN BSICCH 11(9) 2963–3368 (2023)



Cover

See Wojciech Świążkowski, Silvia Farè *et al.*, pp. 2988–3015.

Image reproduced by permission of Wojciech Świążkowski from *Biomater. Sci.*, 2023, **11**, 2988.



Inside cover

See Xian Liu, Ronghui Zhou *et al.*, pp. 3092–3103.

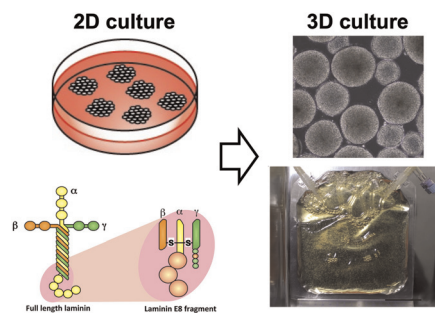
Image reproduced by permission of Ronghui Zhou from *Biomater. Sci.*, 2023, **11**, 3092.

MINIREVIEW

2974

Development of substrates for the culture of human pluripotent stem cells

Eihachiro Kawase* and Norio Nakatsuji

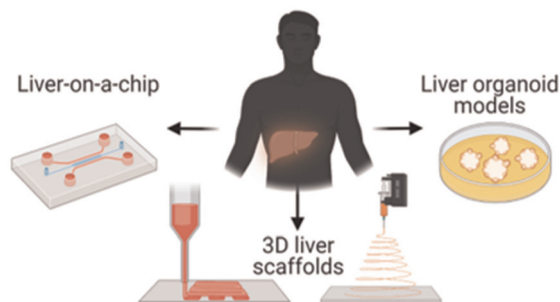


REVIEWS

2988

In vitro functional models for human liver diseases and drug screening: beyond animal testing

Alessia Paradiso, Marina Volpi, Chiara Rinoldi, Nehar Celikkin, Nicola Contessi Negrini, Muge Bilgen, Giorgio Dallera, Filippo Pierini, Marco Costantini, Wojciech Świążkowski* and Silvia Farè*



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

Can Zhang, China Pharmaceutical University,

China

Xinyuan Zhu, Shanghai Jiao Tong University, China

Editorial Board Members

Pamela Habibovic, Maastricht University,
Netherlands

Advisory Board

Lihui 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

Veena Koul, IIT Delhi, India

Christine Le Maitre, Sheffield Hallam University, 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

Phillip 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

Heungsoo Shin, Hanyang University, Korea

Molly Shoichet, 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 Yin, Waterloo, Canada

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. Submissions:

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

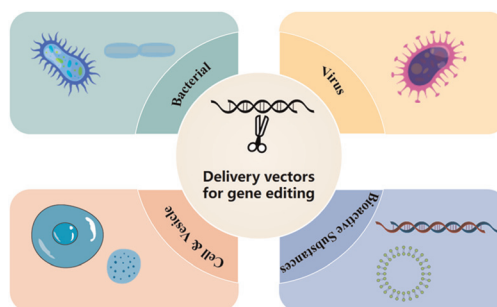


REVIEWS

3016

Biogenic materials for CRISPR delivery and therapeutics

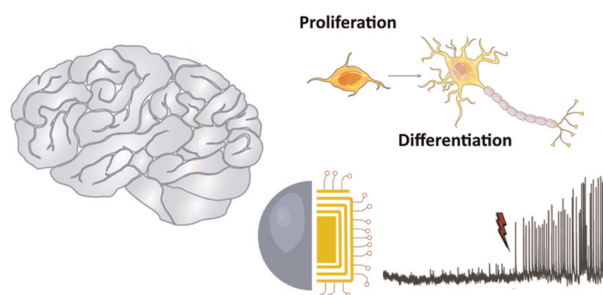
Kaiyong Yang,* Jing Qian, Chunli Zhang, Zeyu Wang, Qiqing Huang, Gaoyu Shi, Zhenyu Zhang, Yanru Yang* and Xin Han*



3034

Engineering optical tools for remotely controlled brain stimulation and regeneration

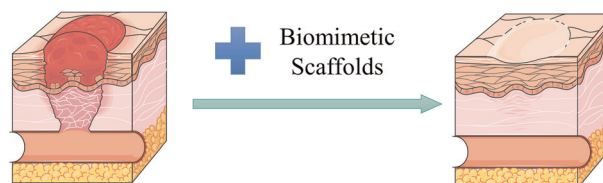
Artur Filipe Rodrigues,* Catarina Rebelo, Tiago Reis, Susana Simões, Liliana Bernardino, João Peça and Lino Ferreira*



3051

Designing biomimetic scaffolds for skin tissue engineering

Jiatian Chen, Yingwei Fan, Guozhao Dong, Huaijuan Zhou,* Ran Du, Xiaoying Tang, Yulong Ying* and Jinhua Li*

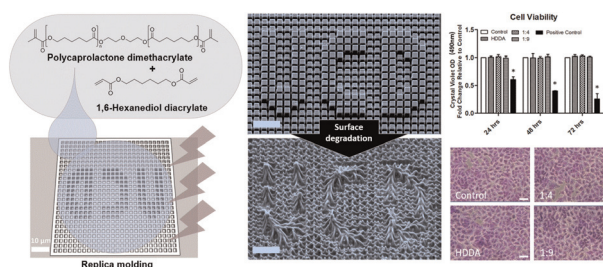


PAPERS

3077

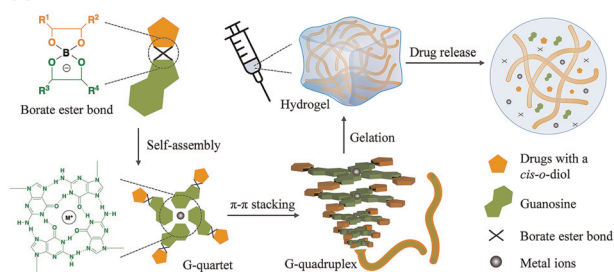
Controlled degradation of polycaprolactone-based micropillar arrays

Niamh Geoghegan, Mark O'Loughlin, Colm Delaney, Keith D. Rochfort, Meabh Kennedy, Srikanth Kolagatla, Lucia Podhorska, Brian J. Rodriguez, Larisa Florea and Susan M. Kelleher*



PAPERS

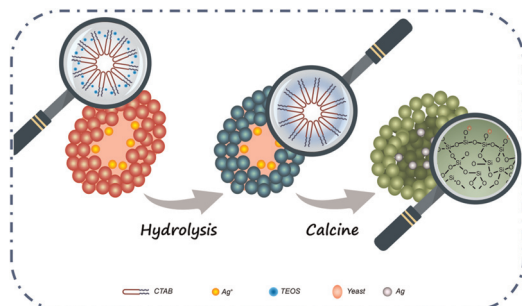
3092



A simple method for fabricating drugs containing a *cis-o*-diol structure into guanosine-based supramolecular hydrogels for drug delivery

Xin Xia, Shaojuan Song, Yinghui Wen, Jiajia Qi, Lideng Cao, Xian Liu,* Ronghui Zhou* and Hang Zhao

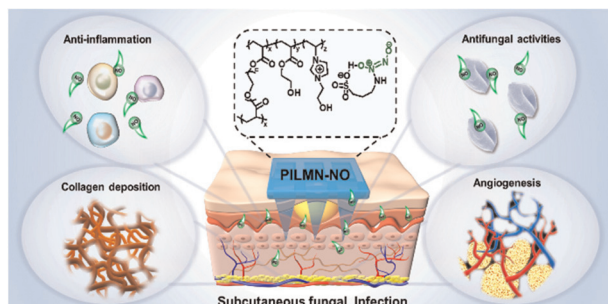
3104



Yeast cell templated porous hollow silica spheres for rapid hemostasis accompanied by antibacterial action

Yuting Shi, Yu Fang, Xiaoqin Liang, Congshu Huang, Yu Liang, Zheng Yang, Jianping Yu, Jianrong Wang* and Guanghui Zhao*

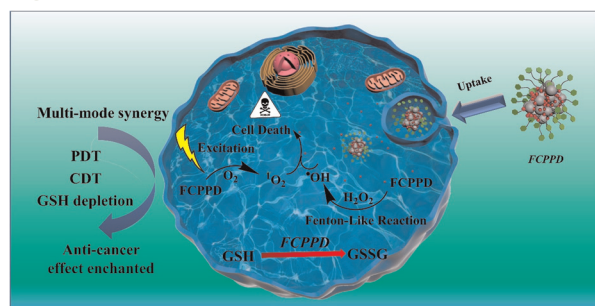
3114



Nitric oxide-releasing poly(ionic liquid)-based microneedle for subcutaneous fungal infection treatment

Qiuyang Zhang, Zijun Zhang, Xiuyang Zou, Ziyang Liu, Qingning Li, Jiamei Zhou, Shuna Gao, Hui Xu, Jiangna Guo* and Feng Yan*

3128



Organic disulfide-modified folate carbon dots for tumor-targeted synergistic chemodynamic/photodynamic therapy

Sihan Tang, Guanghao Li, Hui Zhang, Yujun Bao, Xiaodan Wu, Rui Yan, Zhiqiang Wang* and Yingxue Jin*

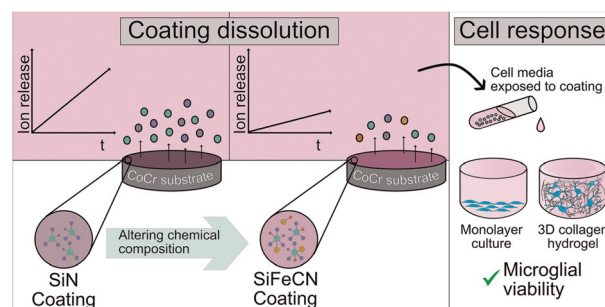


PAPERS

3144

Fe and C additions decrease the dissolution rate of silicon nitride coatings and are compatible with microglial viability in 3D collagen hydrogels

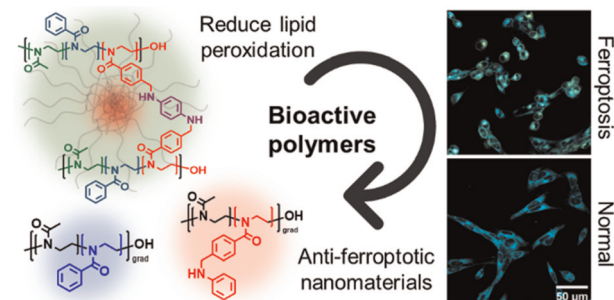
Estefanía Echeverri, Charlotte Skjöldebrand, Paul O'Callaghan, Anders Palmquist, Johan Kreuger, Gry Hulsart-Billström and Cecilia Persson*



3159

Bioactive poly(2-oxazoline)-based nanomaterials bearing arylalkylamine and benzamide motifs possess intrinsic radical trapping and anti-ferroptosis properties

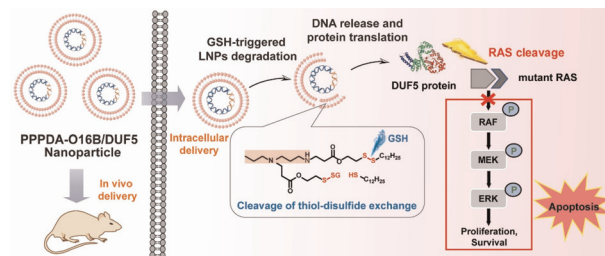
Joshua P. Morrow, David Pizzi, Zihnil A. I. Mazrad, Ashley I. Bush and Kristian Kempe*



3172

Intracellular delivery of bacterial effectors for cancer therapy using biodegradable lipid nanoparticles

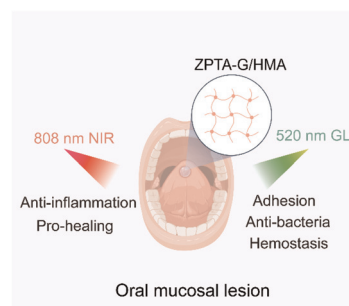
Wenting Li, Leihou Shao, Ji Liu, Jinhan Sheng, Qizhen Zheng and Ming Wang*



3180

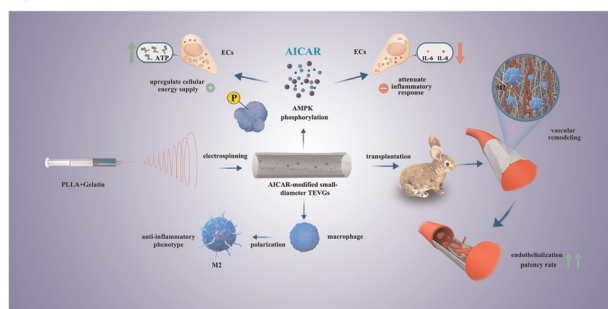
Dual-light defined *in situ* oral mucosal lesion therapy through a mode switchable anti-bacterial and anti-inflammatory mucoadhesive hydrogel

Huijie Liu, Qun Li, Yingying Xu, Yue Sun, Xin Fan, Huaqiang Fang, Binbin Hu, Li Huang, Lan Liao* and Xiaolei Wang*



PAPERS

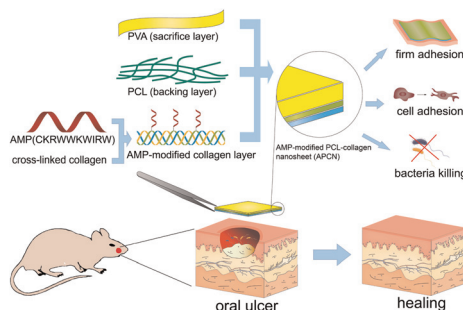
3197



Cellular energy supply for promoting vascular remodeling of small-diameter vascular grafts: a preliminary study of a new strategy for vascular graft development

Hengxian Su, Wenchao Liu, Xifeng Li, Guangxu Li, Shenquan Guo, Chang Liu, Tao Yang, Chubin Ou, Jiahui Liu, Yuanzhi Li, Chengcong Wei, Qing Huang,* Tao Xu* and Chuanzhi Duan*

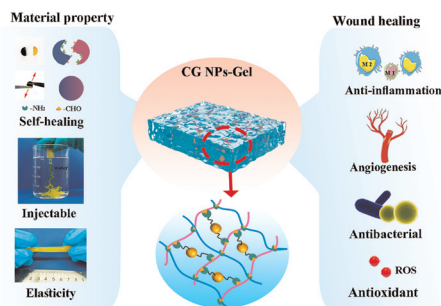
3214



Antibacterial, wet adhesive, and healing-promoting nanosheets for the treatment of oral ulcers

Haijun Fu, Jiayu Yang, Zongshan Shen, Yong Zhang, Shuhong Kuang, Lifeng Li, Zhengmei Lin* and Xuetao Shi*

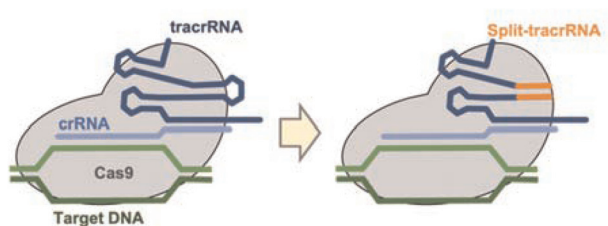
3227



An injectable elastic hydrogel crosslinked with curcumin–gelatin nanoparticles as a multifunctional dressing for the rapid repair of bacterially infected wounds

Xiaohui Cai, Yutong He, Liu Cai, Jiamian Zhan, Qian Li, Saiqiong Zhong, Honghao Hou,* Wenya Wang* and Xiaozhong Qiu*

3241



Split-tracrRNA as an efficient tracrRNA system with an improved potential of scalability

Jihyun Park, Seong Jae Kang, Seulgi Go, Jeongmin Lee, Jinsu An, Hak Suk Chung, Cherlhyun Jeong and Dae-Ro Ahn*

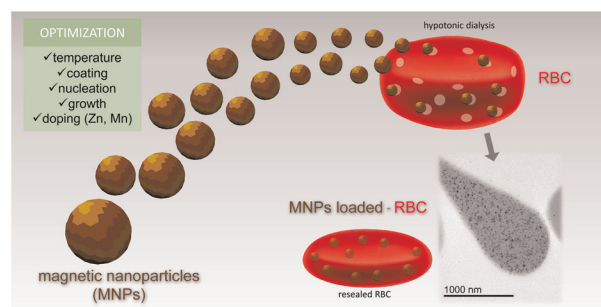


PAPERS

3252

Optimization of magnetic nanoparticles for engineering erythrocytes as theranostic agents

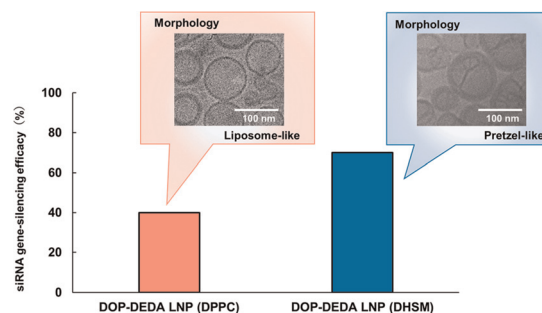
Laura Maria Slavu, Antonella Antonelli,*
Emanuele Salvatore Scarpa, Pasant Abdalla,
Claire Wilhelm, Niccolò Silvestri, Teresa Pellegrino,
Konrad Scheffler, Mauro Magnani, Rosaria Rinaldi* and
Riccardo Di Corato*



3269

Increasing the siRNA knockdown efficiency of lipid nanoparticles by morphological transformation with the use of dihydrosphingomyelin as a helper lipid

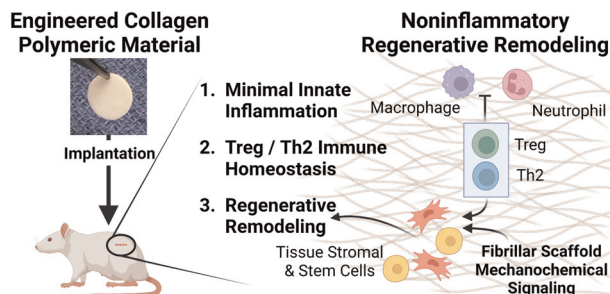
Masahiro Hashimoto, Sei Yonezawa, Song Furan,
Chiori Nitta, Noriyuki Maeda, Koji Tomita,
Ayano Yokouchi, Hiroyuki Koide and Tomohiro Asai*



3278

Engineered collagen polymeric materials create noninflammatory regenerative microenvironments that avoid classical foreign body responses

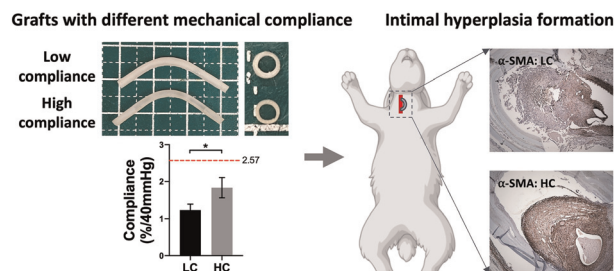
Rachel A. Morrison, Sarah Brookes, Theodore J. Puls,
Abigail Cox, Hongyu Gao, Yunlong Liu and
Sherry L. Voytik-Harbin*



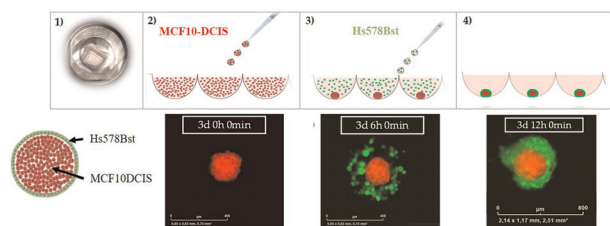
3297

In vivo evaluation of compliance mismatch on intimal hyperplasia formation in small diameter vascular grafts

Yuan Yao, Grace Pohan, Marie F. A. Cutiongco,
YeJin Jeong, Joshua Kunihiro, Aung Moe Zaw,
Dency David, Hanyue Shanguan, Alfred C. H. Yu and
Evelyn K. F. Yim*



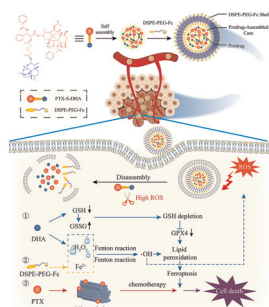
3308



A bicellular fluorescent ductal carcinoma *in situ* (DCIS)-like tumoroid to study the progression of carcinoma: practical approaches and optimization

Ola Habanjar,* Anne-Catherine Maurin, Cyrielle Vituret, Caroline Vachias, Lucie Longechamp, Cécile Garnier, Caroline Decombat, Céline Bourgne, Mona Diab-Assaf, Florence Caldefie-Chezet and Laetitia Delort

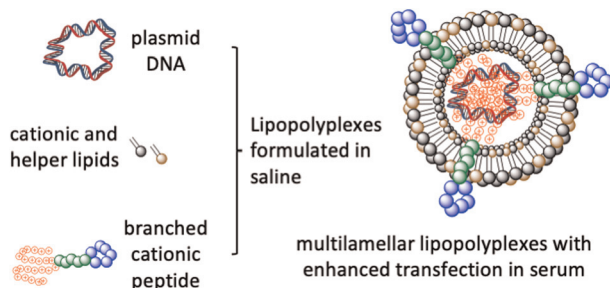
3321



Self-assembled thioether-bridged paclitaxel-dihydroartemisinin prodrug for amplified antitumor efficacy-based cancer ferroptotic-chemotherapy

Yifei Zheng, Chao Qin, Fei Li, Jingxin Qi, Xinyu Chu, Hao Li, Ting Shi, Zhen Yan, Lei Yang, Xiaofei Xin, Lisha Liu, Xiaopeng Han* and Lifang Yin*

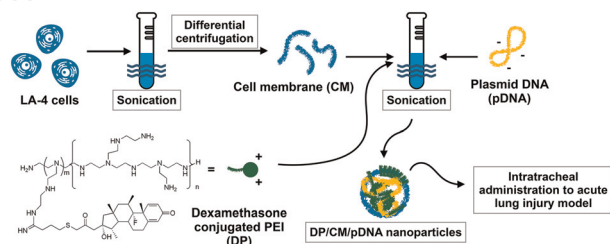
3335



Understanding and optimising the transfection of lipopolyplexes formulated in saline: the effects of peptide and serum

Lili Cui, Laila Kudsiova, Frederick Campbell, David J. Barlow, Helen C. Hailes, Alethea B. Tabor* and M. Jayne Lawrence*

3354



Hybrid nanoparticles with cell membrane and dexamethasone-conjugated polymer for gene delivery into the lungs as therapy for acute lung injury

Chuanyu Zhuang, Chunxian Piao, Minji Kang, Jihun Oh and Minhyung Lee*



RETRACTION

3365

Retraction: Enhanced bone defect repairing effects in glucocorticoid-induced osteonecrosis of the femoral head using a porous nano-lithium-hydroxyapatite/gelatin microsphere/erythropoietin composite scaffold

Donghai Li, Xiaowei Xie, Zhouyuan Yang, Changde Wang, Zhun Wei and Pengde Kang*

