

# Food & Function

[rsc.li/food-function](https://rsc.li/food-function)

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 2042-650X CODEN FFOUAI 14(14) 6277–6752 (2023)



### Cover

See Beiwei Zhu,  
Xinping Lin *et al.*,  
pp. 6363–6375.

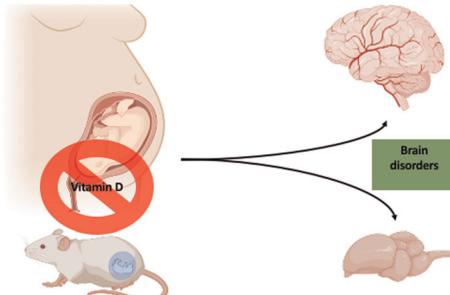
Image reproduced by  
permission of Xinping Lin  
from *Food Funct.*, 2023, **14**,  
6363.

## REVIEWS

6290

### Maternal vitamin D deficiency and brain functions: a never-ending story

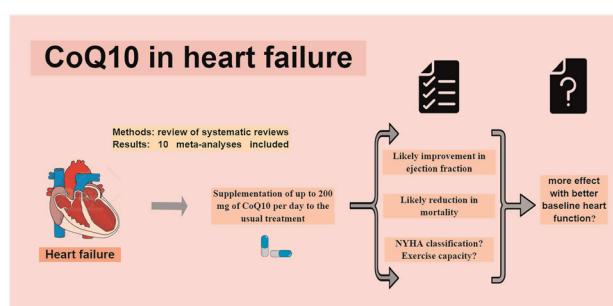
Lidia Saidi, Habib Hammou, Flavie Sicard,  
Jean-François Landrier and Lourdes Mounien\*



6302

### Effect of coenzyme Q10 on cardiac function and survival in heart failure: an overview of systematic reviews and meta-analyses

Eva Alarcón-Vieco, Irene Martínez-García, Irene Sequí-Domínguez,\* Eva Rodríguez-Gutiérrez, Nerea Moreno-Herráiz and Carlos Pascual-Morena



**Editorial Staff****Executive Editor**

Philippa Ross

**Deputy Editor**

Alice Smallwood

**Editorial Production Manager**

Jason Woolford

**Development Editor**

David Lake

**Publishing Editors**Gabriel Clarke, Derya Kara-Fisher,  
Emma Stephen, Ziva Whitelock**Publishing Assistant**

Andrea Whiteside

**Editorial Assistant**

Leo Curtis

**Publisher**

Jeanne Andres

For queries about submitted articles please contact  
Jason Woolford, Editorial production manager, in the first  
instance. E-mail [food@rsc.org](mailto:food@rsc.org)

For pre-submission queries please contact  
Philippa Ross, Executive Editor.  
E-mail [food-rsc@rsc.org](mailto:food-rsc@rsc.org)

Food & Function (electronic: ISSN 2042-650X) is published  
12 times a year by the Royal Society of Chemistry,  
Thomas Graham House, Science Park, Milton Road,  
Cambridge, CB4 0WF, UK.

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](mailto:orders@rsc.org)

2023 Annual (electronic) subscription price: £2665; US\$4591.  
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](http://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](mailto:advertising@rsc.org)

For marketing opportunities relating to this journal,  
contact [marketing@rsc.org](mailto:marketing@rsc.org)

# Food & Function

Linking the chemistry and physics of food with health and nutrition

[rsc.li/food-function](http://rsc.li/food-function)

## Editorial Board

**Editor-in-Chief**

Christine Morand, INRA, France

**Associate Editors**

Lillian Barros, Polytechnic Institute of  
Bragança, Portugal  
Catherine Bondonno, Edith Cowan  
University, Australia  
Laura Bravo-Clemente, Institute of Food  
Science, Technology and Nutrition, Spain

Mario Ferruzzi, Arkansas Children's Nutrition  
Center and University of Arkansas for Medical  
Sciences, USA  
Monica Galleano, University of Buenos Aires,  
Argentina  
Liwei Gu, University of Florida, USA  
Kee-Hong Kim, Purdue University, USA  
Andrew Nielson, North Carolina State  
University, USA

Ana Rodriguez-Mateos, King's College  
London, UK  
Hiroyuki Sakakibara, University of Miyazaki,  
Japan  
Elke Scholten, Wageningen University,  
The Netherlands

## Advisory Board

Mario Allegra, University of Palermo, Italy  
Hitoshi Ashida, Kobe University, Japan  
Letizia Bresciani, University of Parma, Italy  
Aedin Cassidy, University of East Anglia, UK  
Steven Feng Chen, Peking University, China  
Zhen-yu Chen, Chinese University of Hong  
Kong, Hong Kong  
Peter Clifton, Baker IDI Heart & Diabetes  
Institute  
Kevin Croft, University of Western Australia,  
Australia  
Eric Decker, University of Massachusetts, USA  
Inês Figueira, NOVA Medical School, Portugal  
Tim Foster, University of Nottingham, UK  
Cesar Fraga, University of Buenos Aires,  
Argentina & University of California, Davis,  
USA  
Rocio Garcia-Villalba, CEBAS-CSIC, Spain  
Mike Gidley, University of Queensland,  
Australia

H. Douglas Goff, University of Guelph, Canada  
Antonio Gonzales-Sarrias, CEBAS-CSIC, Spain  
Chi-Tang Ho, Rutgers University, USA  
Richard Hurrell, ETH Zurich, Switzerland  
Luana Izzo, University of Naples Federico  
II, Italy  
Rui Hai Liu, Cornell University, USA  
Alejandro Marangoni, University of Guelph,  
Canada  
Julian McClements, University of  
Massachusetts, USA  
Dragan Milenkovic, University of California,  
Davis, USA  
Paul Moughan, Riddet Institute, Massey  
University, New Zealand  
Kevin Murray, The University of Western  
Australia, Australia  
Patricia Oteiza, University of California,  
Davis, USA  
Junji Terao, Konan Women's University, Japan

George van Aken, NIZO Food Research, The  
Netherlands  
Rob van Dam, National University of  
Singapore, Singapore  
Erik van der Linden, TI Food & Nutrition, The  
Netherlands  
Natalie Ward, University of Western Australia,  
Australia  
Gary Williamson, University of Leeds, UK  
Jianping Wu, University of Alberta, Canada  
Xingbin Yang, Shaanxi Normal University,  
China  
Gow-Chin Yen, National Chung Hsing  
University, Chinese Taipei  
Beiwei Zhu, Dalian Polytechnic University,  
China

## Information for Authors

Full details on how to submit material for publication in Food & Function 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/food-function](http://rsc.li/food-function)

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

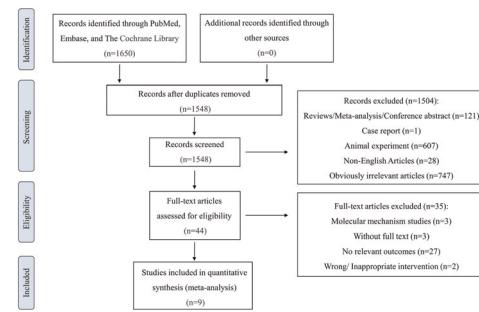


## REVIEWS

6312

## Association of branched-chain fatty acids with metabolic syndrome: a systematic review and meta-analysis of observational studies

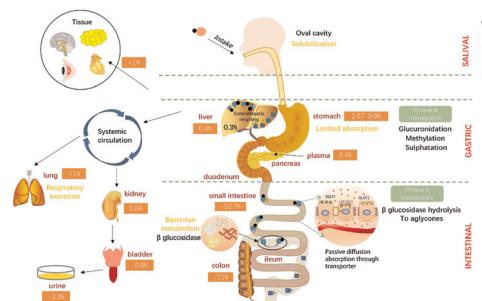
Yuan He, Xin-Hui-Zi Hong, Meng Xu, Yuan-Fa Liu and Yong-Jiang Xu\*



6320

## A review of recent advances on cyanidin-3-glucoside: the biotransformation, absorption, bioactivity and applications of nano-encapsulation

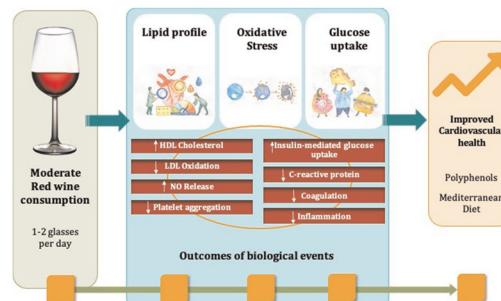
Mengyu Yang, Abdullah, Naveed Ahmad, Muhammad Hussain, Xiaoqin Lu, Jie Xu, Hao Zhong\* and Rongfa Guan\*



6346

## Moderate red wine intake and cardiovascular health protection: a literature review

Francesca Serio,\* Giovanni Imbriani, Mattia Acito, Massimo Moretti, Francesco Paolo Fanizzi, Antonella De Donno and Giuseppe Valacchi\*

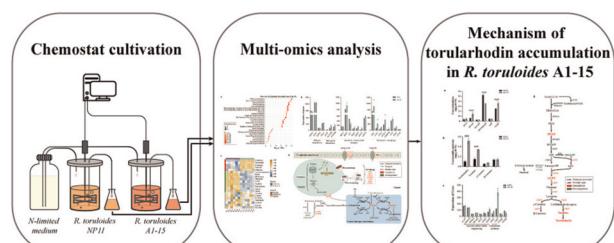


## PAPERS

6363

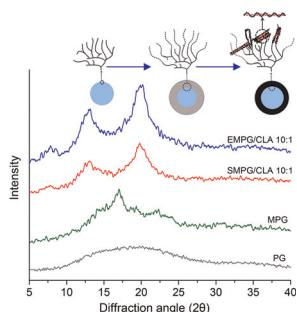
## Multi-omics analysis reveals the mechanism of torularhodin accumulation in the mutant *Rhodosporidium toruloides* A1-15 under nitrogen-limited conditions

Mengyang Liu, Haitao Wang, Xu Yan, Sufang Zhang, Chaofan Ji, Yingxi Chen, Beiwei Zhu\* and Xinping Lin\*



## PAPERS

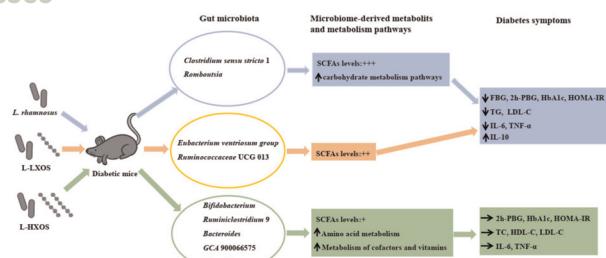
6376



### Development of phytoglycogen-derived core–shell–corona nanoparticles complexed with conjugated linoleic acid

Ziqi Wang, Xiuting Hu, Bruce R. Hamaker, Tao Zhang and Ming Miao\*

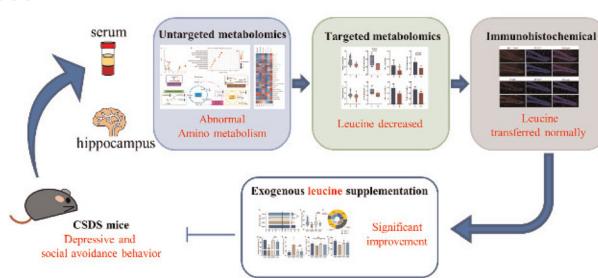
6385



### Dose-dependent effects of xylooligosaccharides on glycemic regulation with *L. rhamnosus* CCFM1060 in diabetic mice

Mengjun Cui, Peng Yu, Tristan C. Liu, Jianguo Liu, Kexin Li, Peng Zhou\* and Xiaoming Liu\*

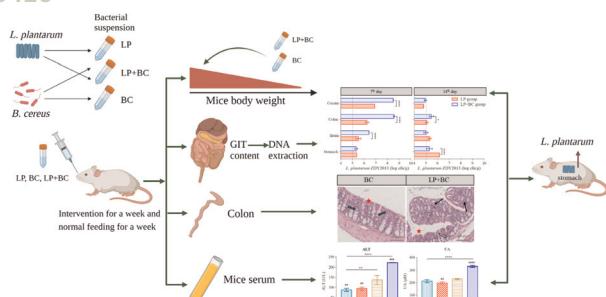
6397



### Revealing the role of leucine in improving the social avoidance behavior of depression through a combination of untargeted and targeted metabolomics

Qi Wang, Zhenning Wu, Huan Xiang, Yuzhi Zhou, Xuemei Qin\* and Junsheng Tian\*

6410



### Acid-tolerant *Lactiplantibacillus plantarum* ZDY2013 shows a colonization niche preference and interacts with enterotoxigenic *Bacillus cereus* in specific-pathogen-free mice

Na Zhang, Jinmei Li, Ying Zhan, Kaiming Wang, Zhongxu Zhan, Hua Wei\* and Zhihong Zhang\*

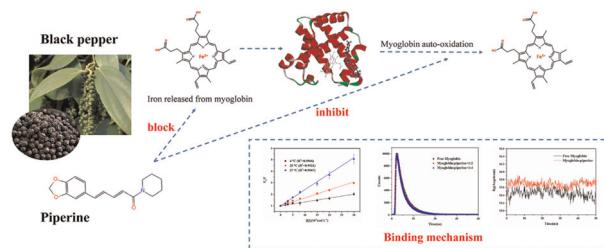


## PAPERS

6422

**Binding behavior and antioxidant study of spice extract piperine with respect to meat myoglobin**

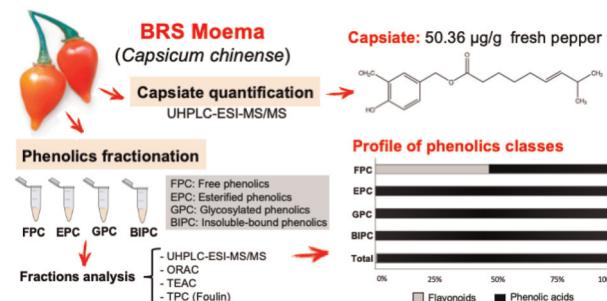
Di Wu,\* Xia Hu, Zhangyu Cai, Jing Zhang, Fang Geng and Hui Li



6432

***Capsicum chinense* var. BRS Moema: chemical characterization by HPLC-ESI-MS/MS and antiproliferative screening**

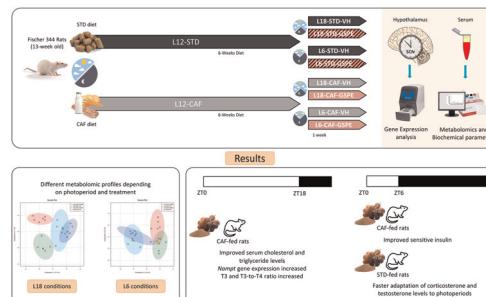
Ana Carolina de Aguiar,\* Gustavo Araujo Pereira, Cláudia Silva da Costa Ribeiro, Marcos Nogueira Eberlin, Lana Pereira Soares, Ana Lucia Tasca Gois Ruiz, Gláucia Maria Pastore and Julian Martínez



6443

**Metabolism disturbance by light/dark cycle switching depends on the rat health status: the role of grape seed flavanols**

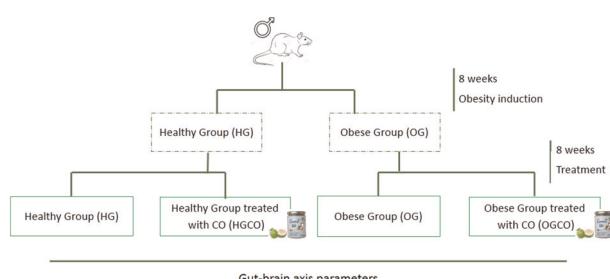
Jorge R. Soliz-Rueda, Raúl López-Fernández-Sobrino, Cristina Torres-Fuentes, Francisca I. Bravo, Manuel Suárez, Miquel Mulero and Begoña Muguerza\*



6455

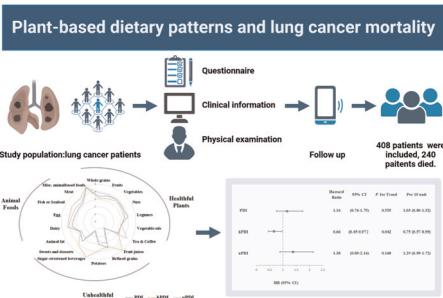
**Extra virgin coconut oil (*Cocos nucifera* L.) intake shows neurobehavioural and intestinal health effects in obesity-induced rats**

M. H. Araújo de Vasconcelos, R. L. Tavares, M. L. da V. Dutra, K. S. Batista, A. B. D’Oliveira, R. O. Pinheiro, R. de A. Pereira, M. dos S. Lima, M. G. da S. S. Salvadori, E. L. de Souza, M. Magnani, A. F. Alves and J. de S. Aquino\*



## PAPERS

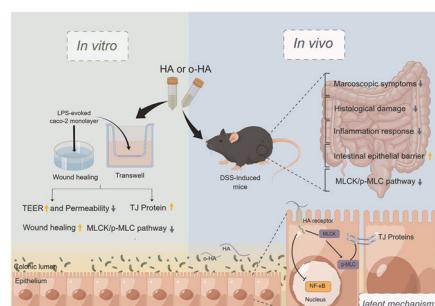
6470



**Plant-based dietary patterns and lung cancer mortality: a perspective cohort study**

Qian Wang, Qi Cui, Jin-Ping Gao and Yu-Hong Zhao\*

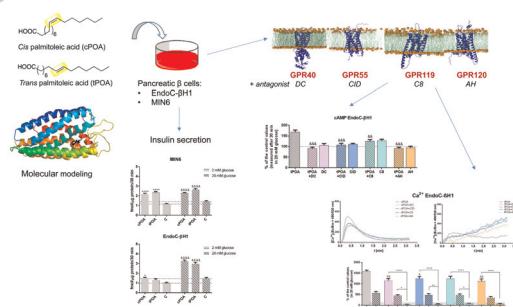
6482



**A comparative study of the ameliorative effects of hyaluronic acid oligosaccharides and hyaluronic acid on DSS-induced colitis in mice and research on relevant mechanisms**

Wei Liu, Yuan-Yuan Liu, Meng-Qiu Zhang, Miao-Zhen Qin, Yuan-Yuan Yang, Bi-Wen Liu, Dong-Jian Zhang, Cui-Hua Jiang, Zhi-Qi Yin, Min Lu, Jian-ping Shen\* and Jian Zhang\*

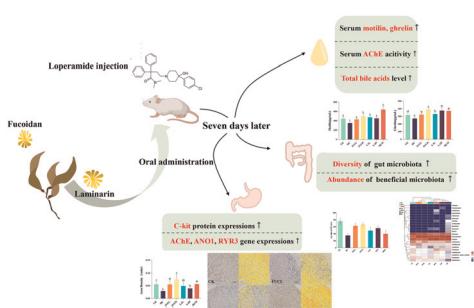
6496



**Trans-palmitoleic acid, a dairy fat biomarker, stimulates insulin secretion and activates G protein-coupled receptors with a different mechanism from the cis isomer**

Eliza Korkus, Marcin Szustak, Rafal Madaj, Arkadiusz Chworos, Anna Drzazga, Maria Koziołkiewicz, Grzegorz Dąbrowski, Sylwester Czaplicki, Iwona Konopka and Edyta Gendaszewska-Darmach\*

6513



**The regulatory effects of fucoidan and laminarin on functional dyspepsia mice induced by loperamide**

Tianxu Liu, Mengting Zhang, Ismail Muhammad Asif, Yonglin Wu, Bin Li and Ling Wang\*

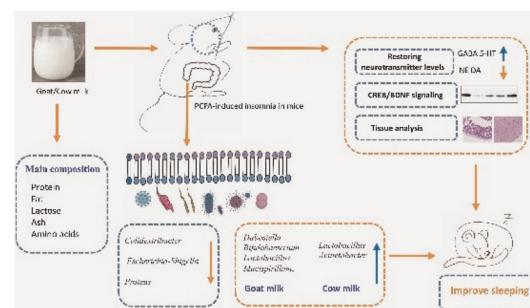


## PAPERS

6526

## Goat and cow milk differ in altering the microbiota composition and neurotransmitter levels in insomnia mouse models

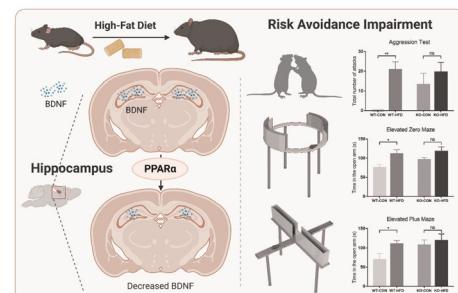
Ling Mo, Huijuan Jing, Xiaojing Du, Chaochao Zhao, Yintao Lin, Jie Li and Hongxin Wang\*



6541

## PPAR $\alpha$ is involved in high-fat diet-induced risk avoidance impairment via the regulation of hippocampal BDNF

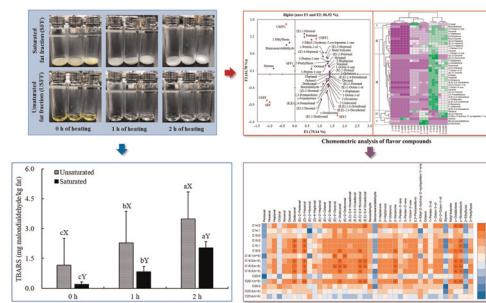
Xin-Yi Zhu, Jia Luo, Xiao-Jie Wei, Lu-Hui Pan, Xiao-Fan Xu, Lin-Bo Hu, Yi-Bei Dong, Ying-Ke Jiang, Fei-Yuan Dong, Le Xu, Li-Min Xu, Ai-Ming Liu\* and Xiao-Qin Zhang\*



6554

## Lipid oxidation and flavor changes in saturated and unsaturated fat fractions from chicken fat during a thermal process

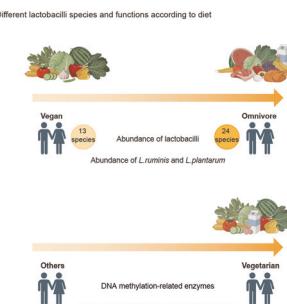
Dong Han, Siyang Deng, Hang Wang, Feng Huang, Marie-Laure Fauconnier, Hong Li, Jian Zheng, Linchun Meng, Chunhui Zhang\* and Xia Li\*



6570

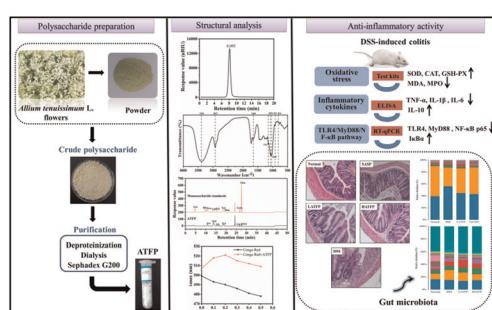
## Compositional and functional features of the intestinal lactobacilli associated with different long-term diet types

Shanrong Yi, Chengcheng Zhang, Pingping Yin, Leilei Yu, Fengwei Tian, Wei Chen and Qixiao Zhai\*



## PAPERS

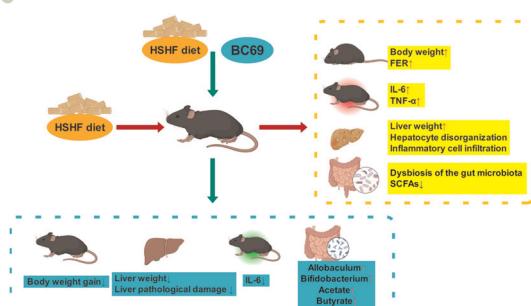
6582



**A polysaccharide from *Allium tenuissimum* L. flowers relieves ulcerative colitis by regulating the inflammatory signaling pathway and gut microbiota**

Yan Zhang,\* Siyu Yu, Jia Liu, Ying Liu, Jie Luo and Yong Li

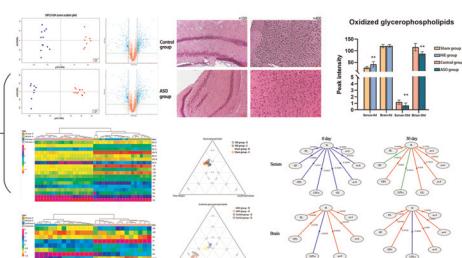
6596



**Effects of the probiotic *Bacillus coagulans* BC69 on the metabolic and histological alterations induced by a high-sugar and high-fat diet in C57BL/6J mice**

Jiawei Huang, Rumeng Jiang and Yonghong Wang\*

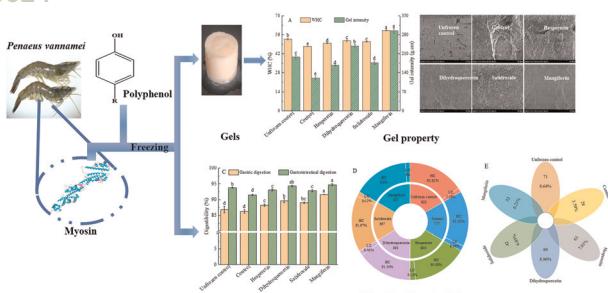
6610



**Lipidomics reveal the cognitive improvement effects of *Acer truncatum* Bunge seed oil on hypoxic-ischemic encephalopathy rats**

Xianyang Chen,\* Wangting Song,\* Yige Song, Hongli Cao, Xiao Xu, Shujia Li, Yanmin Fu, Teng Xue, Chunguang Ding, Feng Lin, Yuan Shi and Jiujun Li\*

6624



**Effects of polyphenols on the gel and digestive properties of *Penaeus vannamei* myosin after freezing**

Yanfang Lv, Xiaoyan Zhen, Qianqian Liang, Defu Zhang, Shumin Yi, Xuepeng Li\* and Jianrong Li\*

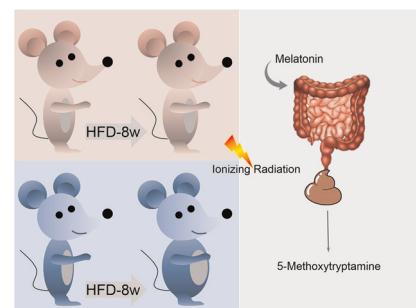


## PAPERS

6636

**High-fat diet alters the radiation tolerance of female mice and the modulatory effect of melatonin**

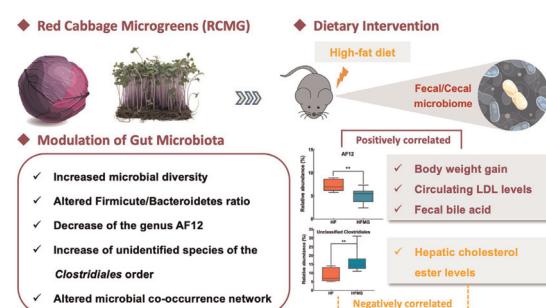
Lu Lu,\* Jingming Ren, Tong Yuan, Xinran Lu, Yiping Dong, Wenzuan Li, Xinyue Wang, Qidong Huo, Junling Zhang, Deguan Li and Sajun Fan\*



6654

**Red cabbage microgreen modulation of gut microbiota is associated with attenuation of diet-induced obesity risk factors in a mouse model**

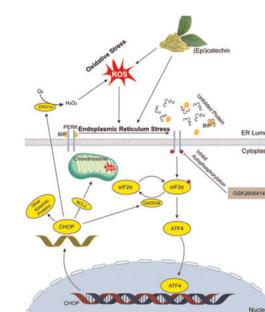
Yanbei Wu, Quynhchi Pham, Yali Wang, Haiqiu Huang, Xiaojing Jiang, Robert W. Li, Liangli Yu, Yuguang Luo, Jing Wang and Thomas T. Y. Wang\*



6665

**(Epi)catechin damage effects on the development of mouse intestinal epithelial structure through the PERK-eIF2 $\alpha$ -ATF4-CHOP pathway**

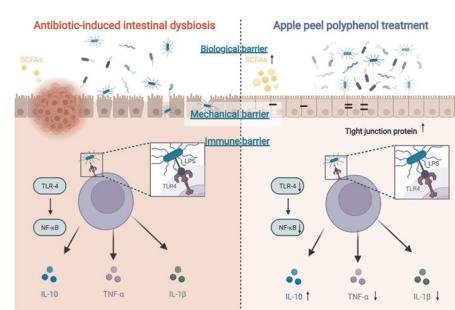
Shijie Guo, Weiwei Huang, Qingqing Cao, Qingbin Guo, Jianzhong Han\* and Yumei Qin\*



6678

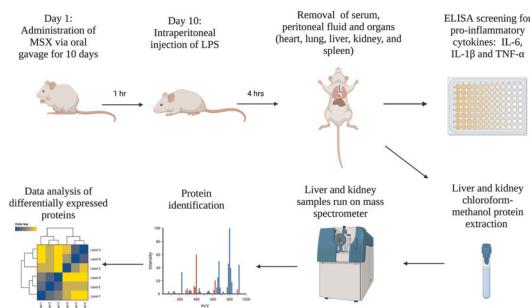
**Apple peel polyphenol alleviates antibiotic-induced intestinal dysbiosis by modulating tight junction proteins, the TLR4/NF- $\kappa$ B pathway and intestinal flora**

Ziqian He, Na Deng, Bisheng Zheng,\* Yingjie Gu, Jian Chen, Tong Li, Rui Hai Liu, Ling Yuan and Wenzhi Li



## PAPERS

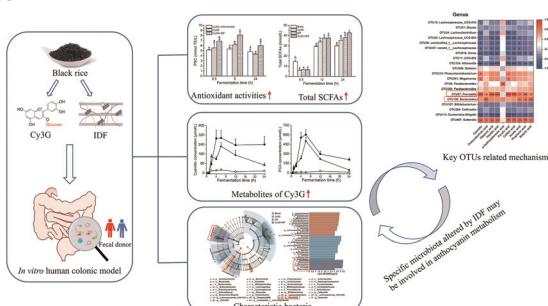
6690



## Uncovering the anti-inflammatory mechanisms of phenolic-enriched maple syrup extract in lipopolysaccharide-induced peritonitis in mice: insights from data-independent acquisition proteomics analysis

Tess Puopolo, Huifang Li, Hang Ma, Joseph M. Schrader, Chang Liu\* and Navindra P. Seeram\*

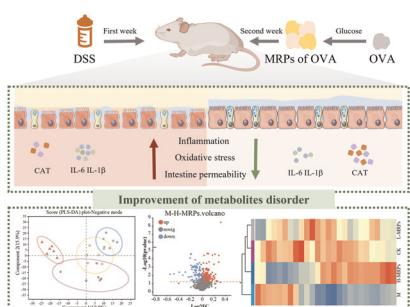
6707



## Modulation effect of black rice dietary fiber on the metabolism and fermentation of cyanidin-3-glucoside in an *in vitro* human colonic model

Shuai Zhang, Mei Deng, Ruifen Zhang, Xuchao Jia, Fei Huang, Dong Zhao, Lihong Dong, Jianwei Chi, Zhida Sun, Qin Ma\* and Mingwei Zhang\*

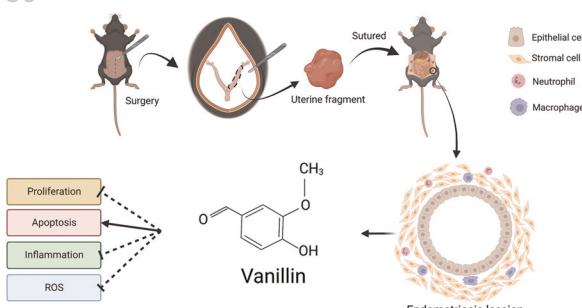
6718



## Untargeted metabolomics revealed the regulatory effect of Maillard reaction products of ovalbumin with different degrees on the metabolism of colitis mice

Qi Yang, Xiaomin Shang, Ting Li, Siwen Lyu, Xuanting Liu, Zhiyang Du, Jingbo Liu and Ting Zhang\*

6730



## Vanillin prevents the growth of endometriotic lesions through anti-inflammatory and antioxidant pathways in a mouse model

Ying-Nan Liu, Jin-Wen Kang, Yu Zhang, Shan-Shan Song, Qi-Xin Xu, Han Zhang, Lei Lu, Shu-Wen Wei, Chen Liang and Ren-Wei Su\*



## CORRECTIONS

6745

**Correction: Polycyclic polyprenylated acylphloroglucinols from *Garcinia xanthochymus* fruits exhibit antitumor effects through inhibition of the STAT3 signaling pathway**

Jing Xu, Shan Jin, Fei Gan, Hui Xiong, Zhinan Mei, Yu Chen\* and Guangzhong Yang\*

6749

**Correction: Heat-treated foxtail millet protein delayed the development of pre-diabetes to diabetes in mice by altering gut microbiota and metabolomic profiles**

Han Wang, Qun Shen, Fan Zhang, Yongxia Fu, Yiqing Zhu, Liangxing Zhao, Chao Wang and Qingyu Zhao\*

