
PNS

PROCEEDINGS OF THE NUTRITION SOCIETY

Volume: 72

Number: 3

August 2013

Available online at
www.journals.cambridge.org

Symposia featured in this issue:

Immuno nutrition & novel substrates
Nutrition Society Cuthbertson Medal Lecture

'Transforming the nutrition landscape in Africa'

Plenary Session 1
Reproductive Health and Fetal Origins
Fatty acids and Health and Disease
Sodium Reduction

'Translating nutrition: integrating research, practice and policy'

Intervention study design and personalised nutrition

Proceedings of the Nutrition Society

Volume 72, 2013 ISSN: 0029-6651

Aims and Scope

Proceedings of the Nutrition Society publishes papers and abstracts presented by members and invited speakers at the scientific meetings of The Nutrition Society.

Coverage includes

- Cellular and molecular nutrition (including immunology)
- Nutritional genomics
- Nutrition and the food chain
- Clinical nutrition and metabolism
- Obesity and body composition
- Infant nutrition
- Diet selection and control of intake
- Nutrition and behaviour
- Reproduction, growth and development
- Public health nutrition
- Nutrition policy
- Sports and exercise nutrition
- Animal nutrition and metabolism
- Molecular aspects of nutrition
- Functional foods
- Macronutrient metabolism
- Micronutrients and antioxidants
- Companion animal nutrition
- Epidemiology

The *Proceedings of the Nutrition Society* is published four times a year by Cambridge University Press on behalf of the Nutrition Society. Symposium papers are published in February, May, August and November and are available as hard copy or electronically; Original Communications from individual meetings are published electronically only and comprise an OCE issue.

The journal is available on the Internet at: journals.cambridge.org/pns

Editor in Chief

M O'Sullivan, *Trinity Centre for Health Science, Dublin, Republic of Ireland*

Deputy Editor

A Mostyn, *School of Veterinary Medicine and Science, University of Nottingham, UK*

Editorial Board

M Cantwell, *Queen's University Belfast, UK*
A Chwalibog, *University of Copenhagen, Denmark*
A Cross, *National Cancer Institute, USA*
J E Drew, *Rowett Institute of Nutrition and Health, University of Aberdeen, UK*
M D Robertson, *Diabetes and Endocrinology, University of Surrey, UK*
P Sharp, *Nutritional Sciences Division, King's College London, UK*
M Siervo, *Institute for Ageing and Health, Newcastle University, UK*

Science Committee

K M Younger <i>Chair/Treasurer</i>	M O'Sullivan <i>Proceedings Editor</i>	D Bender <i>Publications Officer</i>
A Gallagher <i>Programmes Secretary</i>	A Salter <i>Scientific</i>	F Thies <i>Scottish Section Secretary</i>
E Gibney <i>Irish Section Secretary</i>	B Corfe <i>Cellular and Molecular Nutrition Theme</i>	A Welch <i>Public Health Nutrition Theme</i>
B Corfe <i>Cellular and Molecular Nutrition Theme</i>	A Welch <i>Public Health Nutrition Theme</i>	B Griffin <i>Whole Body Metabolism Theme</i>

Publications Staff

C Goodstein, *Publications Manager*;
C Jackson, *Deputy Publications Manager*;
L Weeks, D Owen, *Publications Officers*

The Nutrition Society has as its objectives the advancement of the scientific study of nutrition and its application to the maintenance of human and animal health.

Honorary Officers of the Society

J J Strain <i>President</i>	H J McArdle <i>Secretary</i>	K M Younger <i>Treasurer</i>
A Gallagher <i>Programmes Secretary</i>	D A Sewell <i>External Relations</i>	D Bender <i>Publications</i>
B Lang <i>Training and Education</i>	S Bird <i>Public Engagement</i>	P Amuna <i>International Affairs</i>

Application for membership is open to any person who has a genuine interest in the science of human or animal nutrition and its application to human or animal health. Reduced subscriptions are available to full-time student members within 2 years of graduation and retired members, the unwaged and members who reside in very low income countries.

For more information about membership benefits and for membership application forms, contact The Nutrition Society, 10 Cambridge Court, 210 Shepherds Bush Road, London, W6 7NJ, UK. Tel: +44 (0)20 7605 6555, Fax: +44 (0)20 7602 1756, Email: office@nutsoc.org.uk

The Nutrition Society Home Page is at <http://www.nutritionssociety.org>

© Nutrition Society 2013

Contents

Proceedings of the
Nutrition
Society

Arena Convention Centre, Liverpool, 17–20 June 2012

Digestive Disorders Federation Conference

BAPEN and Nutrition Society Symposium: Immuno nutrition & novel substrates

Chair: C. J. Seal, *University of Newcastle*

Lipids for intravenous nutrition in hospitalised adult patients: a multiple choice of options
P. C. Calder 263–276

Novel nutritional substrates in surgery
N. Buijs, E. Wörner, S. Brinkmann, J. Luttikhoud, B. van der Meij, A. Houdijk & P. van Leeuwen 277–287

Nutrition Society Sir David Cuthbertson Medal Lecture

Mechanisms and effectiveness of prebiotics in modifying the gastrointestinal microbiota for the management of digestive disorders
K. Whelan 288–298

University of the Free State, Bloemfontein, South Africa, 1–4 October 2012

Conference on ‘Transforming the nutrition landscape in Africa’

Plenary Session 1

Chairs: A. Lartey & R. Lategan

Feeding the immune system
P. C. Calder 299–309

Dietary management of the metabolic syndrome - one size fits all?
C. M. Champagne & G. A. Bray 310–316

Plenary Session 2: Joint Nutrition Congress Africa-Nutrition Society Symposium: Reproductive Health and Fetal Origins

Chairs: M. Smuts & P. Amuna

Fetal programming of CVD and renal disease: animal models and mechanistic considerations
S. C. Langley-Evans 317–325

Plenary Session 3: Fatty acids and Health and Disease

Chairs: M. Smuts & D. Marais

n-3 Fatty acids, inflammation and immunity: new mechanisms to explain old actions
P. C. Calder 326–336

Dietary lipid modification for mild and severe dyslipidaemias
A. D. Marais 337–341

Plenary Session 8: Sodium Reduction

Chairs: P. Jooste & E. Vorster

Assessment of salt intake: how accurate is it?
C. M. Champagne & K. C. Cash 342–347

Queen's University, Belfast, 16–19 July 2012

Conference on 'Translating nutrition: integrating research, practice and policy'

Symposium 2: Intervention study design and personalised nutrition

Chairs: I. Young, *Queen's University Belfast*; M. Ward, *University of Ulster*

Use of nutrigenomic endpoints in dietary interventions

H. F. J. Hendriks

348–351

Dietary exposure biomarker lead discovery based on metabolomics analysis of urine samples

M. Beckmann, A. J. Lloyd, S. Haldar, G. Favé, C. J. Seal, K. Brandt, J. C. Mathers & J. Draper

352–361

Proceedings of the
Nutrition
Society

Editor in Chief
Associate Professor M. O'Sullivan
Deputy Editor
Dr A. Mostyn
pns@nutsoc.org.uk
<http://www.nutritionssociety.org>

<http://www.journals.cambridge.org/pns>

Forthcoming topics to be featured in *Proceedings of the Nutrition Society* for 2013 (vol. 72):

November issue

- Dietary strategies for the management of cardiovascular risk:
Royal Society of Medicine meeting organised jointly with the NS at the Royal Society of Medicine, London, 11–12 December 2012
- Irish Section Postgraduate Symposium:
NS meeting at Queen's University, Belfast, 14–15 February 2013
- PUFA mediators: implications for human health:
NS meeting at Pollock Halls, South Hall Complex, Edinburgh, 18–19 March 2013

Original Communications

- Childhood nutrition and obesity: current status and future challenges:
NS meeting at Dublin Institute of Technology, Republic of Ireland, 19–21 June 2013
- Nutrition and healthy ageing:
NS meeting at Newcastle University, 15–18 July 2013
- Diet, gut microbiology and human health:
NS meeting at the Royal College of Surgeons, London, 11–12 December 2013

For further details, see our website: <http://www.nutritionssociety.org/node/17>

Proceedings of the Nutrition Society

Volume 72, 2013 ISSN: 0029-6651

Publishing, Production, Marketing, and Subscription Sales Office:

Cambridge University Press
The Edinburgh Building
Shaftesbury Road
Cambridge CB2 8RU
UK

For Customers in North America:

Cambridge University Press
Journals Fulfillment Dept
100 Brook Hill Drive
West Nyack
New York 10994-2133
USA

Publisher: Katy Christomanou

Editorial Assistant: Katherine Cameron

Special sales:

This journal accepts advertisements and inserts. We also provide bulk reprints of suitable papers to meet teaching or promotional requirements. Please contact Katy Christomanou at Cambridge University Press for further details.

Subscription information:

Proceedings of the Nutrition Society is an international journal published by Cambridge University Press on behalf of The Nutrition Society as four issues per year. Symposium papers are published in February, May, August and November; Original Communications are published online (only).

Annual subscription rates:

Volume 72, 2013 (4 issues):

Internet/print package: £570/\$1111 Americas only/
€909 EU only

Internet only: £428/\$834 Americas only/€668 EU only

Japanese Agent: Maruzen Company Ltd, PO Box 5050,
Tokyo International, 100-31, Japan.

Back volumes are available. Please contact Cambridge University Press for further information.

Claims for non-receipt of journal issues will be considered on their merit and only if the claim is received within six months of publication. Replacement copies supplied after this date will be chargeable.

Despatch: deliveries outside the UK are by ASP Print-flow Airsaver unless other arrangements are made.

Customers requiring airmail delivery should indicate clearly their requirements and add an additional 10% to the relevant subscription price.

US POSTMASTERS: please send address corrections to *Proceedings of the Nutrition Society*, Cambridge University Press at the New York address.

Directions to Contributors are available from the Society at the address below or can be found on the Society's website at <http://www.nutrition-society.org> (concise Directions to Contributors can be found inside the back cover).

Offprints: The authors (or main author) of an accepted paper will receive a free PDF file of their paper. Paper offprints are available for a fee and should be ordered at proof stage. No page charges are levied by this journal.

Copyright: As of July 2000 the copyright of all articles submitted to the *Proceedings of the Nutrition Society* is retained by the authors or their institutions. For articles prior to this date permission for reproduction of any part of the journal (text, figures, tables or other matter) in any form (on paper, microfiche or electronically) should be sought directly from the Society, at: The Publications Office, The Nutrition Society, 10 Cambridge Court, 210 Shepherds Bush Road, London W6 7NJ, UK.

Disclaimer: The information contained herein, including any expression of opinion and any projection or forecast, has been obtained from, or is based upon, sources believed by us to be reliable, but is not guaranteed as to accuracy or completeness. The information is supplied without obligation and on the understanding that any person who acts upon it or otherwise changes his/her position in reliance thereon does so entirely at his/her own risk. Neither the Society nor Cambridge University Press accepts responsibility for any trade advertisement included in this publication.

Typeset by S R Nova Pvt Ltd., Bangalore, India.

This journal issue has been printed on FSC-certified paper and cover board. FSC is an independent, non-governmental, not-for-profit organization established to promote the responsible management of the world's forests. Please see www.fsc.org for information. Printed by Bell & Bain, Glasgow, UK.

Proceedings of the Nutrition Society is covered in Current Contents[®]/Agriculture, Biology & Environmental Sciences, SciSearch[®], Research Alert[®], Current Contents[®]/Life Sciences, Index Medicus[®] (MEDLINE[®]), AGRICOLA[®], CAB ABSTRACTS[®], Global Health, BIOSIS[®] Database, EMBASE/Excerpta Medica and Elsevier BIOBASE/Current Awareness in Biological Sciences, CINAHL and Chemical Abstracts Service.