

**WineHealth 2013**

International Wine & Health Conference

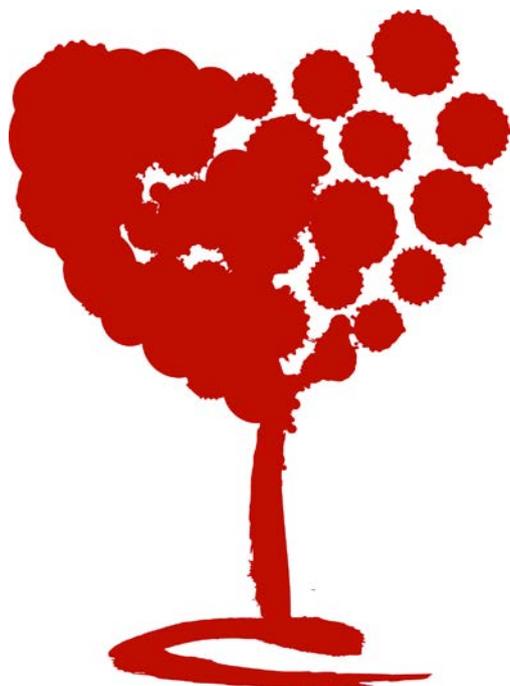
Sydney Convention & Exhibition Centre

Sydney, NSW

18 – 20 July 2013

---

# Information and abstracts



# Welcome to Sydney

On behalf of the Planning and Scientific Advisory committees of WineHealth 2013 it is our pleasure to welcome you to this special scientific event.

Twenty years after the term the 'French Paradox' was coined, studies continue to explore the complex relationship between the consumption of wine and health. This relationship has been the focus of a long standing series of scientific meetings starting in Udine (Italy) in 1996 followed by the New York Academy of Science Meeting in 2001 in Palo Alto, California (USA), Santiago (Chile) in 2002, Stellenbosch (South Africa) in 2005, Bordeaux (France) in 2007 and Friuli (Italy) in 2010. You are now invited to Sydney, Australia from the 18th to the 20th of July 2013 for WineHealth 2013.

This Conference provides an opportunity to bring together world experts for a stimulating exchange of scientific information and ideas on the impacts of wine consumption on human health, and to explore the epidemiological evidence of the effect of wine as a unique alcoholic beverage.

The Conference also aims to provide deeper insight into the biological mechanisms involved in any beneficial effects of wine on health, and how specific molecules present in grapes and wine have biological activities that may be harnessed for health. Sociological outcomes of the use and abuse of wine, and hence public health priorities will also be presented for debate and discussion.

It is envisaged that these exchanges will contribute to the evidence base for public policy setting, provide direction for new research efforts into the health effects of wine, and offer opportunities for international collaborations. This field of research is still in its infancy and many more questions remain unanswered than answered at present. Your support and active engagement of WineHealth 2013 is a vital contributor to the success not only of this year's event but to continuing WineHealth events into the future.





**Dr Dan Johnson**  
Chair of WineHealth 2013 Planning Committee

**Creina Stockley**  
Chair of WineHealth 2013 Scientific Advisory Committee

**Conference Planning Committee Members:**

Dan Johnson, The Australian Wine Research Institute - Chair  
 Creina Stockley, The Australian Wine Research Institute  
 Jonathan Breach, Accolade Wines  
 Graham Ellender, Ellender Estate  
 Peter Hayes, Industry Consultant  
 Kate Thompson, Pernod Ricard  
 Nick Carne, Winemakers' Federation of Australia

**Secretariat:**

Kate Beames, The Australian Wine Research Institute  
 Andrea Francis, The Australian Wine Research Institute  
 Annette Freeman, The Australian Wine Research Institute

**International Scientific Advisory Committee Members:**

Creina Stockley (Australia) - Chair  
 Prof Alan Crozier (UK)  
 Dr Curt Ellison (USA)  
 A/Prof Tedd Goldfinger (USA)  
 Prof Jonathon Hodgson (Australia)  
 Prof Arduino Mangoni (UK)  
 Prof Fulvio Mattivi (Italy)  
 A/Prof Rosa Lamuela Raventos (Spain)  
 Prof Andrew Scholey (Australia)  
 Prof Jeremy Spencer (UK)  
 Prof Pierre-Louis Teissedre (France)  
 Prof Fulvio Ursini (Italy)  
 Dr David van Velden (South Africa)  
 Prof Andy Waterhouse (USA)

[www.winehealth.com.au](http://www.winehealth.com.au)

# Contents

---

- 4 General information
- 5 Site plan
- 6 Conference program
- 9 Formal paper abstracts and speaker profiles
- 9 Session I  
**Epidemiological evidence on the relationship between alcohol and wine consumption and human health**
- 12 Session II  
**Wine and cardiovascular disease**
- 17 Session III  
**Wine and degenerative diseases of ageing**
- 20 Session IV  
**Wine and cognitive function**
- 22 Session V  
**Grapes, wines and nutraceuticals (omics)**
- 27 Session VI  
**Grapes, wines and nutraceuticals (omics) continued**
- 31 Session VII  
**Integrated medicine – healthy ageing**
- 35 Session VIII  
**Our daily diet and lifestyle – interactions with wine**
- 40 Poster paper abstracts

# General information

---

## Venue

The Sydney Convention & Exhibition Centre  
Bayside 201, Level 2  
Darling Drive, Darling Harbour, Sydney, Australia  
Tel: +61 (0)2 9282 5000  
Fax: +61 (0)2 9282 5041  
www.scec.com.au

## Registration and information desk

On Thursday 18 July, the registration desk will be located in the Bayside foyer, level one of the Sydney Convention and Exhibition Centre and open between 9.00 am and 12.30 pm. On Friday 19 July the registration desk will be relocated to Bayside 201, level 2 and will open from 8.15 am. Staff at the registration desk will be happy to assist you with any queries.

Registration entitles delegates to a conference folder containing name badge, Conference *Information and abstracts* booklet and list of delegates, as well as access to all presentations, Gala Dinner, coffee breaks (Thursday and Friday), lunch (Friday) and the Hunter Valley tour on Saturday.

## Name badges

Delegates are requested to wear their name badge at all times during the Conference as this provides access to the presentations, refreshments, Gala Dinner and the Hunter Valley tour.

## Mobile phones

Mobile phones MUST BE TURNED OFF or ON SILENT during the presentations.

## Wi-Fi

Wi-Fi is available to Conference delegates at the Sydney Convention and Exhibition Centre by searching for the network named Centre Wireless and clicking on 'Free internet access available (speed limited) – Click here'. Connections are limited, so please consider others and manage your access responsibly. Further information can be obtained from the Conference registration desk.

## Gala Dinner

This event will be held on Thursday 18 July at multi-award-winning Doltone House, Jones Bay Wharf in the 'Doltone Loft' – a unique heritage venue situated on the historic finger wharf at the recently restored Jones Bay Wharf, Pyrmont Point. It is a spectacular waterfront venue on the foreshore of Sydney Harbour, with views of the Harbour Bridge, city skyline and the Darling Harbour precinct. Doltone House, Jones Bay Wharf is located an easy 10-15 minute walk from the Sydney Convention and Exhibition Centre.

- **Date/time:** Thursday 18 July, 7.00 pm for pre-dinner drinks
- **Dress code:** Lounge suit/'After-five'
- **Venue:** Doltone House, Jones Bay Wharf
- **Cost:** Included in registration (extra tickets cost AUD\$150 inc GST)

## Hunter Valley tour

Departing from the front of the Parkroyal Darling Harbour Hotel, 150 Day Street, Sydney

- **Date/time:** Saturday 20 July, 8.00 am – 6.30 pm
- **Dress code:** Casual

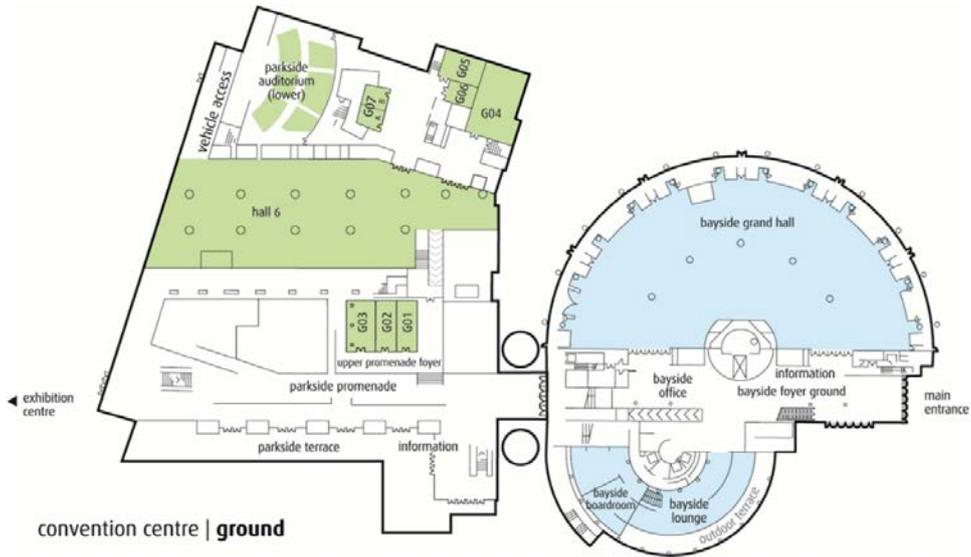
## Conference presentations – Sydney Convention & Exhibition Centre, Bayside 201, Level 2

The Conference will be officially opened at 12.30 pm on Thursday 18 July 2013 by Dr Dan Johnson, Chair of the WineHealth 2013 Planning Committee. Delegates are requested to be seated in the auditorium by 12.20 pm. Abstracts of the formal papers and posters are included in this booklet. Posters will be on display in the Bayside foyer level 2.

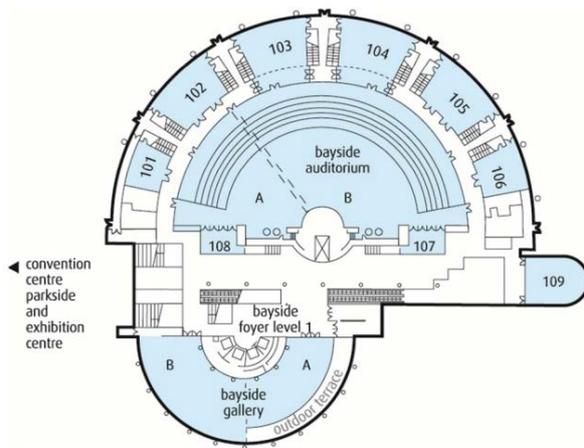
## Disclaimer

The WineHealth 2013 Conference and the editors of this publication accept no responsibility or liability of any kind for any statement, opinion or other material contained in this publication. Abstracts published do not necessarily represent the opinion of the organisers of WineHealth 2013: articles and other comments represent the opinions of their respective authors and might contain mistakes of fact, hypotheses and other unsubstantiated material. Notwithstanding the mention of any products or services in this publication, the organisers of WineHealth 2013 give no warranty or endorsement in respect to them.

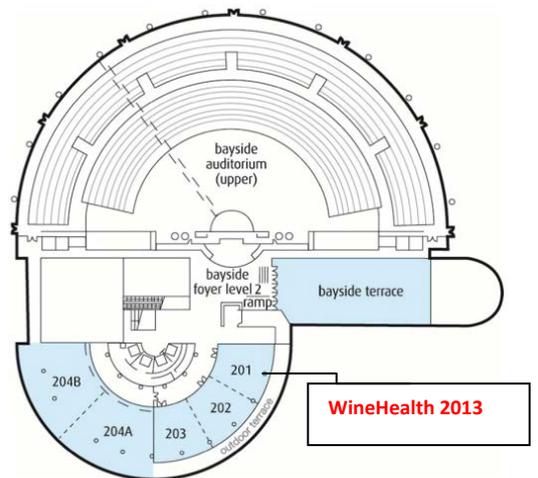
**Site plan of the Sydney Convention & Exhibition Centre**



convention centre bayside | level 1



convention centre bayside | level 2



## Program – Thursday 18 July 2013

---

9.00 – 12.30	<b>Registration</b>
12.30 – 12.40	<b>Welcome</b> Dan Johnson, The Australian Wine Research Institute, Chair of WineHealth Planning Committee
<b>Session I</b>	<b>Epidemiological evidence on the relationship between alcohol and wine consumption and human health</b>
12.40 – 13.25	<b>The J-shaped curve: the good, the bad and the ugly</b> ( <i>Serge Renaud Memorial Lecture</i> ) R. Curtis Ellison, Boston University
13.25 – 14.10	<b>Alcohol intake and survival in Australian seniors: the Dubbo Study</b> Leon Simons, University of NSW
14.10 – 14.30	<b>Moderate wine consumption is associated with lower cardiovascular risk factors over 7 years: The Study of Women's Health Across The Nation (SWAN)</b> Imke Janssen, Rush University Medical Centre
14.30 – 15.00	<i>Afternoon tea</i>
<b>Session II</b>	<b>Wine and cardiovascular disease</b>
15.00 – 15.30	<b>Effects of red wine on arterial structure and function: role of nitric oxide-mediated pathways</b> Arduino Mangoni, Flinders University
15.30 – 16.00	<b>The effects of alcohol and red wine on cardiovascular disease and vascular biology</b> Tedd Goldfinger, University of Arizona
16.00 – 16.30	<b>Wine, ethanol and polyphenols: mechanisms of the protective effects of wine intake on cardiovascular disease</b> Ramon Estruch, University of Barcelona
16.30 – 16.50	<b>Melatonin in red wine: its role in the cardioprotective effect of moderate and regular consumption of red wine</b> Sandrine Lecour, University of Cape Town
<b>Session III</b>	<b>Wine and degenerative diseases of ageing</b>
16.50 – 17.20	<b>Proanthocyanidins are available in the gut after grape seed extract consumption by rats</b> ( <i>Federico Leighton Memorial Lecture</i> ) Andrew Waterhouse, University of California
17.20 – 17.50	<b>The antioxidant paradox and para-hormesis: a paradigm shift in the mechanism of nutraceutical effects of antioxidants</b> Henry Jay Forman, University of Southern California
17.50 – 18.10	<b>Alcoholic beverages consumption (wine, beer and spirits) and mortality from the main cancers in 35,292 men of the COLOR French cohort followed for 25 years: the CANCEALCOOL program</b> Dominique Lanza, Paris X and Bordeaux 2 University
19.00 for 19.30	<i>Conference Dinner</i>

## Program – Friday 19 July 2013

---

### Session IV Wine and cognitive function

---

- 08.45 – 09.30 **Chronic Champagne wine consumption improves spatial working memory in aged rats via modulation of hippocampal and cortical protein expression**  
Jeremy Spencer, University of Reading
- 09.30 – 10.15 **Eat, drink and be merry? Effects of bioactive foods and alcohol on mood and cognitive function**  
Andrew Scholey, Swinburne University
- 10.15 – 10.45 **Morning tea**

### Session V Grapes, wines and nutraceuticals (omics)

---

- 10.45 – 11.15 **Red wine flavonoids and vascular health**  
Jonathan Hodgson, University of Western Australia
- 11.15 – 11.35 **Prediction of the functionality of young South American red wines based on chemical parameters**  
Inar Castro, University of São Paulo
- 11.35 – 11.55 **Bioconversion of red wine anthocyanins into bioactive phenolic compounds by lactic acid bacteria**  
Paul Kilmartin, University of Auckland
- 11.55 – 12.15 **Moderate intake of red wine promotes a significant increase of phenolic metabolites in human faeces**  
Irene Munoz-Gonzalez, Institute of Research in Food Sciences
- 12.15 – 12.35 **Evolutionarily conserved pathways to longevity: modulation by wine polyphenols**  
Jamie Barger, LifeGen Technologies LLC
- 12.35 – 13.20 **Lunch**

### Session VI Grapes, wines and nutraceuticals (omics) - continued

---

- 13.20 – 13.50 **Polyphenols composition of wine and grapes sub-products and potential effects on chronic diseases**  
Pierre-Louis Teissedre, University of Bordeaux
- 13.50 – 14.20 **The case for anthocyanin consumption to promote human health**  
Fulvio Mattivi, Fondazione Edmund Mach
- 14.20 – 14.40 **Study of grape bioactive stilbenes by suspect screening metabolomics**  
Luigi Bavaresco, Research Centre for Viticulture CRA
- 14.40 – 15.10 **Afternoon tea**

### Session VII Integrated medicine – healthy ageing

---

- 15.10 – 15.40 **Integrative medicine in the quest for healthy ageing**  
David van Velden, University of Stellenbosch
- 15.40 – 16.10 **Healthy cardiovascular ageing**  
Justin Ardill, Flinders Medical Centre and Noarlunga Hospital
- 16.10 – 16.30 **Assessment of the impact of hereditary factors on biochemical parameters of cardiovascular risk in relation to moderate alcohol consumption**  
Maritha Kotze, University of Stellenbosch

## Program – Friday 19 July 2013

---

16.30 – 17.00 **Wine consumption benefits on cardiovascular disease risk factors in the PREDIMED (Prevention with Mediterranean Diet) Trial**  
Rosa Lamuela-Raventos, University of Barcelona

### Session VIII **Our daily diet and lifestyle – interactions with wine**

---

17.00 – 17.20 **The business of wine and health: responsible delivery of wine's health message**  
Greg Waters, Tuscon Orthopaedic Institute

17.20 – 17.40 **WINEinMODERATION – successfully educating wine professionals in Germany**  
Ursula Fradera, Deutsche Weinakademie

17.40 – 18.10 **Wine, cultural health, and social cohesion – a modern day challenge**  
Brian and Evan Mitchell

18.10 – 18.30 **Translation of science into public health policy**  
Creina Stockley, The Australian Wine Research Institute

18.30 – 18.45 **Close**  
Peter Hayes, Member, WineHealth 2013 Planning Committee and former President, Organisation International de la Vigne et du Vin

## Saturday 20 July 2013

---

08.00 – 18.30 **Hunter Valley tour**  
Departing from the Parkroyal Darling Harbour hotel, 150 Day Street, Sydney

# Formal paper abstracts and speaker profiles

---

## Session I      Epidemiological evidence on the relationship between alcohol and wine consumption and human health

---

### The J-shaped curve: the good, the bad and the ugly *Serge Renaud Memorial Lecture*



#### **Prof R. Curtis Ellison**

Boston University School of Medicine  
801 Massachusetts Avenue  
Boston, MA 02118 USA  
Email: ellison@bu.edu

*R. Curtis Ellison, MD, MSc (Epidemiology), is Professor of Medicine and Public Health at Boston University School of Medicine and was Chief of the Evans Section of Preventive Medicine and Epidemiology from 1989 to 2008. Dr Ellison also serves as a senior investigator in The Framingham Study, and has been the principal investigator of a number of research studies on the interaction of genetic and environmental factors in determining familial risk of hypertension and heart disease and on the relation of alcohol consumption to health and disease. He is best known to the lay public for his research on what is known as the 'French Paradox'. Dr Ellison and the late Dr Serge Renaud of Lyon, France, were the key scientists who were a part of the program on this topic which appeared on the American television program, 60 Minutes, in November 1991. In July 1994, he established and became the director of the Institute on Lifestyle and Health at Boston University School of Medicine. The Institute focuses research on various aspects of lifestyle, especially diet and the moderate consumption of alcoholic beverages. In 2010, he teamed with Helena Conibear of Alcohol in Moderation, and with 35 international specialists, in founding the International Scientific Forum on Alcohol Research. The Forum regularly critiques emerging scientific literature related to alcohol and health; it publishes its reviews on its web-site: [www.bu.edu/alcohol-forum](http://www.bu.edu/alcohol-forum).*

#### **Abstract**

Serge Renaud probably contributed more than any other individual to our understanding of the 'J-shaped curve' that describes the association between wine and alcohol intake and cardiovascular disease (CVD). Starting medical training in his native France, he moved to Canada in 1951 where he noted high rates of CVD, which he blamed largely on diet: no fruits, few vegetables, high saturated fat, and no wine. After key research on thrombosis and CVD, he recognised the importance of the omega-3 fatty acid ALA, and conducted the Lyon Diet Heart Study that showed dramatic reduction in CVD among patients assigned a high-ALA diet.

After many decades of research, he determined that wine was one explanation of the 'French Paradox'. Until his death in 2012 at age 85, he was a great advocate of moderate wine consumption as part of a healthy diet.

Since the early work of Serge Renaud, there have been literally thousands of scientific studies supporting the role that the moderate consumption of wine and alcohol, versus no alcohol intake, is associated with much less CVD. Such studies have included observational studies on hundreds of thousands of subjects, clinical trials, and a huge amount of basic scientific research. Studies now indicate also that the risks of diabetes, osteoporosis, and dementia are similarly lower among moderate drinkers, and increasingly, biologic mechanisms have been identified for such effects. Overall, research clearly shows that, for most people, moderate wine consumption can be considered as an important component of a 'healthy lifestyle'.

---

## Alcohol intake and survival in Australian seniors: the Dubbo Study



**Assoc Prof Leon Simons**

University of NSW  
Sydney, Australia  
Email: l.simons@unsw.edu.au

*Leon Simons, MD FRACP, is Associate Professor of Medicine at the University of NSW and Principal Investigator of the Dubbo Study of the Elderly, a prospective study of healthy ageing which commenced in 1987 ([www.dubbostudy.org](http://www.dubbostudy.org)). He has worked in the field of cardiovascular research for more than 40 years and has published numerous peer-reviewed papers. He is a co-founder of the Australian Atherosclerosis Society. He has interests centred around preventive cardiology, clinical trials, and patient compliance with chronic medications.*

### **Abstract**

Consumption of moderate amounts of alcohol, compared with abstinence or with heavy intake, appears to be associated with reduced all-cause mortality (ACM) in middle-aged subjects. The Dubbo Study of Australian elderly is a longitudinal study of healthy ageing. In 1988-89 we examined 2805 non-institutionalised citizens 60+ years of age born before 1930, mean age 69 years. The cohort comprised 1233 men and 1572 women, representing 73% of the eligible population. This report examines the relationship between alcohol intake and mortality in this cohort during follow-up over 20 years. Alcohol intake was arbitrarily grouped into 4 categories: nil, low, moderate and heavy. The analysis did not distinguish between intake of wine versus intake of spirits. 78% of men and 52% of women reported some alcohol intake. Most men reported an intake of 1-14 drinks/week, most women 1-7 drinks/week; 87% of male drinkers and 44% of female drinkers predominantly consumed beer and the remainder consumed wine and/or spirits. Over 20 years to 2008, 66% of men and 53% of women died; 64% of male drinkers died versus 72% of non-drinkers; 46% versus 60% in females. In a multivariate model, ACM was related to quantity of alcohol intake in the familiar 'U' shaped relationship, being 20% and 28% reduced in the low and moderate intake categories respectively, compared with nil intake. This relationship was similar in men and women, and with intake of beer or wine/spirits. Any alcohol intake added 12 months survival time in men and women over the follow-up period. Alcohol intake in the low to moderate range appeared to offer protection against the onset of dementia. The overall Dubbo results are not unique, but are applicable to senior citizens. A 'healthy survivor' effect may be partially operating in this context.

---

## Moderate wine consumption is associated with lower cardiovascular risk factors over 7 years: The Study of Women's Health Across The Nation (SWAN)



### Dr Imke Janssen

Department of Preventive Medicine  
 Rush University Medical Centre  
 1700W van Buren Street, Suite 470  
 Chicago, USA  
 Email: Imke\_Janssen@rush.edu

*Dr Imke Janssen is a biostatistician by training and an epidemiologist by practice. She grew up in Germany, received her PhD from UC Berkeley, and has been on the faculty at Rush University Medical Centre for 12 years, working on longitudinal observational studies as well as clinical trials. Of 49 peer-reviewed publications, she has published 20 papers on data from the Study of Women's Health Across the Nation (SWAN) which has been following women as they transition to menopause over the last 17 years. She is particularly interested in how psychosocial factors and a healthy lifestyle protect women against developing cardiovascular disease.*

### Abstract

Moderate wine consumption has been associated with reduced cardiovascular (CV) risk, but most investigations have been conducted in Caucasian populations. To investigate the relationship of wine consumption to CV risk markers, we studied a multi-ethnic sample of middle-aged, healthy women (N=2941; 48% white, 28% black, 7% Hispanic, 8% Chinese, 9% Japanese) participating in SWAN over seven years with repeated assessments of CV risk factors. Consumption of wine was stable and common with 20% reporting none, 69% light (<1/day), 7% moderate (=1/day), and 4% heavy (>1/day). To guard against underreporting, we took the maximum reported wine consumption over seven years as the predictor. We used mixed models with a random intercept to assess the relationship between wine consumption and CV risk factors with moderate consumption as the reference.

Outcome variables were log-transformed where necessary. Longitudinal models were adjusted for ethnicity, age, and time-varying menopausal status, hormone therapy use, overall alcohol consumption, and a healthy lifestyle score based on physical activity, not smoking, and weight maintenance. Interactions of wine consumption with time were not significant. Moderate wine consumers had significantly lower levels of C-reactive protein (CRP,  $p < .001$ ), fibrinogen ( $p = .014$ ), factor VII ( $p = .019$ ), and plasminogen activator inhibitor (PAI-1,  $p = .002$ ) than women who drank no or little wine. These associations were independent of significant effects of healthy lifestyle and overall alcohol consumption and similar across ethnic groups. Moderate wine consumption may protect against cardiovascular disease via inflammatory and clotting pathways.

Acknowledgements: SWAN has grant support from the National Institutes of Health (NIH) (Grants NR004061; AG012505, AG012535, AG012531, AG012539, AG012546, AG012553, AG012554, AG012495). The content of this abstract is solely the responsibility of the authors and does not necessarily represent the official views of the funding agency.

### Authors and affiliations:

Imke Janssen<sup>1</sup>, Alan L. Landay<sup>1</sup>, Kristine Ruppert<sup>1</sup> and Lynda H. Powell<sup>2</sup>

<sup>1</sup> Rush University Medical Centre; <sup>2</sup> University of Pittsburgh

## Session II Wine and cardiovascular disease

---

### Effects of red wine on arterial structure and function: role of nitric oxide-mediated pathways



#### Prof Arduino Mangoni

Department of Clinical Pharmacology  
 School of Medicine  
 Flinders University  
 Adelaide, Australia  
 Email: arduino.mangoni@flinders.edu.au

*Professor Arduino Mangoni, MD(Hons), PhD, MRCP(UK), FRCP (London), FRCP (Glasgow), FRACP, FESC, FACC, FACP, FCP, trained in Milan, Boston and London. He was appointed as Senior Lecturer in Clinical Pharmacology at Flinders University (Adelaide, Australia) in 2003, and promoted to Associate Professor in 2007 before taking up the Chair in Medicine of Old Age at the University of Aberdeen, UK, in 2010. He has been recently appointed as Strategic Professor in Clinical Pharmacology at Flinders University. His research interests include arginine metabolism and vascular pharmacology, cardiovascular safety of NSAIDs, and adverse effects of anticholinergics in older patients. He is Editor-in-Chief of Therapeutic Advances in Drug Safety and associate editor of the British Journal of Clinical Pharmacology and Age and Ageing. He has published 99 papers and co-edited the book Prescribing in elderly patients.*

#### Abstract

Nitric oxide (NO), an endogenous vasodilator synthesised in endothelial cells, plays a major role in the pathophysiology of atherosclerosis and cardiovascular disease. There is good evidence that impaired NO synthesis, a hallmark of endothelial dysfunction, exerts detrimental effects on vascular homeostasis, favouring the onset and progression of atherosclerosis and thrombosis. Arterial stiffening, increasing inflammation and oxidative stress are involved in this process. Several clinical studies have demonstrated that impaired endothelial function independently predicts adverse cardiovascular outcomes in different patient groups.

The beneficial effects of red wine and its components on endothelial function and NO synthesis have been demonstrated both *in vitro* and *in vivo*. However, the difficulties in measuring NO and its metabolites, for example, a very short half-life, often limit data interpretation. Another issue is identifying the red wine components most likely to exert such beneficial effects in experimental and clinical studies.

The discovery of relatively stable NO-related endogenous metabolites, such as the methylated arginines, might prompt further studies on the short- and long-term effects of red wine and its components on NO-synthesis, endothelial function and other important biomarkers of atherosclerosis and cardiovascular disease.

---

## The effects of alcohol and red wine on cardiovascular disease and vascular biology



### Dr Tedd Goldfinger

Desert Cardiology of Tucson and University of Arizona  
School of Medicine  
Tucson, Arizona, USA  
Email: teddgoldfinger@comcast.net

*Tedd Goldfinger, DO, FACC, FCCP, is a Clinical Assistant Professor of Medicine at the University of Arizona School of Medicine, Tucson, Arizona, as well as Senior Cardiologist and President of Desert Cardiology of Tucson Heart Centre which is a multidisciplinary clinical cardiology medical group serving southern Arizona. He is a graduate of the College of Osteopathic Medicine & Surgery (IA), and has completed post graduate training in internal medicine and cardiovascular disease at the US PHS Hospital-New York, Geisinger Medical Centre-PA, and University of New Mexico School of Medicine. He has served as a commissioned officer of the United States Public Health Service before entering clinical practice. He is also President of the Desert Heart Foundation, a non-profit medical foundation for research and education and director of its Wine & Heart Health Research, in addition to being a founding member and current President of the Renaud Society, which is an international society of medical professionals with an interest in better health.*

### Abstract

Cardiovascular disease (CVD) is the leading cause of death and disability in the United States and is responsible for 53% of deaths in women and 46% of deaths in men. CVD is a primary or contributing cause in 60% of all deaths, and claims more lives as the next leading causes of death including cancers, accidents, infections, and pulmonary disease. Coronary heart disease (CHD) affects 12 million people in the United States of which 1.1 million have a myocardial infarction annually and about one third die. Worldwide, CVD is the foremost cause of death, accounting for 57% of deaths among developing nations, and the second most cause of disability.

Over the past several decades, studies have consistently demonstrated an inverse relationship between alcohol consumption and the occurrence of myocardial infarction and cardiac death, with a J-shaped curve relating alcohol intake to mortality, favouring moderate alcohol drinkers compared with non-drinkers or heavy drinkers. Millions of persons living in the USA drink alcohol; most consume fewer than three alcoholic drinks per day. The American Heart Association, among others, have cited widely acknowledged harmful effects of heavy drinking, although continue to underemphasise the risk reduction for cardiac and all cause mortality that has been associated with moderate alcohol consumption.

Plausible biologic mechanisms, showing vascular protection from beverage alcohol, lend credibility to a direct causative effect. The salutary effects of beverage alcohol, particularly red wine, on lipid biology, thrombosis, endothelial health, and other unique mechanisms of vascular protection, are robust, and support clinical observations and the positive epidemiologic evidence of health benefit. The medical community, in general, remains unenlightened. Ellison had written, 'telling people to avoid any alcohol consumption, because of the potential dangers of heavy use may not be in the best health interest of the public'. In the absence of a randomised, prospective trial, the debate as to the health benefits of wine and beverage alcohol as a part of a healthy lifestyle, will undoubtedly continue.

## Wine, ethanol and polyphenols: mechanisms of the protective effects of wine intake on cardiovascular disease



### Prof Ramon Estruch

Department of Internal Medicine  
Hospital Clinic, IDIBAPS University of Barcelona  
Barcelona, Spain  
Email: restruch@clinic.ub.es

*Professor Ramon Estruch, MD, PhD, is currently Senior Consultant at the Internal Medicine Department of the Hospital Clinic (Barcelona) from 2002. He is also Associate Professor in the School of Medicine at the Barcelona University from 1996 and member of the ERAB Advisory Board at UE from 2011. The main research lines developed are the following: 1) Effects of chronic alcohol consumption on heart, liver and brain; 2) Cardiovascular effects of Mediterranean diet; 3) Mechanisms of the effects of moderate wine and beer consumption: Effects on the expression and function of cellular and endothelial adhesion molecules related to development of atherosclerosis; 3) Effects of different alcoholic beverages on immune system; 4) Effects of olive oil, nuts and cocoa in lipid profile and inflammatory biomarkers related to atherosclerosis. In recent years, his group has received grants from the European Commission, National Institute of Health (NIH) from USA, CICYT, Instituto Nacional de Investigación Agroalimentaria (INIA) del Ministerio de Educación y Ciencia, Fondo de Investigación Sanitaria (FIS) and Instituto de Salud Carlos III del Ministerio de Sanidad (ISCIII). In addition, Prof. Estruch is the leader of the Thematic Network 'Mediterranean Diet and Cardiovascular Disease' from the ISCIII (Spain) and the coordinator of the PREDIMED study which has enrolled near 7,500 high-risk patients and aims to evaluate the effects of a Mediterranean Diet and its main components on the primary prevention of cardiovascular disease. He has published more than 225 articles in peer-review journal, including papers in New England Journal of Medicine, JAMA, Lancet, Annals of Internal Medicine, Annals of Neurology and American Journal of Clinical Nutrition. All these studies are being performed in collaboration with foreign universities such as: Columbia University in New York, Loma Linda University in California, Harvard School of Public Health in Massachusetts, Human Nutrition Research Centre in Tufts University, Massachusetts, USA and Mario Negri Sud, Santa Maria d'Imbaro, Italy.*

### Abstract

Epidemiological data suggest that moderate red wine consumption reduces cardiovascular mortality and incidence of chronic diseases such as diabetes. However, whether these effects are due to ethanol or to non-alcoholic components of red wine still remains unknown.

We compared the effects of moderate consumption of red wine, dealcoholized red wine, and gin, a polyphenol-free alcoholic beverage, on blood pressure, glucose metabolism, lipid profile, plasma nitric oxide, and expression of inflammatory biomarkers related to atherosclerosis in men at high cardiovascular risk. Sixty-seven volunteers were randomized in a crossover feeding trial. After a washout period, all subjects received either red wine (30 g alcohol/d), the equivalent amount of dealcoholized red wine, or gin (30 g alcohol/d) for 4 weeks. Blood pressure, plasma glucose and insulin, homeostasis model assessment of insulin resistance, plasma lipoproteins, adipokines, nitric oxide and inflammatory molecules were determined at baseline and after each intervention. Dealcoholized red wine decreases systolic and diastolic blood pressure and increases NO plasma concentration, whereas the effects of red wine and gin were not significant. Fasting glucose concentration was unchanged after the three treatments, while mean adjusted plasma insulin and homeostasis model assessment of insulin resistance decreased from baseline after red wine and dealcoholized red wine by 30% (P=0.035) and 22% (P=0.008), respectively. HDL cholesterol, Apolipoprotein A-I and Apolipoprotein A-II increased after red wine and gin. Mean adjusted lipoprotein(a) decreased by 12% after red wine (P=0.011). Alcohol also increased interleukin-10 (IL-10) and decreased Macrophage-Derived Chemokine (MDC) concentrations, while the phenolic compounds of red wine decreased serum concentrations of Intercellular Adhesion Molecule-1 (ICAM-1), E-Selectin and IL-6, and inhibited the expression of Lymphocyte Function-Associated Antigen-1 (LFA-1) in T-lymphocytes and Mac-1, SLe<sup>x</sup> and CCR2 expression in monocytes. Both ethanol and phenolic compounds of red wine downregulated serum concentrations of CD40 antigen (CD40a), CD40 Ligand (CD40L), IL-16, Monocyte Chemoattractant Protein-1 (MCP-1) and Vascular Cell Adhesion Molecule-1 (VCAM-1).

---

The results support a beneficial effect of red wine polyphenols on blood pressure, insulin resistance, and may modulate leukocyte adhesion molecules and soluble inflammatory mediators, contributing to the greater protective effects of red wine than other alcoholic beverages on cardiovascular disease.

Authors and affiliations:

Ramon Estruch, Gemma Chiva-Blanca, Palmira Valderas-Martinez, Rosa Casasa, Sara Arranza, and Rosa M Lamuela-Raventós\*

Department of Internal Medicine, Hospital Clínic, Institut d'Investigacions Biomèdiques August Pi i Sunyer (IDIBAPS), University of Barcelona, Barcelona, Spain; \*Nutrition and Food Science Department, XaRTA, INSA, Faculty of Pharmacy, University of Barcelona, INGENIO-CONSOLIDER Program, Fun-c-food CSD2007-06, Barcelona, Spain; CIBER CB06/03 Fisiopatología de la Obesidad y la Nutrición, (CIBERobn); and RETIC RD06/0045

## Melatonin in red wine: its role in the cardioprotective effect of moderate and regular consumption of red wine



### Assoc Prof Sandrine Lecour

Hatter Institute  
University of Cape Town  
Medical School, Anzio Rd, 7925  
Observatory, South Africa  
Email: sandrine.lecour@uct.ac.za

*Sandrine Lecour, PharmD, PhD, trained at the University of Burgundy, France. She is an Associate Professor at the University of Cape Town and Leader of the Cardioprotection group at the Hatter Cardiovascular Research Institute for Africa, Department of Medicine, University of Cape Town, South Africa. Prof Lecour is also co-Director of the Medical Research Council Cape Heart Centre group in South Africa. Her research focuses on the delineation of novel cardioprotective signalling pathways and her major discovery involves the delineation of the novel and powerful cardioprotective signalling pathway that she has termed the SAFE (Survivor Activating Factor Enhancement) pathway. After developing an animal model to demonstrate the cardioprotective effect of daily moderate consumption of red wine, her current research aims to understand how red and white wine may present some cardioprotective benefits, with particular interest in the role of melatonin in wine. She has published over 50 papers in peer-reviewed journals (h index = 23). She is on the Editorial Board of Basic Research in Cardiology (IF 6.0), Journal of Molecular and Cellular Cardiology (IF 5.1), and on the Editorial Advisory Panel of Clinical Science (IF 4.2). In 2009, she initiated the creation of the South African Cardiovascular Research Society (SASCAR) as part of an interest group of the South African Heart Association. As the Chairperson of SASCAR, she intends to promote the research and training of students in the cardiovascular field in South Africa. Sandrine is a Fellow of the European Society of Cardiology and she is currently a listed grade B (=researcher with international recognition) scientist of the South African National Research Foundation.*

### Abstract

Recently, we have discovered that melatonin, at the concentration found in red wine, can confer cardioprotection against ischemia reperfusion injury via the activation of the prosurvival factor signal transducer and activator of transcription 3 (STAT3). We investigated the contribution of melatonin and STAT3 in the cardioprotective effect of regular moderate consumption of red wine. The drinking water of wistar rats, C57black6 mice (WT) or cardiomyocyte specific STAT3 deficient mice (STAT3<sup>-/-</sup>) was supplemented with red wine (to a final concentration equivalent to 2 glasses of wine per day). Rats were also pretreated with prazosin, a specific inhibitor of melatonin receptor type 3 (2.5mg/kg/day, intraperitoneally), or AG490, an inhibitor of STAT3 (10mg/kg/day, intraperitoneally). After 14 days, hearts were perfused on the Langendorff system and subjected to an ischemia and reperfusion insult. Functional parameters were recorded throughout the experiments and infarct size was measured at the end of the protocol using triphenyltetrazolium chloride staining (n ≥ 4 per group). Treatment with red wine reduced infarct size from 61±6% to 20±8% (p<0.001) in rats and from 58±3%, to 24±2% (p<0.001) in WT mice. Co-treatment with prazosin reduced the protective effect of red wine to 39±3% (p<0.01 versus control). Similarly, co-treatment of wine with AG490 abolished the infarct-sparing effect of red wine (infarct size: 58±3%; n.s. versus. control). Furthermore, western blots analysis performed at the onset of reperfusion showed an activation of STAT3 in both the cytosol (0.5±0.2 A.U; p<0.05 vs. control) and the nucleus (p<0.01 vs. control). In contrast, red wine failed to protect STAT3 deficient mice (52.4±1.4%, n.s. versus control). In conclusion, our novel findings provide strong evidence that the presence of melatonin in red wine contributes to the cardioprotective effect of red wine against lethal reperfusion injuries and this effect is mediated via the activation of the prosurvival factor STAT3.

Authors and affiliations:

Kim Lamont, Lionel Opie and Sandrine Lecour

Hatter Institute, University of Cape Town, South Africa

## Session III Wine and degenerative diseases of ageing

---

### Proanthocyanidins are available in the gut after grape seed extract consumption by rats

#### *Federico Leighton Memorial Lecture*



#### **Prof Andrew Waterhouse**

Viticulture and Enology  
 University of California  
 595 Hilgard Lane  
 Davis, CA 95616, USA  
 Email: alwaterhouse@ucdavis.edu

*Andrew L. Waterhouse, PhD, moved to the Department of Viticulture and Enology at UC Davis in 1991 where his research program has delved into various aspects of phenolic compounds such as wine oxidation chemistry, and the absorption and metabolism of anthocyanins. He is a Professor of Enology and has previously held the John E. Kinsella Chair in Food, Nutrition and Health, and the Marvin Sands Endowed Chair. He has won the Medical Friends of Wine Research Award, a UC Davis Chancellor's Fellow award, holds an honorary doctorate from the University of Bordeaux, and he has been named one of the most highly cited researchers by ISI. He also has an appointment at the University of Auckland as Honorary Professor. In addition to his research and teaching, he is associate editor of the American Journal of Enology and Viticulture and serves on the editorial boards of two other prominent research journals. He has chaired numerous national and international symposia and is active in such professional organisations as the American Society for Enology and Viticulture and the American Chemical Society. He also consults on oenology and provides expert advice in related legal matters.*

#### **Abstract**

Current evidence shows that proanthocyanidins yield phenolic acids in the blood and urine, but it has not been clear whether or not these oligomeric and polymeric proanthocyanidins (PAC) still exist in the colon. The objective of this study was to optimize the analysis of grape seed extract (GSE) in faeces and use that method to assess the presence of PAC in the colon after ingestion of GSE. Rats were fed a diet ad libitum containing 0.25% (w/w) GSE for 10 days. Faeces were collected daily and colonic content at sacrifice on day 10, respectively. The recovery of faecal PAC using a solid-phase extraction (SPE) method was higher than 70%. The PAC were separated by normal phase HPLC with fluorescence detection, and subsequent peak confirmation by MS-ion trap. The concentration of colonic contents at day 10 was 13.9 (mg/kg) for monomer and for oligomers (dimers-hexamers), 33.4, 84.6, 87.2, 57.3 and 35.7 (mg/kg), respectively. The concentration of monomeric and oligomeric PAC in daily faeces was similar among days. Approximately 11% of ingested PAC was recovered in the faeces, demonstrating that that ingested PAC were present in the colon, and thus may contribute to the health of the gastrointestinal tract, as other studies have shown effects of PAC on colonic cells with respect to mitigating cancer mechanisms. Studies in other animals are underway.

#### Authors and affiliations:

Andrew L. Waterhouse, Ying Y. Choy and Patricia I. Oteiza

Departments of Viticulture and Enology, and Nutrition, University of California, Davis

---

## The antioxidant paradox and para-hormesis: a paradigm shift in the mechanism of nutraceutical effects of antioxidants



### Prof Henry Jay Forman

Research Professor of Gerontology  
 University of California, Merced  
 University of Southern California, USA  
 Email: hjforman@gmail.com

*Henry Jay Forman received his PhD in Biochemistry from Columbia University in 1971. After a post-doctoral position at Duke University, he has held faculty positions in multiple disciplines at several universities including the University of Pennsylvania, the University of Southern California and the University of Alabama, where he was the Chairman of Environmental Health Sciences. He now holds appointments at both the University of California, Merced as Distinguished Professor of Biochemistry and Chemistry and Founding Faculty and as a Research Professor of Gerontology at the University of Southern California. Dr. Forman's expertise is in the areas of oxidative stress and signal transduction and he has over 200 publications and has been an invited lecturer at many national and international symposia. He is the President of the Society for Free Radical Biology and Medicine and Reviews Editor of Free Radical Biology & Medicine. His major research achievements include the pioneering work in redox signalling including the mechanisms of induced resistance to oxidative stress and discovery of mitochondrial superoxide production.*

### Abstract

In the area of health effects of wine, the word 'paradox' had been often used - or misused - to describe the inconsistency between what we observe and our prejudices. In fact, the term 'paradox' relays with the contradiction between two concepts appearing incompatible although apparently being both true. Usually, for paradoxes in science the conclusions are biased by an epistemological error. The recently introduced 'antioxidant paradox' describes the contradiction between the epidemiological evidence for disease prevention by dietary free radical scavenging antioxidants ( $1 e^-$  transition) and the kinetic evidence that this mechanism is ineffective *in vivo*. In fact, the endogenous enzymatic removal of non-radical electrophiles in  $2 e^-$  redox reactions ( $S_n2$  mechanism) is by far the major antioxidant mechanism. From available evidence it can be proposed that the actual mechanism of action for nutritional free radical scavengers is the oxidative activation of the Nrf2 signaling pathway, which maintains protective oxidoreductases and their nucleophilic substrates. By undergoing an oxidation, while sensing the cellular environment, phenolic antioxidants produce the oxidant electrophiles competent for the activation of the adaptive response. Thus 'antioxidants' are biologically active as 'oxidants'. This maintenance of 'Nucleophilic Tone' by a mechanism that can be called 'Para-hormesis' provides a means for regulating physiological non-toxic concentrations of the non-radical oxidant electrophiles that boost antioxidant response, damage removal and repair systems. As a whole, the para-hormetic mechanism proposed is seen consistent with the promotion of a healthy ageing by boosting defense and repair machinery by compounds mimicking the effect of really toxic oxidants. This evidence nicely fits the observation that silencing or down regulating antioxidant enzymes 'paradoxically' increases life span.

Remarkably, wine is a major nutritional source of 'para-hormetic antioxidants'.

## Alcoholic beverages consumption (wine, beer and spirits) and mortality from the main cancers in 35,292 men of the COLOR French cohort followed for 25 years: the CANCEALCOOL program



**Dr Dominique Lanzmann-Petithory**

Paris X and Bordeaux 2 University  
France  
Email: dominique.lanzmann@orange.fr

*Dominique Lanzmann-Petithory, MD, PhD in nutritional epidemiology, University Degree in Gerontology and Geriatrics, and Sport Medicine, is geriatrician and nutritionist at Hospital Émile Roux, Public Assistance of Paris Hospitals, France. She managed a Nutrition research group in agro-business for 13 years (1988-2001, Dannon Company). She directs clinical and epidemiological research in collaboration with JM Mérillon's team in GESVAB Institut des Sciences de la vigne et du vin Bordeaux2 University, France, continuing the work of Pr. Serge Renaud on prevention of cardiovascular diseases and cancer by moderate wine intake, and on omega 3 fatty acids, having worked with him for more than 20 years. Also she is University lecturer in Nutrition, Geriatrics and Public Health in Paris X University. She was recently coordinator of a 4-year Program financed by French National Research Agency, entitled "CANCEALCOOL" on alcoholic beverage consumption and mortality by different types of cancer, a follow-up study for 25 years on 100,000 subjects in the east of France. She is also the author of the book, Longevity Diet (La diététique de la longévité), Odile Jacob Edition 2004, and member of the National Council on Moderation and Prevention (for alcoholism) in France from 2009.*

### Abstract

A cohort of 98,063 subjects 40 to 65 years old from Eastern France (COLOR as « COhorte LORraïne ») underwent a comprehensive health appraisal, evaluating major biological and biometrical parameters, as well as drinking habits including types of alcoholic beverages. After a 21 to 28 years follow up, death causes were obtained from National Death File Service (CépiDC). This study was the first in France demonstrating that in middle aged men, moderate wine consumption was associated with a lower mortality from cardiovascular disease (-40%) and from cancer (-20%) (Renaud S, Arch Intern Med 1999). A 4-year program was then financed by National Research Agency: CANCEALCOOL, to evaluate the relationship between wine, beer and spirits consumption and mortality from the main cancers. We used data from 35,292 middle-aged men of COLOR, with normal electrocardiogram, no medications for cardiovascular risk factors, cancer, or psychiatric disorders, and could record a total of 4035 cancer death cases. In a Cox model adjusted for 12 confounding variables, the cancer death risk was related to age (older), educational level (lower), blood pressure, cholesterol (lower), BMI (lower), smoking, sedentary lifestyle, and lower water intake. Increasingly higher levels of alcohol consumption were correlated with cancer death increases, but, surprisingly enough, no cardiovascular death decrease. Whereas wine preference (>50% of alcohol intake from wine), regardless of the quantity of alcohol, was inversely related not only to cardiovascular death (RR=0.77 (CI 0.66-088) p<0.001), thromboembolic diseases (RR=0.69 (CI 0.57-082) p<0.001), but to all cancer death risk (RR=0.85 (CI 0.77-0.92) p<0.001), lung (RR=0.82, p=0.02), lip, oral cavity and pharynx (RR=0.43, p<0.001), larynx (RR=0.54, p=0.05), bladder (RR=0.62, p=0.06), rectum/anus (RR=0.59, p=0.09) death risks. Death risks for colon, stomach, pancreas, liver, and prostate cancers were not found to be related to wine preference.

### Authors and affiliations:

D. Lanzmann-Petithory<sup>1-2\*</sup>, R. Guéguen<sup>3</sup>, O. Brandmeyer<sup>3</sup>, O. Henry<sup>1</sup>, J.-M. Mérillon<sup>2</sup> and S.C. Renaud<sup>1-2</sup> †

<sup>1</sup> Groupe hospitalier Henri Mondor, Paris X University, Hôpital Émile Roux. BP 60010, 94451 Limeil-Brévannes Cedex, France; <sup>2</sup> GESVAB, Bordeaux2 University, ISVV, CS 50008 210, Chemin de Leysotte / F-33882 Villenave d'Ornon, France; <sup>3</sup> Centre de médecine préventive, 54500 Vandoeuvre-Les-Nancy, France

## Session IV Wine and cognitive function

### Chronic Champagne wine consumption improves spatial working memory in aged rats via modulation of hippocampal and cortical protein expression



**Prof Jeremy P.E. Spencer**

School of Chemistry, Food and Pharmacy  
 University of Reading  
 Reading, UK RG6 6AP  
 Email: j.p.e.spencer@reading.ac.uk

*Jeremy Spencer, PhD, is Professor of Biochemistry in the School of Chemistry, Food and Pharmacy at the University of Reading, Reading, UK. He has published over 130 peer-reviewed papers, co-authored 12 book chapters and one book. He has been invited to present at over 40 international conferences and received three prestigious international research prizes, ICPH 2009, 2011 and Nutrition Society 2009. He is Editor-In-Chief of Nutrition and Aging, Associate Editor of Genes and Nutrition and serves as an Editorial Board member on three other international journals. His research is focused on investigating the molecular mechanisms that underlie the accumulating body of epidemiological, and medical anthropological evidence, on a positive correlation between the consumption of diets rich in fruits and vegetables and a decreased risk of neurodegenerative disorders. In this context, his research interests centre on two aspects: (1) the elucidation of cellular mechanisms involved in neurodegeneration; and (2) the bioactive properties of phytochemicals, in particular flavonoids, which may underlie their putative beneficial effects against neurodegenerative processes. This work has led to detailed knowledge regarding potential mechanisms of action of flavonoids based on their modulation of intracellular signalling pathways. The overall aim of the work is the development of dietary or therapeutic strategies to delay the onset of, or combat degenerative disorders, in particular those associated with the central nervous system.*

#### Abstract

Whilst much data exists for the effects of flavonoid-rich foods on spatial memory in rodents, there are no such data for foods/beverages predominantly containing hydroxycinnamates and phenolic acids. To address this we investigated the effects of moderate Champagne wine intake, which is rich in these components, on spatial memory and related mechanisms relative to alcohol- and energy-matched controls. In contrast to the iso-caloric and alcohol matched controls, supplementation with champagne wine (1.78 ml/kg BW, alcohol 12.5 % vol.) for 6 weeks led to an improvement in spatial working memory in aged rodents. Targeted protein arrays indicated that these behavioral effects were paralleled by the differential expression of a number of hippocampal and cortical proteins (relative to the iso-caloric control group), including those involved in signal transduction, neuroplasticity, apoptosis and cell cycle regulation. Western immunoblotting confirmed the differential modulation of BDNF, CREB, p38, dystrophin, CNPase, mTOR, Bcl-xL in response to champagne supplementation compared to the control drink, and the modulation of mTOR, Bcl-xL and CREB in response to alcohol supplementation. Our data suggest that smaller phenolics such as gallic acid, protocatechuic acid, tyrosol, caffeoyl acid and caffeic acid, in addition to flavonoids, are capable of exerting improvements in spatial memory via the modulation in hippocampal signalling and protein expression. Changes in spatial working memory induced by Champagne supplementation are linked to the effects of absorbed phenolics on cytoskeletal proteins, neurotrophin expression and the effects of alcohol on the regulation of apoptotic events in hippocampus and cortex.

Authors and affiliations:

Giulia Corona<sup>1</sup>, David Vauzour<sup>3</sup> Claire M. Williams<sup>2</sup> and Jeremy P.E. Spencer<sup>a\*</sup>

<sup>1</sup> Molecular Nutrition Group, Centre for Integrative Neuroscience and Neurodynamics, School of Chemistry, Food and Pharmacy, University of Reading, Reading RG6 6AP, UK; <sup>2</sup> School of Psychology and Clinical Language Sciences, University of Reading, Reading, RG6 6AL, UK

---

## Eat, drink and be merry? Effects of bioactive foods and alcohol on mood and cognitive function



**Prof Andrew Scholey**

Centre for Human Psychopharmacology  
Swinburne University  
Melbourne, Australia  
Email: AScholey@groupwise.swin.edu.au

*Professor Andrew Scholey, PhD, CPsychol AFBPsS, is Director of the Centre for Human Psychopharmacology at Swinburne University, Melbourne. He is a leading international researcher into the neurocognitive effects of natural products, supplements and food components, having published over 100 peer-reviewed journal articles and numerous book chapters. In 1998, he established the Human Cognitive Neuroscience Unit at Northumbria University, UK and was the Unit's director until joining the then Brain Sciences Institute at Swinburne University in 2007. He has been lead investigator in a series of studies into the human biobehavioural effects of natural products, and their neurocognition-enhancing and anti-stress/anxiolytic properties. He has attracted millions of dollars in research funding, including as Chief Investigator on national competitive grants from the UK, Europe and Australia as well as from many industry bodies in Europe, North America, Asia and Australia. He has also acted as advisor to numerous industry bodies, ILSI Europe and ILSI South East Asia and has reported to the UK Parliamentary Forum on Diet and Health.*

### Abstract

The role of dietary components on cognitive functioning has received increasing research attention over the last decade or so. These studies have included investigations into the human mood and neurocognitive effects of phenol- and polyphenol-containing foods and beverages – including cocoa, tea, coffee and wine. This presentation will briefly review methodological and theoretical challenges to such investigations and provide an overview of work in this field in the context of alcohol, wine, and resveratrol. There is evidence from both preclinical studies, epidemiology and human clinical trials suggesting beneficial effects of resveratrol to systems underpinning cognitive function. Nevertheless direct evidence of cognitive benefits from resveratrol has proved elusive. Data from a pilot study comparing mental performance in an older cohort following red wine alone or enriched with resveratrol will be presented. These suggest that there are differential effects of the treatments depending on type of task.

Authors and affiliations:

Andrew Scholey<sup>1</sup> and Creina Stockley<sup>2</sup>

<sup>1</sup> Centre for Human Psychopharmacology, Swinburne University, Melbourne, VIC 3122, Australia; <sup>2</sup> The Australian Wine Research Institute, PO Box 197, Glen Osmond SA 5064, Australia

## Session V Grapes, wines and nutraceuticals (omics)

---

### Red wine flavonoids and vascular health



#### Prof Jonathan Hodgson

School of Medicine and Pharmacology  
 University of Western Australia  
 Perth, Australia  
 Email: jonathan.hodgson@uwa.edu.au

*Jonathan Hodgson, PhD, is Professor and a Senior Research Fellow of the National Health & Medical Research Council of Australia. He currently works at the University of Western Australia within the School of Medicine and Pharmacology located at Royal Perth Hospital. His research focuses on the role of diet in cardiovascular disease prevention. He has a range of research interests including investigating the role that dietary polyphenols play in reducing the risk of cardiovascular disease; studying the effects of dietary macronutrients on measurements related to heart health; and exploring the potential for grain legumes to benefit obesity, diabetes and blood pressure. He has published widely in these fields. Over the past 15 years, he has had a strong research interest in understanding the effects of dietary polyphenols on cardiovascular health. The research has investigated polyphenols derived from soy, tea, red wine, cocoa and fruit. More than 40 peer-reviewed publications have derived from this research.*

#### Abstract

Several epidemiological studies suggest that low to moderate red wine consumption may protect against cardiovascular disease. Because epidemiological studies have also shown a similar relationship for other alcoholic beverages, the alcohol, at low to moderate intakes, is proposed to provide protection via effects on HDL-cholesterol and platelet function. It remains uncertain however whether there is a causal link between red wine and cardiovascular disease. This is very difficult to explore in epidemiological studies because of the many confounding social and dietary factors, and because risk of cardiovascular disease increases substantially from moderate to very high intakes of alcohol.

The other major components of red wine that have received attention as potentially cardioprotective are the flavonoids. Flavonoids are potent antioxidants *in vitro*, but it is their ability to cause vasorelaxation that is likely to be important for any vascular health benefits. Red grapes, their skin, their seeds and the wine derived from them are rich in flavonoids. In studies using animal models, dealcoholised red wine has been shown to improve endothelial function, reduce blood pressure and reduce atherosclerosis. A number of human studies have also been performed to investigate the *in vivo* effects of short-term red wine/dealcoholized red wine/red grape juice/grape seed extract on endothelial function. The results of these studies are mixed, with some studies indicating benefit and others showing no effect.

The effects of other rich dietary sources of flavonoids, such as tea, cocoa, soy, and fruits to improve measures of vascular health may also provide a guide to the potential benefits of red wine flavonoids. There is mounting evidence that flavonoids and foods rich in flavonoids can make an important contribution to cardiovascular health. Intakes of fruit and vegetables, tea, cocoa, and soy have all been associated with reduced risk of cardiovascular disease. Furthermore, results of human trials and meta-analyses of these trials suggest that tea, cocoa and soy may all improve endothelial function and lower blood pressure. Therefore, there is good evidence that flavonoid-rich foods and beverages can have vascular health benefits. However, because bioactivity of different flavonoids varies, health effects cannot be generalised to all flavonoids and flavonoid-rich foods. Further studies are needed to establish any vascular health benefits of the red wine flavonoids.

---

## Prediction of the functionality of young South American red wines based on chemical parameters



### Prof Inar Castro

Faculty of Pharmaceutical Sciences  
 University of São Paulo  
 Av. Lineu Prestes, 580, B14, 05508-900  
 São Paulo, Brazil  
 Email: inar@usp.br

*Professor Inar Castro, MSc, PhD, is based in the of Food and Experimental Nutrition, Faculty of Pharmaceutical Sciences, University of São Paulo and the NAPAN – Food and Nutrition Research Centre, Av. Lineu Prestes, 580, B14, 05508-900, São Paulo, Brazil. Her current research interests include: the effect of the administration of ezetimibe or phytosterol on oxidative stress and inflammatory parameters in subjects with metabolic syndrome and dyslipidemia controlled by statins; the effect of the vintage on the antioxidant activity and the chemical and sensory characterization of South American young red wines according to their grape variety and geographical origin; and the effect of combined use of omega 3 fatty acids and phytosterols on oxidative stress. A Fellow of the National Research Council (CNPq - Brazil) - Level 2, she has published 62 peer-reviewed publications and 12 book chapters, and has supervised 5 Masters and 2 PhD students.*

### Abstract

Our objective was to classify young South American red wines according to their functionality, here defined as antioxidant activity (DPPH and ORAC), total polyphenol content (TP), total anthocyanin content (TA) and colour. Four factors were considered for sample selection: (n=666 wines): vintage (2009/2010), variety (Cabernet Sauvignon, Carménère, Malbec, Merlot, Tannat and Syrah), country (Argentina, Chile, Uruguay and Brazil) and price (low, medium and high). Wines from Cabernet Sauvignon and Malbec grapes produced in Argentina with medium to high prices demonstrated the highest functionality. Wines classified as HF (high functionality) demonstrated higher values of TP, TA, ORAC, DPPH, some individual anthocyanins, darkness and more purple colour than wines classified as IF and LF (intermediate and low functionality, respectively). Using discriminant analysis, 96.2% of the wines were correctly classified according to their functionality using simple markers. This classification is a simple mechanism to inform consumers of their choices regarding wine functionality.

### Authors and affiliations:

Laura García Llobodanin, Lucia Pereira Barroso and [Inar Alves Castro](#)

LADAF, Department of Food and Experimental Nutrition, Faculty of Pharmaceutical Sciences, University of São Paulo, NAPAN – Food and Nutrition Research Centre, Av. Lineu Prestes, 580, B14, 05508-900, São Paulo, Brazil; Department of Nutrition, School of Public Health, University of São Paulo, Av. Dr. Arnaldo, 715, 01246-904, São Paulo, Brazil

## Bioconversion of red wine anthocyanins into bioactive phenolic compounds by lactic acid bacteria



### Assoc Prof Paul Kilmartin

University of Auckland  
 School of Chemical Sciences  
 University of Auckland  
 Private Bag 1142  
 Auckland, New Zealand  
 Email: p.kilmartin@auckland.ac.nz

*Paul Kilmartin is an Associate Professor at the University of Auckland. He completed a PhD in electrochemistry at the same University in 1997 and joined the academic staff soon after. His research interests have diversified to include the characterisation of beverage aromas and polyphenol antioxidants, particularly in New Zealand wines, after establishing a postgraduate Wine Science programme in 2003. At the same time, several research projects involving conducting polymers have continued within the Polymer Electronics Research Centre, particularly the use of electrodes modified by conducting polymers as selective electrochemical sensors, and the development of antioxidant packaging systems. Research projects within Paul Kilmartin's group have engaged over 50 postgraduate students and have been reported in over 130 refereed publications.*

### Abstract

There has been increasing interest in red wine anthocyanins, not only for their influence on wine colour, but in relation to beneficial health effects. Lactic acid bacterial strains come into a direct contact with wine anthocyanins during malolactic fermentation and in the human digestive system. Anthocyanins are modified multiple times under the varying pH conditions encountered during digestion, meaning that intact anthocyanins are unlikely to survive the process. They may still act as local antioxidants within the digestive system. Metabolites such as phenolic acids are easier to absorb, and are more bioavailable. This study has investigated the biotransformation of representative red wine anthocyanins, malvidin-3-glucoside and petunidin-3-glucoside, into metabolites in the presence of *Lactobacillus plantarum* and *L. sakei* at pH 3.4, 4.2, 5.9 and 7.0, incubated anaerobically at 37°C for up to 24 hours. Samples were centrifuged and the compounds present in the supernatants were separated out using semi-preparative liquid chromatography. The metabolites were identified using HPLC-MS, and further characterized for their reducing (antioxidant) power by cyclic voltammetry. The anthocyanin glycosides were found to be completely hydrolyzed by the selected lactic acid bacteria strains at pH 4.2 and 5.9 after 24 h of incubation. The anthocyanins were quite stable under acidic conditions (pH 3.4) but were highly unstable at neutral pH, and were nearly completely lost after 8 h at pH 7.0 by both chemical and microbial degradation. The main metabolites were phenolic acids which showed greater antioxidant activity than the anthocyanins themselves. The antiradical power was found to decrease in the order, gallic acid > protocatechuic acid > syringic acid > malvidin-3-glucoside. Thus, the anthocyanin metabolites may be mainly responsible for the antioxidant activity of red wine against free radicals and other oxidative-related diseases.

Authors and affiliations:

Winai Suthanthangjai<sup>1,3</sup>, Paul A. Kilmartin<sup>1,3\*</sup>, Anthony Phillips<sup>2</sup>, Kevin Davies<sup>3,4</sup> and Juliet Ansell<sup>3,4</sup>

<sup>1</sup>School of Chemical Sciences; <sup>2</sup>School of Biological Sciences, University of Auckland, Private Bag 92019, Auckland, New Zealand; <sup>3</sup>Riddet Institute, Massey University, Private Bag 11222, New Zealand; <sup>4</sup>Plant & Food Research, Private Bag 11600, Palmerston North 4442, New Zealand

---

## Moderate intake of red wine promotes a significant increase of phenolic metabolites in human faeces



**Irene Muñoz-González**

Institute of Research in Food Sciences  
 Madrid, Spain  
 Email: irene.munoz@csic.es

*Irene Muñoz-González is a PhD student at the Institute of Research in Food Sciences (CIAL) (CSIC-UAM) Madrid-Spain. She finished her Master's degree in Food Science and Technology in 2009. Her thesis is focused on the study of the modulatory effect of wine polyphenols on colonic and oral microbiota and the metabolism involved. In 2010, she enjoyed a stay as a visitor scientist in the Institute for Oral Biology at the Centre for Dental and Oral Medicine (University of Zürich), where she studied the application of an oral biofilm model in order to determine the antimicrobial effect and/or modulatory capacity of red wine and some phenolic related extracts in oral microbiota.*

### Abstract

Recent scientific evidence suggests that dietary polyphenols, including red wine polyphenols, might exert biological effects at the gut level including anti-inflammatory activity, modulatory effects on the gut microbiota composition, and interactions with cells, among others. Moreover, these effects seem to be mainly due to phenolic metabolites formed in the gastrointestinal tract rather than the original forms present in foods. Our hypothesis is that the consumption of wine enhances phenolic metabolism that might have physiological relevancy at the gut level. Saying this, our starting point is to assess changes in phenolic metabolites in faecal samples as consequence of wine intake.

In the present work, a randomized, crossover, controlled intervention study involving 41 healthy volunteers was performed. The study was divided into two consecutive periods: a) an initial washout period of 2 weeks during which the volunteers did not consume any wine or any other alcoholic beverage and followed a low-polyphenols-diet; and b) a period of 4 weeks during which the case volunteers consumed 250 mL of red wine/day. Faecal samples were collected before and after the 4-week intervention period, and were analysed by an UPLC-ESI-MS/MS method validated for the screening of more than 60 microbial derived phenolic metabolites. A total of 35 phenolic metabolites were identified in the aqueous phase of faeces (faecal solutions). Statistical tests showed significant differences in the content of 11 phenolic metabolites, mainly benzoic and 4-hydroxy valeric acids, demonstrating that, effectively, the microbial metabolic profile of faecal solutions was significantly modified after the moderate intake of red wine polyphenols. In addition, the distribution of the volunteers by means of the total phenolic metabolite content in faecal solutions, clearly showed stratification of the volunteers after the 4-weeks period, indicating different human metabolic capacity for wine polyphenols.

### Authors:

Irene Muñoz-González, Ana Jiménez-Girón, Pedro J. Martín-Álvarez; Begoña Bartolomé and M.V. Moreno-Arribas

---

## Evolutionarily conserved pathways to longevity: modulation by wine polyphenols



**Dr Jamie Barger**

LifeGen Technologies, LLC  
 510 Charmany Drive, Suite 262  
 Madison WI 53719, USA  
 Email: Jamie.L.Barger@gmail.com

*Jamie Barger, Ph.D. is the Chief Operating Officer at LifeGen Technologies, a company focused on gene expression analysis as it relates to the ageing process of humans and animals. Dr. Barger is also an Associate Editor at Frontier in Nutrigenomics. He received his doctorate degree from the University of Alaska Fairbanks and received post-doctoral training at the University of Wisconsin Madison where he studied the role of a calorie-restricted diet on improving health span of rodents and non-human primates. His current research focuses on: (1) indentifying gene expression biomarkers of ageing and calorie restriction; and (2) screening natural compounds for their ability to slow the ageing process. This work was funded in part by the United States National Institute on Aging, has been published in peer-reviewed journals, and has resulted in several patent applications. Dr. Barger has been invited to present these findings at national and international conferences, including France, England, Spain, India, Argentina and Japan.*

### Abstract

Resveratrol is reported to slow the ageing process by mimicking a calorie restricted (CR) diet, however the mechanism by which resveratrol achieves this effect is controversial. We first sought to identify evolutionarily conserved pathways associated with slowed ageing as these processes represent likely sites for the action of resveratrol. We performed a meta-analysis of gene expression datasets and found that activation of mitochondrial energy pathways and downregulation of inflammatory pathways represent a robust and conserved signature of slowed ageing. Interestingly, these same pathways are modulated in obese humans consuming the red wine polyphenol resveratrol.

We then performed gene expression profiling in seven strains of mice subjected to CR in order to identify genetic targets that can be used to screen for the ability of resveratrol (and other natural compounds) to slow the ageing process. We identified four gene expression biomarkers of CR in white adipose tissue that are also components of either mitochondrial energy metabolism or inflammatory pathways that we associated with slowed ageing. In mice, consumption of a diet containing resveratrol and/or quercetin modulated these genes in a manner similar to CR.

We propose that these gene expression biomarkers can be used to screen for additional compounds (including other bioactive components of wine) that hold promise for slowing the ageing process.

Authors and affiliations:

Jamie L. Barger<sup>1</sup>, Tomas A. Prolla<sup>2</sup> and Richard Weindruch<sup>3</sup>

<sup>1</sup> Ph.D. LifeGen Technologies, Madison, Wisconsin USA; <sup>2</sup> Department of Genetics, University of Wisconsin Madison; <sup>3</sup> Department of Medicine, University of Wisconsin Madison

## Session VI Grapes, wines and nutraceuticals (omics) - continued

### Polyphenols composition of wine and grapes sub-products and potential effects on chronic diseases



**Prof Pierre-Louis Teissedre**

Faculty of Enology  
 University Bordeaux  
 Segalen, France  
 Email: pierre-louis.teissedre@u-bordeaux2.fr

*Pierre-Louis Teissedre, PhD, an oenologist, is a Professor in the Faculty of Enology of the University Bordeaux Segalen; Adjunct Director of the UMR 1219 Œnologie INRA (Mixed Research Unit) with the responsibility of the Oenopro Group; and is directing the applied Chemistry Laboratory of the USC 1366 Œnologie. He is an expert in the Technology group and is the Scientific Secretary of the Commission Safety and Health of the International Wines and Vines Organization (OIV). His research focuses on grape and wine-derived phenolic compounds, including the physiological effects of phenolic and mineral compounds from wines, grapes and fruits on human health, analytical and nutritional oenological chemistry, the sensory properties of tannins, and food/wine safety, in particular contaminants. He has developed numerous scientific collaborations at industry and academic levels. He is author of more than 200 peer-reviewed publications and communications and is co-inventor of five patents.*

#### Abstract

Grapes (*Vitis vinifera*) are one of the most cultivated fruit crops in the world, with an approximate annual production of 64 million metric tons in 2010 (OIV, 2011). The polyphenol composition of grapes and their extractability, which is far from complete and typically reaching only 30–40%, depends on grape variety, vineyard location and the technological parameters during the winemaking process including destemming, crushing, maceration and pressing. Therefore, grape pomace potentially constitutes an abundant and relatively inexpensive source of a wide range of polyphenols including monomeric and oligomeric flavan-3-ols (proanthocyanidins), as well as anthocyanins (glucosides, acetylated glucosides and coumarilic glucosides).

Grape pomace has also been evaluated as a potential source of antioxidant polyphenols which could be used as nutraceuticals or food additives, as polyphenols are known to have some health benefits such as preventing or reducing the risk of cardiovascular, cancer, and degenerative diseases. In order to evaluate wine by-products from the Rhone Valley area red wine cultivars, grapes, grape and pomace seeds and skins from red wines cultivars at maturity from the vintage 2009 and 2010 for varieties Grenache, Syrah, Carignan, Mourvèdre, Counoise and Alicante, have been characterized for their phenolic content. This characterisation included: total phenolic content; tannin and anthocyanin content (total and individual); quantification of monomeric and oligomeric proanthocyanidins; as well as some anthocyanins such as glucosides, acetylated glucosides and coumarilic glucosides. The ratio of initial phenolic compounds from grape to pomace was also estimated. The comparison of wine industry by-products with their respective grapes provided evidence that grape seed and skin pomace extracts still contained appreciable amounts of flavanol-3-ols and anthocyanins even after the fermentation process. Quantitative and qualitative distribution of polyphenols in grape pomace showed significant differences between varieties. Seed extracts from grapes and pomace contain exceptionally high amounts of total polyphenols compared to skin's extracts.

This study showed that seeds from Grenache, Syrah and Alicante and skins from Syrah, Carignan and Alicante are the most interesting fractions to be evaluated because of their richer polyphenol content compared to the other assessed fractions and varieties. This work further supports that grape pomace obtained after vinification still retained a significant amount of polyphenols of which level depends largely on the vintage. The use of this by-product would constitute a promising natural source of available polyphenols which could be included in nutraceutical formulations. Activities and effects of grapes by-products on a chronic disease model with hypertension are also presented.

Authors and affiliations:

Isabelle Ky<sup>1,2</sup>, Alan Crozier<sup>2</sup>, Gérard Cros<sup>3</sup> and Pierre-Louis Teissedre<sup>1</sup>

<sup>1</sup> Université Bordeaux Segalen, Institut des Sciences de la Vigne et du Vin, EA 4577- USC Œnologie 1366 INRA-UBS-IPB, 210, chemin de Leysotte, CS 50008, 33882 Villenave d'Ornon Cedex, France; <sup>2</sup> School of Medicine, College of Medical, Veterinary and Life Sciences, University of Glasgow, UK <sup>3</sup> Laboratoire de Pharmacologie et Physiopathologies Expérimentales, CNRS FRE 3400 Centre de Pharmacologie et d'Innovation dans le Diabète, Faculté de Pharmacie, 34093 Montpellier-Cedex 5, France

## The case for anthocyanin consumption to promote human health



### Dr Fulvio Mattivi

Department Food Quality and Nutrition  
 Research and Innovation Centre  
 Fondazione Edmund Mach  
 Via E. Mach 1, 38010  
 San Michele all'Adige  
 Italy  
 Email: fulvio.mattivi@fmach.it

*Fulvio Mattivi, PhD, is currently research manager (R1) and since 2009 he is the head of the Department of Food Quality and Nutrition at the Research and Innovation Centre of the Edmund Mach Foundation, Italy. He has been the scientific coordinator of over 30 projects funded by national and regional agencies, as well as of collaborations with industries and consortia which has lead to in excess of 150 scientific papers and 150 communications to national and international conferences. He also co-authored two international patents. His main research activity is food chemistry, investigating the main classes of polyphenols under the analytical, technological and nutritional point of view. More recently, he moved his research interests towards plant biochemistry and human nutrition, and he is now co-ordinating biochemical studies in the fields of plant, animal and human metabolomics, having established a state-of-the-art MS-based laboratory of metabolomics at FEM-IASMA in 2009. He is on the Editorial Board of oenological journals in Italy, Germany, South-Africa and Austria and is a correspondent member of the 'Accademia Italiana della Vite e del Vino di Siena'. He has been a member of the board of Groupe Polyphenols (2006-2008) and of a National Committee for the protection of the Brunello di Montalcino wines (2008). In 1995 and 2013 he received the Award for Scientific Research in Viticulture and Oenology from the Italian Association of Enologists, and in 1999 the award OICCE. Other co-authored papers received mention at the Morsiani Awards 2008 and 2009, Euroberry 2009; ICPH 2011.*

### Abstract

The advent of metabolomics is important in wine research since it provides advanced solutions for the assessment of grape and wine quality. The quality of grapes is directly related to their metabolite content and determines the commercial value in relation to colour, flavour, fragrance and other important attributes, among which the content of bioactive compounds is of particular relevance. Metabolomics applied to viticulture represents a way of analysing and monitoring grape metabolism, physiology, and development and is also an indispensable tool in terms of bridging the phenotype-genotype gap. Metabolomics applied to winemaking represents an intriguing way of analysing and understanding the complex interactions between multiple components evolving in a complex beverage such as wine. Metabolomics applied to wine and health provides the tools to measure the global effects of the administration of wine or of wine components. It is indeed possible to profile, in a single experiment, the circulating levels of the wine components and their catabolites, together with the transient changes in the human biofluids of hundreds of endogenous metabolites. On the other hand, the advent of metabolomics requires a new way of thinking the laboratory organisation and of planning the experiments. Our research group at FEM is developing mass spectrometry-based tools to provide a metabolomics research nucleus for the emerging strategic area of fruit biology. In this context, the final aim of the study is to identify, measure and interpret the complex time related concentration, activity and flux of endogenous metabolites in cells, tissues, and other plant samples. In this lecture we will introduce the instruments and team of the metabolomics facility at FEM, and discuss the pros and cons of the targeted and untargeted protocols so far developed, with the aid of practical examples from both published and on-going grape and wine research, including the novel results from the grape metabolome project in order to provide a preliminary picture of the complexity of the grape metabolome.

## Study of grape bioactive stilbenes by suspect screening metabolomics



### Prof Luigi Bavaresco

Centro di Ricerca per la Viticoltura  
Consiglio per la Ricerca e la Sperimentazione in Agricoltura CRA - VIT  
Viale XXVIII Aprile 26  
31015 CONEGLIANO (TV), Italy  
Email: luigi.bavaresco@entecra.it

*Professor Luigi Bavaresco is Director of the Research Centre for Viticulture – CRA (Consiglio per la Ricerca e la Sperimentazione in Agricoltura), at Conegliano (Italy), since 2010. From 1983 until 2000 he worked at the “Università Cattolica S. Cuore” at Piacenza (Italy) as assistant and associate professor of Viticulture. He has a Degree (“Laurea”) in Agricultural Sciences, from the “Università Cattolica S. Cuore”, Piacenza, (1980), and a Doctoral Degree in Agricultural Sciences with a designated emphasis in Viticulture, from the Ecole National Supérieure Agronomique (E.N.S.A.), Montpellier (France) (1991). He has been an invited speaker at many national and international symposia. Luigi is involved in many national and international research programmes, and his main fields of investigation cover the following aspects of viticulture: germplasm characterisation, disease resistance, grape and wine stilbenes, breeding, mineral nutrition (emphasizing iron), cultural practices and climate change. He has published 130 scientific papers in national and international journals (51 on journals with I F), including 9 chapters in international books, and is co-editor of a scientific book.*

### Abstract

Stilbenes are the grapevine phytoalexins also present in the wine. These compounds are one of the main classes of grape polyphenols associated with the beneficial effects of drinking wine. An epidemiological study carried out in the late 1970s showed that in France, despite the high consumption of food rich in saturated fatty acids, the incidence of mortality from cardiovascular diseases was lower than in other comparable countries. This phenomenon, called the “French paradox”, was correlated with the beneficial effects of consuming red wine as a major factor. In the present study, a targeted metabolomics approach called ‘suspect screening’ was used to study the grape stilbenes, which are then transferred to the wine. Compounds were characterized by accurate mass spectrometry analysis with a LC/QTOF system, and identification using the database, GrapeMetabolomics. This database was expressly constructed and contains the molecular formulas of around 1,000 putative grape and wine metabolites. With this approach, a total of 18 stilbene derivatives were identified in two grape samples (*V. vinifera* L. red cvs. Raboso Piave and Primitivo) on the basis of accurate mass measurements and isotopic patterns, and identification was confirmed by MS/MS analysis. Among them, bioactive stilbenes such as trans-resveratrol, Z- and E-piceid, piceatannol and Z- and E-astringin, and several resveratrol dimers, trimers and tetramers such as pallidol and pallidol-3-O-glucoside, E- and Z-ε-viniferin, E- and Z-□-viniferin, caraphenol B, parthenocissin A, E- and Z-miyabenol C, hopeaphenol, ampelopsin H and a vaticanol C isomer, were identified. To our knowledge, this is the first time that these resveratrol trimers and tetramers have been found in grapes.

### References:

Bavaresco, L., Mattivi, F., De Rosso, M., Flamini, R. (2012). Mini-Reviews in Medicinal Chemistry, 12, 1366-1381. Renaud, S., de Lorgeril. M. (1992). Lancet, 339, 1523-1526.

VIGNETO Project (2011-20133), funded by MiPAAF, grant 11275/7303/11

## Session VII Integrated medicine – healthy ageing

---

### Integrative Medicine in the quest for healthy ageing



**Dr David van Velden**

Department of Pathology  
 Faculty of Medicine  
 University of Stellenbosch  
 4 Le Sueur Street  
 Stellenbosch 7600 South Africa  
 Email: dpvv@sun.ac.za

*David van Velden, MD, M Prax Med, M Phil, is the founder of the Department of Family Medicine and Primary Care of the University of Stellenbosch, South Africa. Since his retirement, he still maintains close links with academia through a part-time appointment as senior researcher and lecturer at the Faculty of Health Sciences of the University of Stellenbosch, promoting research in the field of the health benefits of moderate wine and alcohol consumption, as well as the role of exercise and diet in the prevention of lifestyle-related diseases, and naturopathy in the treatment of chronic degenerative diseases such as metabolic syndrome, osteo-arthritis and osteoporosis. Other areas of interest include Sports Medicine, Integrative Medicine, Continuing Medical Education as well as scientific journalism as he contributes actively to the field of scientific reporting by translating scientific articles into understandable format for lay people. He has been an invited speaker at numerous national and international scientific meetings, and is a regular presenter and facilitator of CPD accredited lectures, and radio and TV presentations on health- and disease-related matters.*

#### **Abstract**

Integrative Medicine is defined as a post-modern healing-oriented medicine that reaffirms the importance of the relationship between practitioner and patient, focuses on the whole person (body, mind and spirit), is informed by evidence, and makes use of all appropriate therapeutic approaches, both conventional and alternative / complimentary, healthcare professionals and disciplines to achieve optimal health and healing, including all aspects of lifestyle.

This is a model of comprehensive care and primary prevention for complex, chronic illness that is grounded in both the science and the art of clinical medicine. Genetic tests are developed to diagnose treatable subtypes of complex diseases, to facilitate prevention of cumulative risks and to formulate intervention programs tailored to the individual. With this knowledge we identify the complex, lifelong interactions among lifestyle, environment and genetics.

Emphasis is on community actions dealing with health education and promotion, active and healthy ageing, health maintenance, motivation for healthy lifestyle, and less invasive and more cost effective treatment of illness. To a great degree, the body has the capacity to heal itself; this concept, in some ways, opposes the mechanical model in which doctors act as fixers. One goal of future practitioners will be to guide and empower patients toward self-healing. Consonant with this approach will be use of prevention and health promotion, the full range of natural treatments, including diet, use of the safest and least expensive interventions first, and also the mobilizing of community and social support for healthy living.

---

## Healthy cardiovascular ageing



### Dr Justin Ardill

Consultant Cardiologist  
Flinders Medical Centre and Noarlunga Hospital  
Adelaide, Australia  
Email: Justin.Ardill@health.sa.gov.au

*Dr Justin Ardill, BPharm MBBS (Hons) FRACP, is a part-time Staff Specialist - Flinders Medical Centre Interventional Cardiologist and also consults through SA heart rooms at Flinders and Yankalilla. His particular clinical interests include ischaemic heart disease, preventative cardiology and hyperlipidaemia. His current research includes Principle Investigator of the Excite Study, Principal investigator of the E-Select study, which looked at outcomes following stenting procedures and Principal investigator SA Heart for the DAL-Outcome study which looked at the clinical benefit of a cholesteryl ester transfer protein (CETP) inhibitor which raises the levels of HDL.*

### Abstract

The presentation will focus on the interplay between dietary, lifestyle and genetic factors in the cardiovascular development of adolescence through the problems of middle age and the challenge of maintaining cardiovascular function in advancing years. The major focus will be on primary preventative strategies with a review of up-to-date literature.

---

## Assessment of the impact of hereditary factors on biochemical parameters of cardiovascular risk in relation to moderate alcohol consumption



**Prof Maritha Kotze**

University of Stellenbosch  
 Department of Pathology  
 PO Box 19063  
 Tygerberg 7505  
 South Africa  
 Email: maritha@sun.ac.za

*Prof Maritha Kotze obtained her BSc, BSc honours and MSc degrees cum laude at the University of Stellenbosch. Since obtaining her PhD degree in 1990, she has supervised many postgraduate students including more than 10 PhD graduates. She has been awarded the Rector's Award for Research Excellence in 1999. She received a patent incentive award for Research Innovation in 2005 and was identified during this time by the Institute for Scientific Information in the USA as one of the 20 highest ranking active publishers in the biomedical field in South Africa. Her publications include more than 100 peer-reviewed articles and invited book chapters. Maritha has been an invited speaker at numerous national and international scientific meetings and is a regular presenter and facilitator of CPD accredited lectures. In 2009, she completed the Gknowmix - Genetic Knowledge Integration - Project under the auspices of the South African Medical Research Council. The goal of this initiative is to provide a gateway for clinicians, genetic counsellors, laboratories and medical scientists to translate genomic research into clinical practice by using a multi-disciplinary approach.*

### **Abstract**

A pathology supported genetic testing strategy has been developed to facilitate risk management of common multi-factorial diseases. Cardiovascular disease (CVD) provides a model to address the lifestyle link in most chronic disorders due to shared genetic underpinnings of pathophysiological pathways implicated in phenotypic expression of disease-related gene-environment interaction.

A study was undertaken to determine the effect of red wine vs brandy consumption on cardiovascular health parameters by taking genetic risk factors for CVD into consideration. An 8-week cross-over intervention study was performed to determine the effect of regular alcohol consumption in the form of red wine or brandy in healthy volunteers. The study population consisted of 37 individuals between the ages of 18 and 70 years. The assessments included anthropometric measurements, biochemical determinations and genetic analysis of CVD risk factors relating to lipoprotein abnormalities, oxidative stress and inflammation. The level of total glutathione as an indicator of redox status was significantly decreased only after the brandy intervention when compared to the baseline ( $P=0.038$ ). Both the brandy and wine intervention resulted in a significant increase in HDL-cholesterol ( $p=0.00002$ ). Important genetic findings included an increase of triglyceride levels with alcohol intake observed only in HFE mutation-positive individuals ( $p=0.02$ ).

The well-established protective effect of moderate alcohol consumption on cardiovascular disease (CVD) risk factors has been confirmed. Red wine has an additional benefit compared to brandy consumption that may be ascribed to polyphenolic antioxidants in the wine. Since the genetic profile influences the effect of alcohol on biochemical parameters of CVD risk, safe limits of wine and brandy consumption may in future be based partly on the genetic profile.

## Wine consumption benefits on CVD risk factors in the PREDIMED (Prevention with Mediterranean Diet) Trial



### Assoc Prof Rosa Lamuela-Raventos

Department of Nutrition and Food Science  
 School of Pharmacy  
 University of Barcelona  
 Av Joan XXIII s/n  
 08028-Barcelona, Spain  
 Email: lamuela@ub.edu

*Rosa M. Lamuela-Raventos, PhD, is Associate Professor in the Department of Nutrition and Food Science, University of Barcelona, Spain and was also Secretary of the Board of the Food Science and Nutrition Department from February 2003-June 2012. She has published more than 150 peer-reviewed papers and has been invited to speak at conferences in Argentina, Belgium, Brazil, France, Italy, Israel, Malta and Mexico. Her areas of research include the analysis of phenolic compounds in foods and biological samples. She has designed studies to assess how technological processing or cooking methods affect bioactive compounds as well as designing clinical trials to assess the functional effect of these components in the human body, in addition to studying the bioavailability, metabolism and action of the microbiota. In particular, she is a member of the Polyphenol research - Natural antioxidant group at the University of Barcelona associated with the PREDIMED study (PREvención con Dieta MEDiterránea), which is a thematic network of centres of the Ministry of Health that includes 16 groups of researchers in eight regions of Spain aimed at assessing the effects of the Mediterranean diet on the primary prevention of cardiovascular disease.*

### Abstract

The PREDIMED study is a large, parallel-group, multicentre, randomized, controlled 5-year clinical trial aimed at assessing the effects of the Mediterranean diet on the primary prevention of cardiovascular disease. The 7,447 eligible participants were community-dwelling people aged 55 to 80 years, who were free of cardiovascular disease at baseline. We evaluated the effects of wine consumption on cardiovascular risk factors such as blood pressure (BP), heart rate, body mass index (BMI), abdominal perimeter, plasma glucose and triglycerides concentrations, among others. Statistical analyses (ANOVAs and Bonferroni tests) were conducted using SAS software, version 9.3 (SAS Institute, Inc., Cary, North Carolina). Moderate wine drinkers showed a decrease in triglycerides levels (-9.6 mg/dL,  $P=0.05$ ) and glucose levels (-5.6 mg/dL,  $P=0.046$ ) comparing to non-drinkers. Heart rate and BMI were significantly lower among wine consumers comparing to non-drinkers ( $P<0.05$ ; both). There were no changes on SBP and DBP among non-drinkers and moderate wine drinkers, although both pressures were increased among those who drank >14 cups/week (SBP: +3.3 mmHg,  $P=0.001$ ; DBP: +2.6 mmHg,  $P<0.001$ ). No significant differences were observed in total cholesterol, HDL, and LDL concentrations.

### Authors:

Lamuela-Raventos RM<sup>1,2</sup>, Tresserra-Rimbau A<sup>1,2</sup>, Medina-Remón A<sup>1,2</sup>, Martínez-González MA<sup>2,3</sup>, Maria-Isabel Covas<sup>2,4</sup>, Jordi Salas-Salvadó<sup>2,5</sup>, Dolores Corella<sup>2,6</sup> and Estruch R<sup>2,7</sup>, on behalf of the PREDIMED Study Investigators

<sup>1</sup> Nutrition and Food Science Dep., XaRTA, INSA, Pharmacy School, University of Barcelona, Avda. Joan XXIII, s/n, Barcelona, Spain; <sup>2</sup> CIBER CB06/03 Fisiopatología de la Obesidad y la Nutrición (CIBEROBN), Spain; <sup>3</sup> Department of Preventive Medicine and Public Health, School of Medicine, University of Navarra, Pamplona; <sup>4</sup> Cardiovascular Epidemiology Unit, Municipal Institute for Medical Research, Barcelona, Spain; <sup>5</sup> Human Nutrition Department, Hospital Universitari Sant Joan, Institut d'Investigació Sanitària Pere Virgili, Universitat Rovira i Virgili, Reus, Spain; <sup>6</sup> Department of Epidemiology, Preventive Medicine and Public Health, School of Medicine, University of Valencia, Valencia, Spain; <sup>7</sup> Internal Medicine Department, Hospital Clínic, Institut d'Investigacions Biomèdiques August Pi i Sunyer (IDIBAPS), University of Barcelona, Barcelona, Spain

## Session VIII Our daily diet and lifestyle – interactions with wine

---

### The business of wine and health: responsible delivery of wine's health message



**Greg Waters**

Tucson Orthopaedic Institute  
Tucson, Arizona, USA  
Email: g1waters@mac.com

*Greg Waters, BA, MBA, has been Chief Executive officer of the Tucson Orthopaedic Institute since 2009, and is concurrently Executive Director of the Desert Heart Foundation and Director of the Wine & Heart Health Research Initiative, Tucson, Arizona. The Desert Heart Foundation Wine & Heart Health Research Initiative is a non-profit organization that sponsors medical research and medical education. All funds raised by this program are directed towards research and education, and promoting the specific goals and initiatives of the Desert Heart Foundation. Prior to this he was Chief Executive Officer of the Desert Cardiology of Tucson and Director of Medical Affairs at Corda Medical Care, Inc.*

#### **Abstract**

The USA has made some progress recognizing the health benefits of wine over many years of research, but still struggles how to advise the public about alcoholic beverages. The history of alcohol in the USA, particularly lessons from the years of prohibition, demonstrate the difficulties governments encounter when trying to legislate alcohol. In an attempt to prevent alcoholism and its social and health consequences, it must draw a division between healthy consumption and excess. This has proven a difficult task. The US Department of Agriculture has considered alcoholic beverages more so a drug than food and as late as 1990, writing in its Dietary Guidelines “drinking has no net benefit (to health).” Five years later it changed its text to “moderate drinking is associated with a lower risk for coronary heart disease.” [1] Moderate drinking later was defined to no more than 2 drinks/day for men, 1/day for women. A drink is one 12 oz. beer, 5 oz of wine, 1.5 oz. of 80-proof spirits, or 1 oz. of 100-proof spirits.

The American Heart Association (AHA) cautions people, in general, not to start drinking because it is unable to determine if drinking will progress to alcoholism. Suggesting that they should discuss healthy alcohol consumption with their physician, the government chooses a broad scheme of control of alcohol consumption, legislating morality that has proven time and again doomed to failure. Middle-aged men and post-menopausal women who do not drink and are urged not to start may, however, be exposed to a higher risk of cardiovascular disease (CVD). [2] This cohort who begin to drink have lower mortality rates. If a non-drinking person began to consume alcohol moderately, he or she would reduce their risk of coronary heart disease by 33 percent, but women might show a 10 percent increased risk in breast cancer by 10 percent. [3] There are approximately 80,000 deaths attributed to excessive alcohol use each year in the USA (about half related to binge drinking), according to the Centres for Disease Control, still less than an estimated 106,000 deaths from adverse effects of prescription drugs, and far less than deaths related to CVD.

The US has no consistent policy that moderate daily consumption of alcohol is part of a healthy lifestyle. The 2011 “National Prevention Strategy,” a publication of the Surgeon General’s Office, mentions alcohol 228 times, mostly focusing on alcohol abuse, alcohol-related motor vehicle accidents, alcohol-related teen pregnancy, etc. Despite being a publication about prevention, there is not one mention that moderate daily consumption of alcohol can prevent certain diseases in certain populations. [4] However, the 2010 Dietary Guidelines for Americans, produced by the US Department of Agriculture, provides a more balanced approach, even though it is covered in the chapter, Foods and Food Components to Reduce: “The consumption of alcohol can have beneficial or harmful effects, depending on the amount consumed, age, and other characteristics of the person consuming the alcohol. Alcohol consumption may have beneficial effects when consumed in moderation. Strong evidence from observational studies has shown that moderate alcohol consumption is associated with a lower risk of cardiovascular disease. Moderate alcohol consumption also is associated with reduced risk of all-cause mortality among middle-aged and older adults and may help to keep cognitive function intact with age. However, it is not recommended that anyone begin drinking or drink more frequently on the basis of potential health benefits because moderate alcohol intake also is associated with increased risk of breast cancer, violence, drowning, and injuries from falls and motor vehicle crashes.” [5]

---

The US government's policy on labelling also is evolving, an issue important for wine producers who are stifled from reporting health issues with the exception of detriment on labels or advertising. For certain, it is unequivocal in its warning about alcohol's negatives: "GOVERNMENT WARNING: (1) According to the Surgeon General, women should not drink alcoholic beverages during pregnancy because of the risk of birth defects. (2) Consumption of alcoholic beverages impairs your ability to drive a car or operate machinery, and may cause health problems." This is in stark contrast to Germany ("Sale prohibited to persons under 18 years of age.") and United Kingdom's voluntary language ("The Chief Medical Officer recommend men do not regularly exceed 3-4 units daily and women, 2-3 units daily."). In 2002, the Alcohol and Tobacco Tax and Trade Bureau (TTB) granted Willamette Valley Vineyards a permit to post content of the antioxidant resveratrol on two of its labels. The TTB in May 2013 gave alcoholic beverage companies the ability to label their bottles voluntarily with nutrition facts. Winemakers expressed it eventually will move from voluntary to mandatory. [6]

References:

1. U.S. Department of Agriculture and US Department of Health and Human Services. Nutrition and Your Health Dietary Guidelines for Americans. 4<sup>th</sup> Edition, Washington, DC: U.S. Government Printing Office, December, 1995.
2. Circulation 2001;103:472-475.
3. <http://www.drinkingandyou.com/site/uk/health/Ellison.htm>
4. National Prevention Council, National Prevention Strategy, Washington, DC: U.S. Department of Health and Human Services, Office of the Surgeon General, 2011.
5. U.S. Department of Agriculture and U.S. Department of Health and Human Services. Dietary Guidelines for Americans, 2010. 7<sup>th</sup> Edition, Washington, DC: U.S. Government Printing Office, December 2010.
6. Finz, Stacy. (2013, June 5). Winemakers resist new nutrition labels. San Francisco Chronicle, from [www.sfchronicle.com/wine/article/Winemakers-resist-new-nutrition-labels-4581548.php](http://www.sfchronicle.com/wine/article/Winemakers-resist-new-nutrition-labels-4581548.php)

---

## WINEinMODERATION – successfully educating wine professionals in Germany



**Ursula Fradera**

Deutsche Weinakademie GmbH  
 Gutenbergplatz 3-5, 55116  
 Mainz, Germany  
 Email: fradera@deutscheweinakademie.de

*Ursula Fradera is a nutritionist (Diplom-Oecotrophologin, MSc) and has been working with the Deutsche Weinakademie (DWA) as a project manager and branch manager since 1999. The objectives of the DWA are to establish wine as part of a healthy diet and modern lifestyle and to make people aware about responsible drinking pattern by informing about the benefits of moderate wine consumption AND the risks of alcohol misuse. Ursula is responsible for the coordination of scientific studies, the organisation of continuing education seminars for health professionals, media relations and the maintenance of a databank with worldwide publications on wine. In addition, she is an appointed expert for the Commission IV Safety and Health of the Organisation Internationale de la Vigne et du Vin (OIV). At a European level, she is currently Vice-President of the Wine in Moderation association and has been coordinator of the Wine Information Council since 2007. She is also involved in implementing the "Wine in Moderation" program at the national level in Germany. Her position at the DWA gave her the opportunity to act as an independent expert for a variety of national and international governmental health and safety forums. Furthermore, she has attended numerous international conferences and meetings as a speaker. Previously, Ursula was in charge of implementing public health nutrition programs in Vancouver, Canada, for four years and lecturer of human nutrition courses at the University of B.C., Canada.*

### **Abstract**

The goal of the WINEinMODERATION – Art de Vivre program (WIM) is to achieve moderate wine consumption patterns as a social and cultural norm, contributing to the reduction of alcohol-related harm. For behaviour change, comprehension is necessary and comprehension needs information, therefore, education and information is central to disseminating the moderation message in Europe. The focus in Germany is the training of multipliers such as wine and health professionals. Thus, all German professional schools for winemakers and cellar men as well as four sommelier schools are integrated in the WIM program. The WIM seminar includes an overview of the wine and health aspects and associated risks of the misuse of alcoholic beverages, and of wine in particular. Responsible drinking patterns and the assessment of the blood alcohol concentration after wine consumption are emphasized. With the help of interactive methods, the trainees are asked to reflect on their own behaviour. The importance of the Wine Information Council in providing the latest, evidence-based scientific information for the seminar content will be discussed. The education aims to sensitize future wine professionals towards alcohol-related risks and equip them with the necessary knowledge not only to inform sophisticated customers competently about the product but also about its health effects. At the same time, these wine professionals act as multiplier for the consumers. With more knowledge about wine, consumers can make informed decisions and a potential misuse can be prevented. For the evaluation of this WIM seminar, responses of a questionnaire covering the basic knowledge are analysed. The results indicate a significant increase in knowledge among the seminar attendees which may indicate a lasting effect. In addition to the knowledge increase, the quality of the seminar as well as the personal and professional value of the participants is assessed.

Authors and affiliations:

Ursula Fradera and Claudia Stein-Hammer, Deutsche Weinakademie GmbH, Mainz, Germany

---

## Wine, cultural health, and social cohesion – a modern day challenge



**Dr Brian Mitchell and Evan Mitchell**

Email: [bmitchell@psychologyofwine.com](mailto:bmitchell@psychologyofwine.com)

*Brian Mitchell has a PhD in Psychology from the University of Sydney. After a period in clinical practice he established an international consulting company applying behavioural science principles in the commercial world. For fifteen years he advised leading US consumer products companies on sales and negotiation strategies with retailers.*

*Evan Mitchell is an Honours graduate in English Literature and Psychology from the University of Sydney. His knowledge and love of wine were developed over years as a sommelier and front of house manager in fine dining restaurants. He also has extensive consulting experience in the hospitality and consumer products industries.*

*The authors have three published books, including The Psychology of Wine... truth and beauty by the glass, a 2009 Praeger hardcover, recently released in a revised edition. Their interest in wine extends from the aesthetic to the practical – with numerous articles on the place of wine in the dining experience published in industry journals. A recent analysis entitled “The Future of Wine” explores the challenges faced by the wine industry from generational changes in tastes and habits, and the social problems stemming from these. They argue that the wine industry is uniquely placed to institute a message of refinement over excess, of taste acquisition over intoxication, of discernment over vulgarity.*

### **Abstract**

The ancients esteemed wine for all that it contributes to life and wellbeing. ‘A medicine’, says Plato in his *Laws*, ‘given for the purposes of securing modesty of soul and health and strength of body’. Ages since have seen wine lauded for its qualities of individual inspiration and cultural enrichment. Celebrated by writers and poets from Homer to Shakespeare to Baudelaire and Wilde, and pondered by philosophers as varied as Kant, Hume and Schopenhauer, wine has also enjoyed a unique place in art, figuratively and symbolically, through the centuries.

Though the pulse of all these age-old cultural strands still beats in the wines made today, such associations largely go unrecognised and unexplained. The modern downplaying of the psychological contribution of wine to society has been accompanied by an equivalent widespread unravelling of hospitality, civility, community and family cohesion values. These wine-inspired virtues see their antithesis in the generational bingeing that increasingly plagues societies and fills headlines. Mediterranean cultures previously immune to such excesses are now encountering their own versions, as their youth desert the stabilizing *ethos* of wine and food enjoyed in family and community, for junk beverages that reward novelty over taste.

Generational trends have moved in the direction of a vulgarizing of tastes. This, combined with the dominance of licence over restraint, poses a serious challenge to society. Wine has the credentials to play a role in addressing the social problem that’s emerged. Wine’s enduring legacy still has resonance. What’s been missing is a modern interpretation and practical application of its values. Through this can come much-needed positive changes in generational attitudes towards discernment, judgment, and what constitutes style and mature behaviour in young adults.

---

## Translation of science into public health policy



### Creina Stockley

The Australian Wine Research Institute  
 PO Box 197,  
 Glen Osmond SA 5064 Australia  
 Email: creina.stockley@awri.com.au

*Creina Stockley, MSc, MBA, a former clinical pharmacologist, has been Health and Regulatory Information Manager at The Australian Wine Research Institute since 1991, and is an Affiliate Senior Lecturer in the School of Agriculture, Food and Wine at the University of Adelaide. In 1997, she was appointed an Australian government representative to the Organisation Internationale de la Vigne et du Vin (OIV) and is currently President of the OIV Commission IV Safety and Health. In addition she is currently Chair of the Scientific Organising Committee of the WineHealth 2013. She is a member of the Winemakers' Federation of Australia Wine and Health Working Group, and is also a member of the International Scientific Forum on Alcohol Research, the EU Wine Information Council Scientific Board and the European Food Safety Authority Expert database. She is actively involved in research projects, such as the effects of wine-derived resveratrol on colorectal cancer with the Royal Melbourne Hospital, on the effects of red wine with different phenolic compound concentrations on vascular function and blood pressure in healthy young and elderly subjects with the University of Aberdeen Scotland and Flinders University, on the effects of wine-derived resveratrol on cognitive function in an ageing population with the Brain Sciences Institute at Swinburne University, Melbourne and on the tracking the grape metabolome into wine in conjunction with the Research and Innovation Centre, Edmund Mach Foundation, Italy. She has presented papers at in excess of 60 conferences, and published in excess of 50 peer-reviewed papers, 50 non-peer-reviewed papers and nine book chapters. The Australian Wine Research Institute (AWRI) is an independent not-for-profit research institution.*

### Abstract

Epidemiological studies conducted over the past 21 years since the publication of Renaud and de Lorgeril and their 'French paradox', have generally concluded that there is an inverse relationship between moderate consumption of wine and the risk of cardiovascular disease that can be extended to risk of death from all causes. This science is often not considered when preparing public health policy in Australia or internationally, where policy focuses on the risk of short and long term harms to human health as consumption increases above moderation. We will discuss this emerging science, and how it may be translated into public health policy going into the future.

## Poster paper abstracts

---

### Solving the puzzle of grapevine metabolome via complementary analytical techniques on many genotypes



**Fulvio Mattivi**

Department of Food Quality and Nutrition  
Fondazione Edmund Mach,  
Research and Innovation Centre,  
via E. Mach 1, 38010 San Michele all'Adige, Italy  
Email: fulvio.mattivi@fmach.it

Anthocyanins, phytopigments associated with health-promoting properties, can be found in several “functional foods” such as red, blue and purple berries and red wine. Their content in red wine depends on different geographical and agricultural factors, and the age of the wine. Present at grams per kg in red grapes, they are transferred at some hundreds of milligrams per L into young wines, and decrease to trace levels in aged wines. Red wine generally contains glycosides of the five major anthocyanidin types: delphinidin; cyanidin; petunidin; peonidin; and malvidin, with pelargonidin occurring at trace levels and pattern related to the cultivar. Depending on the diet, the daily intake of anthocyanins in humans has been estimated to range from several milligrams to hundreds of milligrams. Italians have great provision of anthocyanins due to their Mediterranean diet, rich in berries and other red and blue-coloured fruits and red wine. Indeed, a glass of wine provided approximately 20-35 mg of anthocyanins. Interest in anthocyanins has increased widely during the past decade. This poster chronicles the numerous studies which have suggested that anthocyanins have a wide range of health-promoting activities. This contribution is aimed to provide an updated figure about their pharmacokinetics and the mechanisms involved in their biological activities, discussing also the possible area of major interest calling for more studies, given that red grapes and red wines can be important contributor of dietary anthocyanins.

Authors and affiliations:

Elisa Pojer<sup>1</sup>, Fulvio Mattivi<sup>1</sup>, Daniel Johnson<sup>2</sup> and Creina S. Stockley<sup>2</sup>

<sup>1</sup> Research and Innovation Centre, Fondazione Edmund Mach, Via E. Mach 1, 38010 San Michele all'Adige, Italy, <sup>2</sup> The Australian Wine Research Institute, PO Box 197, Glen Osmond, SA 5064, Australia

## Bioavailability and activity of red wine polyphenols – a multi-dimensional urinalysis study



### Dr Paul Prenzler

Charles Sturt University  
 School of Agricultural and Wine Sciences,  
 Locked Bag 588,  
 Charles Sturt University,  
 Wagga Wagga NSW 2678 Australia  
 Email: pprenzler@csu.edu.au

*A/Prof Paul Prenzler completed a BSc(Hons) and PhD at the University of Queensland, where he researched platinum anti-cancer compounds. After several postdoctoral appointments –Advanced Research Laboratory of Hitachi, in Japan; Research School of Chemistry, ANU; Melbourne University – he was appointed lecturer in Chemistry at Charles Sturt University (CSU) in July 1997. At CSU, his research interests have diversified to encompass projects that are aligned with CSU's location in rural Australia. The projects typically involve the application of different analytical techniques to solve chemical problems that have significance to the region. He is a co-author of 4 book chapters and 89 refereed publications (23 in wine and/or health-related areas), and the recipient of the Vice-Chancellor's Award for Research Excellence. He is also chair of the Riverina-Murray Section of the Royal Australian Chemical Institute, and is actively involved in promoting chemistry in High Schools.*

### Abstract

A necessary condition for bioactivity of polyphenols is bioavailability and increasing amounts of data show that some of the components of red wine are bioavailable. In this study, excretion of wine polyphenols and metabolites was investigated by HPLC-DAD-fluorescence, LC-qTOF-MS, and HPLC-post-column ABTS assay. The various detection methods will be compared and contrasted and the advantage of using multiple detectors will be discussed. In particular, the post-column ABTS assay provides a profile of urinary components with antioxidant activity, and we have established that wine-derived metabolites have antioxidant activity. This provides some evidence that wine can contribute to the overall antioxidant status in an individual.

Authors and affiliations:

Gina Borges<sup>1</sup>, Alan Crozier<sup>2</sup>, Daniel Jardine<sup>3</sup>, Paul D. Prenzler<sup>3</sup> and Danielle Ryan<sup>3</sup>

<sup>1</sup>School of Medicine, College of Medical, Veterinary and Life Sciences, University of Glasgow, Glasgow G12 8QQ, United Kingdom; <sup>2</sup>Flinders Analytical, Faculty of Science & Engineering, Flinders University, Adelaide, SA 5001, Australia; <sup>3</sup>National Wine and Grape Industry Centre, School of Agricultural and Wine Sciences, Charles Sturt University, Wagga Wagga 2678

## Gastrointestinal simulation models applied to the study of bioactive components in wine



### Carolina Cueva

(Presented by Irene Muñoz González and Ana Jimenez-Giron)

CIAL (CSIC-UAM)  
Calle Nicolás Cabrera, 9, 28049,  
Madrid, Spain  
Email: carolina.cueva@csic.es

*Carolina Cueva is a post-doctoral researcher at the Institute of Food Science Research (CIAL) (CSIC-UAM) Madrid, Spain. She obtained her PhD in Food Science and Technology in 2011. Her thesis focused on the study of the modulatory effect of wine polyphenols on human intestinal microbiota and the metabolism involved. In 2009, she enjoyed one stay as a visitor scientist in the School of Chemistry, Food Bioscience and Pharmacy (University of Reading), where she studied the application of human digestion model in order to determine the antimicrobial effect and modulatory capacity of wine polyphenols in intestinal microbiota. Currently, she works with a novel simulation model called SIMGI (CIAL, CSIC-UAM, Spain), which aim is to study the metabolism of polyphenols and other components of wine, by the intestinal microbiota.*

### Abstract

*In vitro* gastrointestinal simulation models are used to assess the changes experienced by food ingredients during transit through the gastrointestinal tract, allowing consideration of regions of remote physiological access (stomach, intestine, colon), and of physiological variables, such as pH variations and fluid gastrointestinal microbiota changes. In regard to the interaction between wine bioactive components (i.e. polyphenols) and the microbiota, models are required to take into account the complexity and diversity of the intestinal microbiota. In recent years, systems have been developed based on simple model static fermentations (batch), and more advanced, systems such as gastrointestinal tract dynamic simulators that intend to reflect most of the physiological parameters that may affect the intestinal microbiota and metabolic activity. In this poster, we review the applications of different *in vitro* gastrointestinal simulators to wine and/or wine components. Among them, it is included a novel simulation model called SIMGI (CIAL, CSIC-UAM, Spain), which aims to study the metabolism of polyphenols and other components of wine, by the intestinal microbiota. The system consists of three compartments, stomach, small intestine and large intestine, and is governed by a PC to simulate, continuous and jointly or separate, the functions of digestion and colonic fermentation. Also, the simulator is accomplished to novel analytical techniques such as UPLC-ESI-MS/MS in order to assess degradation of the wine phenolic compounds and formation of microbial phenolic metabolites in the samples collected at the different compartments.

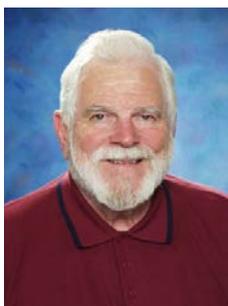
### Authors and affiliations:

Carolina Cueva , [Irene Muñoz-González](#) , Elvira Barroso, [Ana Jiménez-Girón](#), Fernando Sánchez-Patán, Pedro J. Martín-Álvarez, Teresa Requena, Begoña Bartolomé and M. Victoria Moreno-Arribas.

Institute of Food Science Research (CIAL) (CSIC-UAM)

---

## On the apparent neglect of the effects on 'winehealth' and in wines of 'radical ions'



**Gordon J. Troup**

School of Physics,  
Monash University  
Clayton VIC 3800 Australia  
Email: gordon.troup@monash.edu.au

*Gordon John Troup was born in Colombo, Sri Lanka, and sent to Melbourne, Australia in 1940, after completing most of his primary education in Sri Lanka. He was further educated at Xavier College and Melbourne University (B.Sc.). He then joined what is now the Defence Science and Technology Organisation (DSTO) in Adelaide, where he worked on antennas and microwave systems. He spent 1956 to 1958 at the Royal Aircraft Establishment, Farnborough, Hampshire, England. During this period he gained a M.Sc. from London University: his thesis on Masers, was published as a 'Methuen Monograph', and was the first book in the world on the topic. He joined Monash University from its beginning in 1961, where he started work on electron paramagnetic resonance (EPR) and lasers. He gained his D.Sc. from Melbourne University in 1973 with his works on Quantum Electronics. Work on having EPR as an accepted method of detecting food irradiation because of the free radicals formed led to the discovery of free radicals in coffee drinks, and eventually in wines, whiskies and brandies. Dr. Troup is an Honorary Senior Research Fellow at the School of Physics, Monash University, where he continues his researches and some teaching.*

### **Abstract**

'Radical Ions' is an old name for transition metal ions, such as  $\text{Cu}^{2+}$ ,  $\text{Mn}^{2+}$  and  $\text{Fe}^{3+}$ , all of which occur in wines. They are clearly antioxidants in their own rights, because of possible valence change.  $\text{Cu}^{2+}$  is a part of Superoxide Dismutase 1 (SOD1), and  $\text{Mn}^{2+}$  is not only necessary for SOD2, but has a chaperone molecule! These two ions are known to interact with polyphenols.  $\text{Cu}^{2+}$  is used in many 'model wines' which usually contain catechin.  $\text{Mn}^{2+}$  used in a model wine with quercetin shows free radicals also, and is slightly fluorescent. Is this the cause of the fluorescence seen in some white wines? Many papers are written about the different content of polyphenols in wines from different districts, but how many have been written about the different effects of different concentrations of these two ions, for example? Then there is the case of the South Australian Shiraz that threw a waxy red bottle deposit. This was found at first to be an anthocyanin-protein compound, but EPR showed that  $\text{Cu}^{2+}$  was involved as well, interacting with the Nitrogens. The eventual prevention by artificial aging was good for wine sales, and for the wine, in which the Cu and the anthocyanin were preserved. The purpose of this poster is to encourage research in this area, and not to forget the radical ions.

