

# ANZOS August Newsletter

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Welcome to the new ANZOS newsletter. The aim of the revamped newsletter is to help the ANZOS community stay connected and update all members on what is going on in the society. What is included :

- showcasing published works by the members (a way of getting your work known in between conferences),
- letting people know of upcoming research,
- acknowledging those who have recently finished PhD's in obesity field
- listing courses that might be of interest, Jobs that are available,
- what's happening at the ASM, and
- what the society is doing around the country. If you have anything you want to include in the newsletter please contact anzos on XXXXXXXX.

## President's Report

The new landscape of the generalist Annual Scientific Meeting – how do we best find our way?

I was lucky enough to leave Melbourne a few weeks ago for a period of leave and meetings in Portugal and the UK. In doing so I missed a series of wintery blasts, the last of the interminable lead up to the federal election, post mortem analyses of the Brexit vote and aforementioned federal election as well as the ongoing nervous chatter about the potential of President Trump. Each of these elections has elements of world-wide trends and none of these has (hopefully) any direct bearing on ANZOS.

I am struck recently that there is another world-wide trend that does affect us – that is the struggle of generalist obesity (and probably other) meetings to encourage abstract submission and registration. It seems to me that the tendency to lock in an annual date to attend the same meeting each year is slipping away. In my recent personal experience this is the case for the International Congress on Obesity and The Obesity Society (Obesity Week) both of which have recently suffered reduced attendances. While there has been considerable introspection to explain this drop off, the actual reasons may be many and varied. The bottom line is that there appears to be a large generalist meeting fatigue. It may be less than helpful to guess at the underlying detailed explanations without rigorous analyses but it would appear that lower attendances are more pronounced in the basic and clinical streams than the public health, policy and prevention-based contingents. It has always been difficult for practicing clinicians to leave their clinics for 3-4 days both financially and for continuity of care. It would seem that there is also a changing landscape here, clinicians of different types, primary care givers and allied health are all experiencing greater challenges in generating support from their host institutions for time at meetings – while the regulations and nuances are different in different parts of the world, the trend is the same. Clinicians like basic scientists are also being lured by specialist meetings. My personal experience in the basic sciences is that there is a growing attraction to the boutique subject-specific Keystone meetings, for example. In the same vein, the Society for the Study of Ingestive Behavior (SSIB), a meeting that I regularly attend as it rotates around the US with a European meeting every 3 years, has maintained a solid level of registration between 300 and 400 (much the same as ours). This seems to represent a solid core of repeat attendees irrespective of the host city and largely independent of the leaning of

the program. The difference being that this meeting has a focus in the experimental sciences, particularly the neurosciences that extends to include psychology, both behavioural and clinical, the foundations of which were established several decades ago.

ANZOS has recently generated record numbers of registrants and presenters in both Melbourne and Sydney but this has represented a substantial and sustained effort by program organizing committees to constantly improve the quality of symposium speakers and seek ever more high profile marquee figures as plenaries. One suspects that if we were to relax we would experience the shortfalls of the generalist Societies listed above. So, the very reasons that attract me to ANZOS, its breadth across disciplines and the opportunities to cross-pollinate, maybe those that threaten its appeal to others. Presumably, there is a perception that such breadth comes at the cost of critical mass and this is most pronounced for the streams that attract fewest abstracts namely, “basic” sciences and clinical sciences whereas public health, policy and prevention remain consistently strong.

What’s the answer? I think part of it may be to do exactly what we are doing but more - greater cross cutting emphasis between streams, more focus on dedicated themes such as diabetes or physical activity in the basic sciences or clinical workshops, all of which are features of this year’s ASM. One of the keys is undoubtedly to maintain our focus on young and early careers researchers and to underpin this stated support with real financial support for travel. This is a feature of the Australian Diabetes Society and one that we would like to develop with the help of our Industry partners. Recent years have seen Novo Nordisk step forward to support our Young Investigator Award and it would be wonderful to encourage them and others to assist us in supporting a greater number of travel scholarships.

I think we are on the right tack and we have to stay the course, to labour a sailing vernacular.

What I would like to hear are the views of the membership as to whether there is an opportunity to change the approach. Public Health and Policy and Prevention are strong, what are the other options to promote the other streams? Do we consider alternatives to the completely overlapping ASM? Is there a potential to consider dedicated days to individual streams to create the “critical mass”, possibly with overlapping days? Is there an appetite for a slightly longer meeting to accommodate these changes? What are the potentials?

We are doing extremely well but we should be forward looking in our endeavours to make this the best possible ASM for a progressive and integrative obesity society.

Please feel free to canvass your views...

Sincerely

Brian Oldfield, PhD

President ANZOS

## ASM 2016 Brisbane Update

Word from the convenors:

The final pieces in the program of this year's annual meeting are in place and we're looking forward to hosting delegates in October. Confirmed international plenary speakers are Barry Popkin, Norbert Stefan and Clay Semenkovich and they will be supported by internationally renowned speakers from all across Australia. As always, we have strived to develop an integrated and informative program that includes stream-specific symposia (dedicated to each one of the pillars of the society - Public Health, Clinical Research and Basic Research) as well as cross-cutting symposia with speakers from all three streams and facilitators to encourage discussion. The areas that are under focus here are sugar, type 2 diabetes, and management of obesity in adult and childhood. The opportunities for young and emerging investigators to present are unparalleled with increased numbers of oral presentations selected from abstracts and a new initiative where the highest ranked abstracts selected for poster presentations will also give additional, brief oral presentations. Check out the full program details at: <http://www.anzos.com/annual-meeting/program/>

Jon Whitehead and Leonie Heilbronn

## Current Published work from members of the ANZOS community

This is a new section for the newsletter and it is an opportunity for members to get exposure of their published work. Any members of ANZOS are eligible to submit the reference and Abstract and what category it would best fit into of their latest published work to the newsletter. The categories include Childhood obesity, Adolescent obesity, Clinical obesity, animal studies, basic science and Public health. Please send the details to [janet.franklin@sswahs.nsw.gov.au](mailto:janet.franklin@sswahs.nsw.gov.au). Click on the article link and you can read the Abstract.

### Childhood obesity

- Rush, Elaine, et al. "Project Energize: intervention development and 10 years of progress in preventing childhood obesity." BMC research notes 9.1 (2016): 1. PLoS One. 2016 Apr 13;11(4):e0151460

#### Abstract

Prevention of childhood obesity is a global priority. The school setting offers access to large numbers of children and the ability to provide supportive environments for quality physical activity and nutrition. This article describes Project Energize, a through-school physical activity and nutrition programme that celebrated its 10-year anniversary in 2015 so that it might serve as a model for similar practices, initiatives and policies elsewhere. The programme was envisaged and financed by the Waikato District Health Board of New Zealand in 2004 and delivered by Sport Waikato to 124 primary schools as a randomised controlled trial from 2005 to 2006. The programme has since expanded to include all 242 primary schools in the Waikato region and 70 schools in other regions, including 53,000 children. Ongoing evaluation and development of Project Energize has shown it to be sustainable (ongoing for >10 years), both effective (lower obesity, higher physical fitness) and cost effective (one health related cost quality adjusted life year between \$18,000 and \$30,000) and efficient (\$45/child/year) as a childhood 'health' programme. The programme's unique community-based approach is inclusive of all children, serving a population that is 42 % Māori, the indigenous people of New Zealand. While the original nine healthy eating and seven quality physical activity goals have not changed,

the delivery and assessment processes has been refined and the health service adapted over the 10 years of the programme existence, as well as adapted over time to other settings including early childhood education and schools in Cork in Ireland. Evaluation and research associated with the programme delivery and outcomes are ongoing. The dissemination of findings to politicians and collaboration with other service providers are both regarded as priorities.

- Gerritsen, S., Wall, C., & Morton, S. (2015). Child-care nutrition environments: results from a survey of policy and practice in New Zealand early childhood education services. *Public Health Nutrition*, volume 19, issue 09, pp. 1531-1542. doi:10.1017/S1368980015002955

### **Abstract**

To describe nutrition environments in formal child care for 3- and 4-year-olds.

Cross-sectional online survey of nutrition-related child-care policy and practice. Written nutrition policies were analysed using the Wellness Child Care Assessment Tool. Setting: Licensed child-care services in the Auckland, Counties Manukau and Waikato regions of New Zealand. Subjects: Eight hundred and forty-seven services (private and community day care, kindergartens and playcentres).

Managers/head teachers of 257 child-care services completed the survey. Of services, 82•4 % had a written food, nutrition or wellness policy. Most policies did not refer to the national Food and Nutrition Guidelines and lacked directives for staff regarding recommended behaviours to promote healthy eating. Food was provided daily to children in 56•4 % of child-care services, including 33•5 % that provided lunch and at least two other meals/snacks every day. Teachers talked to children about food, and cooked with children, at least weekly in 60 % of childcare services. Nearly all services had an edible garden (89•5 %). Foods/beverages were sold for fundraising in the past 12 months by 37•2 % of services. The most commonly reported barrier to promoting nutrition was a lack of support from families (20•6 %).

Conclusions: Although the majority of child-care services had a written nutrition policy, these were not comprehensive and contained weak statements that could be difficult to action. Foods served at celebrations and for fundraising were largely high in sugar, salt and/or saturated fat. Most services promoted some healthy eating behaviours but other widespread practices encouraged children to overeat or form unhealthy food preferences.

- Gerritsen, S., Morton, S. M.B. and Wall, C. R. (2016), Physical activity and screen use policy and practices in childcare: results from a survey of early childhood education services in New Zealand. *Australian and New Zealand Journal of Public Health*. doi: 10.1111/1753-6405.12529

### **Abstract**

To investigate written policies, equipment, strategies and barriers to children's activity in early childhood education settings, including participation in health promotion programs and reported time children spend in active play and using screens while in care.

Cross-sectional online survey of licensed childcare services in Auckland and Waikato. Policies were scored using a validated tool (WellCCAT-NZ). Results were analysed using descriptive statistics and multivariate regression.

Managers, head teachers or similar from 237 services completed the survey (28% of invited services). Of these, 35% had a written activity policy; most policies scored low on the WellCCAT-NZ. Comprehensive and strongly worded policies were associated with a lower adult-to-child ratio ( $p=0.03$ , adjusted for ECE characteristics). No policies addressed screen use. Children were reported to have teacher-led activity 80 minutes/day, and child-led activity five hours/day (indoor and outdoor). Children watched television daily in 2% and weekly in 11% the services; and used computers daily in 11% and weekly in 22% of services. Fewer than half of services participated in health promotion programs with a physical activity component.

Childcare services reported having adequate equipment, space and time for physical activity of children; however, there are low participation rates in activity programs and a notable absence of written policy.

- Gerritsen, S. (2016, In Press) Nutrition education for early childhood managers, teachers and nursery cooks: a prerequisite for obesity prevention. Public Health. doi: 10.1016/j.puhe.2016.05.025

#### **No Abstract available**

- Morrissey B, Strugnell C, Malakellis M, Whelan J, Millar L, Swinburn B, Allender S. (2016) Sleep duration and risk of obesity among a sample of Victorian school children. BMC Public Health, Mar 9;16(1):245

#### **Abstract**

Insufficient sleep is potentially an important modifiable risk factor for obesity and poor physical activity and sedentary behaviours among children. However, inconsistencies across studies highlight the need for more objective measures. This paper examines the relationship between sleep duration and objectively measured physical activity, sedentary time and weight status, among a sample of Victorian Primary School children.

A sub-sample of 298 grades four ( $n = 157$ ) and six ( $n = 132$ ) Victorian primary school children (aged 9.2-13.2 years) with complete accelerometry and anthropometry data, from 39 schools, were taken from a pilot study of a larger state based cluster randomized control trial in 2013. Data comprised: researcher measured height and weight; accelerometry derived physical activity and sedentary time; and self-reported sleep duration and hypothesised confounding factors (e.g. age, gender and environmental factors). Compared with sufficient sleepers (67 %), those with insufficient sleep (<10 hrs/day) were significantly more likely to be overweight (OR 1.97, 95 % CI:1.11-3.48) or obese (OR 2.43, 95 % CI:1.26-4.71). No association between sleep and objectively measured physical activity levels or sedentary time was found.

The strong positive relationship between weight status and sleep deprivation merits further research though PA and sedentary time do not seem to be involved in the relationship. Strategies to improve sleep duration may help obesity prevention initiatives in the future.

- Strugnell C, Millar L, Churchill A, Jacka F, Bell C, Malakellis M, Swinburn B, Allender S. (2016). Healthy Together Victoria and Childhood Obesity– a methodology for understanding changes in childhood obesity through a community-based, whole of system cluster randomized control trial. *Archives of Public Health*, 74: 16. Published online 2016 Apr 25. doi: 10.1186/s13690-016-0127-y

#### **ABSTRACT**

Healthy Together Victoria (HTV) - a complex 'whole of system' intervention, including an embedded cluster randomized control trial, to reduce chronic disease by addressing risk factors (physical inactivity, poor diet quality, smoking and harmful alcohol use) among children and adults in selected communities in Victoria, Australia (Healthy Together Communities).

To describe the methodology for: 1) assessing changes in the prevalence of measured childhood obesity and associated risks between primary and secondary school students in HTV communities, compared with comparison communities; and 2) assessing community-level system changes that influence childhood obesity in HTC and comparison communities.

Twenty-four geographically bounded areas were randomized to either prevention or comparison (2012). A repeat cross-sectional study utilising opt-out consent will collect objectively measured height, weight, waist and self-reported behavioral data among primary [Grade 4 (aged 9-10y) and Grade 6 (aged 11-12y)] and secondary [Grade 8 (aged 13-14y) and Grade 10 (aged 15-16y)] school students (2014 to 2018). Relationships between measured childhood obesity and system causes, as defined in the Foresight obesity systems map, will be assessed using a range of routine and customised data.

This research methodology describes the beginnings of a state-wide childhood obesity monitoring system that can evolve to regularly inform progress on reducing obesity, and situate these changes in the context of broader community-level system change.

- Gerritsen, S., Morton, S. M.B. and Wall, C. R. (2016), Physical activity and screen use policy and practices in childcare: results from a survey of early childhood education services in New Zealand. *Australian and New Zealand Journal of Public Health*. doi: 10.1111/1753-6405.12529

#### **Abstract**

The objective was to investigate written policies, equipment, strategies and barriers to children's activity in early childhood education settings, including participation in health promotion programs and reported time children spend in active play and using screens while in care.

The study involved a cross-sectional online survey of licensed childcare services in Auckland and Waikato. Policies were scored using a validated tool (WellCCAT-NZ). Results were analysed using descriptive statistics and multivariate regression.

Managers, head teachers or similar from 237 services completed the survey (28% of invited services). Of these, 35% had a written activity policy; most policies scored low on the WellCCAT-NZ. Comprehensive and strongly worded policies were associated with a lower adult-to-child ratio ( $p=0.03$ , adjusted for ECE characteristics). No policies addressed screen use. Children were reported to have teacher-led activity 80 minutes/day, and child-led activity five hours/day (indoor and outdoor). Children watched television daily in 2% and weekly in 11% the services; and used computers daily in 11% and weekly in 22% of services. Fewer than half of services participated in health promotion programs with a physical activity component.

Childcare services reported having adequate equipment, space and time for physical activity of children; however, there are low participation rates in activity programs and a notable absence of written policy.

- Gerritsen, S. (2016, Online) Nutrition education for early childhood managers, teachers and nursery cooks: a prerequisite for obesity prevention. Public Health. June 28 2016, doi: 10.1016/j.puhe.2016.05.025,

## **ABSTRACT**

Thirty years ago, the Ottawa Charter for Health Promotion stated, “Health is created and lived by people within the settings of their everyday life; where they learn, work, play, and love.” Today, this settings approach to promoting health still resonates; especially in the area of non-communicable disease and obesity prevention. It has now been clearly articulated how burgeoning ‘obesogenic’ environments create and perpetuate unhealthy food preferences, exploiting human biological, psychological and social vulnerabilities making it difficult to resist unhealthy food. Settings in which children “learn, work, play, and love” are arguably the most efficacious for obesity prevention efforts; not only to reverse the high rates of childhood obesity but also to optimize the development of healthy habits and behaviours for life. For many young children, these settings are increasingly outside of their family and home; in group-based education and care settings, such as daycare, nurseries and kindergartens, collectively called Early Childhood Education (ECE) services. The OECD reports that over 80% of three and four year olds in developed countries attend ECE services, with England and New Zealand having some of the highest enrolment rates in the world<sup>2</sup>. The healthiness or otherwise of ECE environments is key to the prevention of obesity. This commentary draws on information about ECE services in England and New Zealand, as these countries have a similar mixture of private and community-based ECE services, part-subsidized and subject to state regulation and monitoring. England and New Zealand also have some of the highest rates of childhood overweight and obesity in the world (29% in England and 33% in New Zealand) and both governments have made commitments to address this issue, with early plans to combat childhood obesity underway. The aim of this paper is to outline the evidence-informed components of healthy education environments that work to prevent obesity, and then to make the case that a prerequisite

component found to be lacking in many ECE settings is nutrition education for ECE managers, teachers and food service staff.

## Adolescents

- Hoare E, Millar L, Fuller-Tyszkiewicz M, Skouteris H, Nichols M, Malakellis M, Swinburn B, Allender S. (2016) Depressive symptomatology, weight status and obesogenic risk among Australia adolescents: a prospective cohort study, *BMJ Open*, Mar 14;6(3):e010072 Abstract

### Abstract

Adolescence is a period of increased risk for mental health problems and development of associated lifestyle risk behaviours. This study examined cross-sectional and longitudinal associations between obesogenic risk factors, weight status, and depressive symptomatology in a cohort of Australian adolescents.

This study was a prospective cohort study.

The study used repeated measures data from the Australian Capital Territory (ACT) It's Your Move project, an Australian community-based obesity prevention intervention. Intervention effect was non-significant therefore intervention and comparison groups were combined in this study.

Total sample was 634 secondary school students (female n=338, male n=296) with mean age 13 years (SD=0.6) at baseline (2012) and 15 years (SD=0.6) at follow-up (2014) recruited from 6 government secondary schools in the ACT.

Primary and secondary outcomes measures: Primary outcome was depressive symptomatology measured by Short Mood and Feelings Questionnaire. Secondary outcomes were weight status, physical activity, screen time and diet related measures.

Increased physical activity was associated to lower depressive symptomatology among males (OR=0.35,  $p<0.05$ ). Sweet drink (OR=1.15,  $p<0.05$ ) and takeaway consumption (OR=1.84,  $p<0.05$ ) were associated with higher levels of depressive symptomatology among females at follow-up. Males who were classified as overweight or obese at baseline, and remained so over the study period, were at increased risk of depressive symptomatology at follow-up ( $b=1.63$ , 95% CI 0.33 to 2.92). Inactivity among males over the 2-year study period was predictive of higher depressive symptomatology scores at follow-up ( $b=2.55$ , 95% CI 0.78 to 4.32). For females, those who increased their consumption of takeaway foods during the study period were at increased risk for developing depressive symptomatology ( $b=1.82$ , 95% CI -0.05 to 3.71).

There are multiple, probably complex, relationships between diet, physical activity and outcomes of obesity and mental health as well as between the outcomes themselves. Healthier diets and increased physical activity should be foundations for healthier body weight and mental health.

## Public Health

- Veerman JL, Sacks G, Antonopoulos N, Martin J, The Impact of a Tax on Sugar-Sweetened Beverages on Health and Health Care Costs: A Modelling Study. PLoS One. 2016 Apr 13;11(4):e0151460.

### ABSTRACT

This paper aims to estimate the consequences of an additional 20% tax on sugar-sweetened beverages (SSBs) on health and health care expenditure. Participants were adult (aged  $\geq 20$ ) Australians alive in 2010, who were modelled over their remaining lifetime. We used lifetable-based epidemiological modelling to examine the potential impact of a 20% valoric tax on SSBs on total lifetime disability-adjusted life years (DALYs), incidence, prevalence, and mortality of obesity-related disease, and health care expenditure. Over the lifetime of adult Australian alive in 2010, seemingly modest estimated changes in average body mass as a result of the SSB tax translated to gains of 112,000 health-adjusted life years for men (95% uncertainty interval [UI]: 73,000-155,000) and 56,000 (95% UI: 36,000-76,000) for women, and a reduction in overall health care expenditure of AUD609 million (95% UI: 368 million- 870 million). The tax is estimated to reduce the number of new type 2 diabetes cases by approximately 800 per year. Twenty-five years after the introduction of the tax, there would be 4,400 fewer prevalent cases of heart disease and 1,100 fewer persons living with the consequences of stroke, and an estimated 1606 extra people would be alive as a result of the tax. The tax would generate an estimated AUD400 million in revenue each year. Governments should consider increasing the tax on sugared drinks. This would improve population health, reduce health care costs, as well as bring in direct revenue

## Clinical

- Kiera Buchanan<sup>1</sup> and Jeanie Sheffield<sup>2</sup>, Why do diets fail? : An exploration of dieters' experiences using thematic analysis, Journal of Health Psychology, Dec 2015

### Abstract

Previous research has drawn on theoretical models and clinical observations to develop propositions regarding the mechanisms of diet failure, with only one study examining it directly from the perspective of dieters themselves. Furthermore, research to date has failed to provide an empirically validated, multifactorial model of diet failure, despite the issue being recognised as a complex and multifaceted one. This study extended on previous research by examining themes of diet failure from the perspective of dieters (n = 22) and health professionals in the field (n = 5).

- Gibson AA, Seimon RV, Franklin J, Markovic T, Byrne N, Manson E, Caterson ID, & Sainsbury A. Slow versus fast weight loss: development process and rationale of the dietary interventions for the TEMPO Diet Trial Obesity in Practice; 2016; 2(2):162-173

### Abstract

Finding effective solutions to curb the obesity epidemic is a great global public health challenge. The need for long-term follow-up necessitates weight loss trials conducted in real-world settings, outside the confines of tightly controlled laboratory or clinic conditions. Given the complexity of

eating behaviour and the food supply, this makes the process of designing a practical dietary intervention that stands up to scientific rigor difficult. Detailed information about the dietary intervention itself, as well as the process of developing the final intervention and its underlying rationale, is rarely reported in scientific weight management publications but is valuable and essential for translating research into practice. Thus, this paper describes the design process and underlying rationale behind the dietary interventions in an exemplar weight loss trial – the TEMPO Diet Trial (Type of Energy Manipulation for Promoting optimal metabolic health and body composition in Obesity). This trial assesses the long-term effects of fast versus slow weight loss on adiposity, fat free mass, muscle strength and bone density in women with obesity (body mass index 30–40 kg m<sup>-2</sup>) that are 45–65 years of age, postmenopausal and sedentary.

This paper is intended as a resource for researchers and/or clinicians to illustrate how theoretical values based on a hypothesis can be translated into a dietary weight loss intervention to be used in free-living women of varying sizes.

- Ringland. EM, Gifford.JA, Denyer. GS, Thai. D, Franklin. JL, Stevenson. MM, Prvan. T, and O'Connor. HT Evaluation of an electronic tool to assess food label literacy in adult Australians: A pilot study. *Nutrition & Dietetics Journal of the Dietetic Association of Australia*; 2016 First published online 15 March 2016.

## **Abstract**

This pilot study aimed to evaluate the food label literacy component of an electronic-Nutrition Literacy Tool (e-NutLiT) designed to assess nutrition literacy in adult Australians, and explore the influence of demographic factors.

Obese participants (OP) from an Australian obesity clinic and a criterion group of dietetic students (DS) from two Australian dietetic programs were recruited to complete the e-NutLiT; OP also completed the 'Newest Vital Sign' (NVS), a health literacy screening tool. Construct validity was assessed by comparing scores from the two groups. Associations between demographic factors and e-NutLiT scores were also explored.

Sixty-one participants (OP: n = 32; DS: n = 29) completed the study. The total e-NutLiT scores for OP was significantly lower than that of DS (71.9 ± 17.9%; 94.5 ± 5.6%, respectively: P = 0.01). Items requiring calculation of nutrient intake from the nutrition information panel (NIP) and interpreting endorsement logos were the worst performing sections on the e-NutLiT in both OP (35.9%; 71.9%) and DS (86.2%; 75.8%). Adequate health literacy, indicated by an NVS ≥ 4, was strongly associated with higher scores on the e-NutLiT in OP (P = 0.01). Level of education (≤year 10) and lack of engagement in food shopping were significantly associated with poorer competency on the e-NutLiT (P < 0.05).

Comparison of scores indicated that construct validity was established on most items for participants with lower literacy. The e-NutLiT identified specific weaknesses, such as nutrient calculations and interpretation of endorsement logos. This pilot study will help inform further development of the e-NutLiT.

- Gibson A, Seimon RV, Lee CMY, Ayre J, Franklin J, Markovic TP, Caterson ID & Sainsbury A. Do ketogenic diets really suppress appetite? A systematic review and meta-analysis. *Obesity Reviews*; 2015; 16(1): 64-76

### **Abstract**

Very-low-energy diets (VLEDs) and ketogenic low-carbohydrate diets (KLCDs) are two dietary strategies that have been associated with a suppression of appetite. However, the results of clinical trials investigating the effect of ketogenic diets on appetite are inconsistent. To evaluate quantitatively the effect of ketogenic diets on subjective appetite ratings, we conducted a systematic literature search and meta-analysis of studies that assessed appetite with visual analogue scales before (in energy balance) and during (while in ketosis) adherence to VLED or KLCD. Individuals were less hungry and exhibited greater fullness/satiety while adhering to VLED, and individuals adhering to KLCD were less hungry and had a reduced desire to eat. Although these absolute changes in appetite were small, they occurred within the context of energy restriction, which is known to increase appetite in obese people. Thus, the clinical benefit of a ketogenic diet is in preventing an increase in appetite, despite weight loss, although individuals may indeed feel slightly less hungry (or more full or satisfied). Ketosis appears to provide a plausible explanation for this suppression of appetite. Future studies should investigate the minimum level of ketosis required to achieve appetite suppression during ketogenic weight loss diets, as this could enable inclusion of a greater variety of healthy carbohydrate-containing foods into the diet.

- Naughton SS, Mathai ML, Hryciw DH, McAinch AJ. Linoleic Acid and the Pathogenesis of Obesity. Prostaglandins and Other Lipid Mediators, In Press, doi: 10.1016/j.prostaglandins.2016.06.003

### **Abstract**

The modern Western diet has been consumed in developed English speaking countries for the last 50 years, and is now gradually being adopted in Eastern and developing countries. These nutrition transitions are typified by an increased intake of high linoleic acid (LA) plant oils, due to their abundance and low price, resulting in an increase in the PUFA n-6:n-3 ratio. This increase in LA above what is estimated to be required is hypothesised to be implicated in the increased rates of obesity and other associated non-communicable diseases which occur following a transition to a modern Westernised diet. LA can be converted to the metabolically active arachidonic acid, which has roles in inducing inflammation and adipogenesis, and endocannabinoid system regulation. This review aims to address the possible implications of excessive LA and its metabolites in the pathogenesis of obesity.

- Hryciw DH, McAinch AJ. Cannabinoid Receptors in the Kidney. *Current Opinion in Nephrology and Hypertension*, Accepted 6 May 2016, DOI: 10.1097/MNH.0000000000000249

### **Abstract**

The endocannabinoid system modulates cell signaling targets that are essential for energy homeostasis. Endocannabinoids bind to G protein-coupled receptors in the central nervous

system and periphery, including the kidney. Modulation of cannabinoid receptor 1 (CB1) and CB2 activity in the kidney in diabetes and obesity has been identified as potential therapeutic target to reduce albuminuria and renal fibrosis. This review will highlight the results of recent studies that have identified a role for CB1 and CB2 in normal and pathological renal conditions.

CB1 and CB2 have been reported to play key roles in renal function and dysfunction. Recent studies have determined that antagonism of CB1 and agonism of CB2 in diabetic nephropathy and obesity associated kidney disease can reduce albuminuria, potentially by acting on both the glomeruli and tubules. Emerging studies have also identified a role for CB1 in renal diseases associated with fibrosis, with CB1 upregulated in multiple models of human nephropathies.

Emerging studies using isolated cells, rodent models, and human studies have identified a critical role for the endocannabinoid system in renal function and disease. Thus, therapeutics that modulate the activity of CB1 and CB2 in renal disease could become clinically relevant.

## Animal models

- Boakes, R.A., Martire, S.I., Rooney, K.B. & Kendig, M.D. (2016). Individual differences in saccharin acceptance predict rats' food intake. *Physiology & Behavior*. 164, 151-156.

### Abstract

Following previous results indicating that low acceptance of saccharin-sweetened yoghurt was associated with slower weight gain, the aim of this experiment was to determine which of three measures of individual differences would predict subsequent chow consumption, body weight gain, and fat mass. Pre-test measures consisted of amount of running in an activity wheel, amount of 0.1% saccharin solution consumed over 24h, and performance on an Elevated Plus Maze (EPM). Rats were then maintained for three weeks on a diet of standard chow and water. Subsequent post-testing repeated the procedures used in pre-testing. The rats were then culled and fat pads excised and weighed. Pre-testing revealed a negative correlation between saccharin acceptance and activity, while neither measure correlated with anxiety in the EPM. Pre-test saccharin acceptance was positively correlated with subsequent chow consumption, percent weight gain, and g/kg fat mass. Multiple regression analyses including all three pre-test measures confirmed saccharin acceptance as a predictor of chow consumption and, marginally, of fat pad mass, while high anxiety predicted low percent body weight gain.

- Boakes, R.A., Kendig, M.D., Martire, S.I. & Rooney, K.B. (2016). Sweetening yoghurt with glucose, but not with saccharin, promotes weight gain and increased fat pad mass in rats. *Appetite*, 105, 114-128.

### Abstract

The claim that non-nutritive sweeteners accelerate body weight gain by disrupting sweet-calorie associations was tested in two experiments using rats. The experiments were modelled on a key study from a series of experiments reporting greater body weight gain in rats fed yoghurt sweetened with saccharin than with glucose (Swithers & Davidson, 2008). Both of the current experiments likewise compared groups fed saccharin- or glucose-sweetened yoghurt in addition to chow and water, while Experiment 1 included a third group (Control) given unsweetened yoghurt. In Experiment 1, but not in Experiment 2, rats were initially exposed to both saccharin- and glucose-sweetened yoghurts to assess their relative palatability. We also tested whether the provision of an energy-dense sweet biscuit would augment any effects of saccharin on food

intake and weight gain, as seemingly predicted by Swithers and Davidson (2008). In Experiment 1 there were no differences in body weight gain or fat pad mass between the Saccharin and Control group, whereas the Glucose group was the heaviest by the final 5 weeks and at cull had the largest fat pads. Greater acceptance of saccharin predicted more weight gain over the whole experiment. Consistent with past reports, fasting blood glucose and insulin measures did not differ between the Saccharin and Control groups, but suggested some impairment of insulin sensitivity in the Glucose group. Experiment 2 found similar effects of glucose on fat mass, but not on body weight gain. In summary, adding saccharin had no detectable effects on body-weight regulation, whereas the effects of glucose on fat pad mass were consistent with previous studies reporting more harmful effects of sugars compared to non-nutritive sweeteners.

- Betik AC, Aguila J, McConell GK, McAinch AJ, Mathai ML. Tocotrienols and Whey Protein Isolates Substantially Increase Exercise Endurance Capacity in Diet -Induced Obese Male Sprague-Dawley Rats. PLOS ONE, 11(4):e0152562 (2016) doi: 10.1371/journal.pone.0152562

### **Abstract**

Obesity and impairments in metabolic health are associated with reductions in exercise capacity. Both whey protein isolates (WPIs) and vitamin E tocotrienols (TCTs) exert favorable effects on obesity-related metabolic parameters. This research sought to determine whether these supplements improved exercise capacity and increased glucose tolerance in diet-induced obese rats.

Six week old male rats ( $n = 35$ ) weighing  $187 \pm 32$ g were allocated to either: Control ( $n = 9$ ), TCT ( $n = 9$ ), WPI ( $n = 8$ ) or TCT + WPI ( $n = 9$ ) and placed on a high-fat diet (40% of energy from fat) for 10 weeks. Animals received 50mg/kg body weight and 8% of total energy intake per day of TCTs and/or WPIs respectively. Food intake, body composition, glucose tolerance, insulin sensitivity, exercise capacity, skeletal muscle glycogen content and oxidative enzyme activity were determined.

Both TCT and WPI groups ran >50% longer ( $2271 \pm 185$ m and  $2195 \pm 265$ m respectively) than the Control group ( $1428 \pm 139$ m) during the run to exhaustion test ( $P < 0.05$ ), TCT + WPI did not further improve exercise endurance ( $2068 \pm 104$ m). WPIs increased the maximum in vitro activity of beta-hydroxyacyl-CoA in the soleus muscle ( $P < 0.05$  vs. Control) but not in the plantaris. Citrate synthase activity was not different between groups. Neither supplement had any effect on weight gain, adiposity, glucose tolerance or insulin sensitivity.

Ten weeks of both TCTs and WPIs increased exercise endurance by 50% in sedentary, diet-induced obese rats. These positive effects of TCTs and WPIs were independent of body weight, adiposity or glucose tolerance.

- Jenkin KA, O'Keefe L, Simcocks AC, Briffa JF, Mathai ML, McAinch AJ, Hryciw DH. Renal Effects of Chronic Pharmacological Manipulation of CB2 in Rats with Diet Induced Obesity. British Journal of Pharmacology, 173 (7): 1128-42 (2016)

### **Abstract**

In diabetic nephropathy agonism of CB2 receptors reduces albuminuria and podocyte loss; however, the role of CB2 receptors in obesity-related nephropathy is unknown. The aim of this

study was to determine the role of CB2 receptors in a model of diet-induced obesity (DIO) and characterize the hallmark signs of renal damage in response to agonism (AM1241) and antagonism (AM630) of CB2 receptors.

Male Sprague Dawley rats were fed a high-fat diet (HFD: 40% digestible energy from lipids) for 10 weeks. In another cohort, after 9 weeks on a HFD, rats were injected daily with either 3 mg•kg<sup>(-1)</sup> AM1241, 0.3 mg•kg<sup>(-1)</sup> AM630 or saline for 6 weeks.

Ten weeks on a HFD significantly reduced renal expression of CB2 receptors and renal function. Treatment with AM1241 or AM630 did not reduce weight gain or food consumption in DIO. Despite this, AM1241 significantly reduced systolic BP, peri-renal adipose accumulation, plasma leptin, urinary protein, urinary albumin, urinary sodium excretion and the fibrotic markers TGF-β1, collagen IV and VEGF in kidney lysate. Treatment with AM630 of DIO rats significantly reduced creatinine clearance and increased glomerular area and kidney weight (gross and standardized for body weight). Diastolic BP, glucose tolerance, insulin sensitivity, plasma creatinine, plasma TGF-β1 and kidney expression of fibronectin and α-smooth muscle actin were not altered by either AM1241 or AM630 in DIO.

This study demonstrates that while agonism of CB2 receptors with AM1241 treatment for 6 weeks does not reduce weight gain in obese rats, it leads to improvements in obesity-related renal dysfunction.

## Basic Science

- Yu-Hee Kim<sup>1,2</sup>, Johanna L. Barclay<sup>1</sup>, Jingjing He, Xiao Luo<sup>3</sup>, Hayley M. O'Neill<sup>4</sup>, Sahar Keshvari, Julie A. Webster<sup>5</sup>, Choaping Ng, Louise J. Hutley, Johannes B. Prins and Jonathan P. Whitehead<sup>6</sup>, Identification of carboxypeptidase X (CPX)-1 as a positive regulator of adipogenesis, *The FASEB Journal*, 2016 vol. 30 no. 7 2528-2540

### Abstract

Adipose tissue expansion occurs through a combination of hypertrophy of existing adipocytes and generation of new adipocytes via the process of hyperplasia, which involves the proliferation and subsequent differentiation of preadipocytes. Deficiencies in hyperplasia contribute to adipose tissue dysfunction and the association of obesity with chronic cardiometabolic diseases. Thus, increased understanding of hyperplastic pathways may be expected to afford novel therapeutic strategies. We have reported that fibroblast growth factor (FGF)-1 promotes proliferation and differentiation of human preadipocytes and recently demonstrated that bone morphogenetic protein and activin membrane-bound inhibitor (BAMBI) is a central, proximal effector. Herein, we describe the identification and characterization of carboxypeptidase X (CPX)-1, a secreted collagen-binding glycoprotein, as a novel downstream effector in human primary and Simpson-Golabi-Behmel syndrome preadipocytes. CPX-1 expression increased after treatment of preadipocytes with FGF-1, BAMBI knockdown, or induction of differentiation. CPX-1 knockdown compromised preadipocyte differentiation coincident with reduced collagen expression. Furthermore, preadipocytes differentiated on matrix derived from CPX-1 knockdown cells exhibited reduced Glut4 expression and insulin-stimulated glucose uptake. Finally, CPX-1 expression was increased in adipose tissue from obese mice and humans. Collectively, these findings establish CPX-1 as a positive regulator of adipogenesis situated downstream of FGF-1/BAMBI that may contribute to hyperplastic adipose tissue expansion via affecting extracellular matrix remodelling.

- R. Jia<sup>1,2,3</sup>, X.-Q. Luo<sup>4</sup>, G. Wang<sup>5</sup>, C.-X. Lin<sup>1,2</sup>, H. Qiao<sup>1,2</sup>, N. Wang<sup>1,2</sup>, T. Yao<sup>1,2</sup>, J. L. Barclay<sup>6,7</sup>, J. P. Whitehead<sup>6,7</sup>, X. Luo<sup>1,2,\*</sup> and J.-Q. Yan<sup>1,2</sup>, Characterization of cold-induced remodelling reveals depot-specific differences across and within brown and white adipose tissues in mice, *Acta Physiologica* Volume 217, Issue 4, pages 311–324, August 2016

### **Abstract**

Brown and beige adipose tissues dissipate energy in the form of heat via mitochondrial uncoupling protein 1, defending against hypothermia and potentially obesity. The latter has prompted renewed interest in understanding the processes involved in browning to realize the potential therapeutic benefits. To characterize the temporal profile of cold-induced changes and browning of brown and white adipose tissues in mice.

Male C57BL/6J mice were singly housed in conventional cages under cold exposure (4 °C) for 1, 2, 3, 4, 5 and 7 days. Food intake and body weight were measured daily. Interscapular brown adipose tissue (iBAT), inguinal subcutaneous (sWAT) and epididymal white adipose tissue (eWAT) were harvested for histological, immunohistochemical, gene and protein expression analysis.

Upon cold exposure, food intake increased, whilst body weight and adipocyte size were found to be transiently reduced. iBAT mass was found to be increased, whilst sWAT and eWAT were found to be transiently decreased. A combination of morphological, genetic (Ucp-1, Pgc-1 $\alpha$  and Elov13) and biochemical (UCP-1, PPAR $\gamma$  and aP2) analyses demonstrated the depot-specific remodelling in response to cold exposure.

Our results demonstrate the differential responses to cold-induced changes across discrete BAT and WAT depots and support the notion that the effects of short-term cold exposure are achieved by expansion, activation and increasing thermogenic capacity of iBAT, as well as browning of sWAT and, to a lesser extent, eWAT.

## **Research in the wings**

- RCT comparing sugary drinks vs diet drinks vs water

Research team: Dr.Sarah Martire, Mr. Michael Kendig, Dr.Kieron Rooney and Prof. Robert Boakes, all based at the University of Sydney.

We are currently running a randomised controlled trial (ANZRCT registered no.368612) involving healthy young adults with a BMI range of 18-30 who normally consume at least 2L of sugary drinks per week. The latter can include sweetened iced tea, flavoured dairy, sports drinks, fruit juices, and carbonated soft drinks. The aims of the trial include (a) testing for improved metabolic and cognitive functioning following 12-weeks withdrawal from sugary drinks; and (b) testing for differences between switching from sugary to diet drinks and switching from sugary drinks to water.

Following a phone interview and initial screening volunteers are randomly allocated to one of three arms: in the Sugar condition they are required to consume a dozen 375-ml cans of Coca Cola or of an equivalent carbonated soft drink containing about 10% sucrose; in the Diet condition they are

required to consume a dozen 375-ml cans of an artificially-sweetened carbonated drink each week; and in the Water condition they are required to consume an equivalent volume of bottled water. All participants are required to cease their regular consumption of sugary drinks, so that the intervention cuts out sugar for the Diet and Water groups and maintains it (approximately) for the Sugar group.

The primary metabolic outcome is waist circumference, but in addition glucose tolerance and body fat content are measured. The primary cognitive measure is the Logical Memory test, whereby participants have to remember the content of two stories they are told, both immediately and following a short delay. Given the current rate of recruitment, it will take another 12 months to complete the trial.

- Supporting carers of sufferers of Long standing eating disorders a questionnaire for patients QUT study recruiting now (see brochure)
- Radiance – self compassion for eating and weight concerns (see brochure)

NHMRC Centre of Research Excellence in the Early Prevention of Obesity in Childhood (EPOCH)

NHMRC has funded the EPOCH CRE from 2016-2020. The CRE aims to reduce the prevalence of obesity and obesity-related behaviours in the first five years of life, and their future impact. Professor Louise Baur from the University of Sydney leads a diverse team of experts from around Australia and internationally to bridge the current gaps in research, practice and policy and help improve the health outcomes for children as they grow into adulthood. Our lead Universities include the University of Sydney, Deakin University, the University of South Australia, Queensland University of Technology and the University of Otago in New Zealand.

Why?

Obesity affects children even prior to school entry: 1 in 5 Australian children is affected by overweight or obesity at age 5 years. Further, early childhood is a period when many behaviours that promote the development of obesity – such as poor eating habits and physical inactivity - are established or begin to track into later life. It is also a time when biology is most amenable to change, and hence interventions are more likely to have sustained effects on health. The prevention of obesity in early childhood is now of policy interest, both nationally and internationally. However, the evidence base for interventions needs to be further developed, and translated into policy and practice environments.

The EPOCH CRE's research work is organised as four inter-related research Streams:

1. Analysing interventions to prevent obesity in early childhood (led by A/Prof Lisa Askie)
2. Advancing assessment of obesity-related behaviours (led by Dr Rebecca Golley and Prof Stewart Trost)
3. Economic evaluation of early childhood obesity prevention (led by A/Prof Alison Hayes and Prof Marj Moodie)

#### 4. Translation of evidence into policy and practice (led by Dr Rachel Laws and Prof Chris Rissel)

Our website

Please visit our website to find out more information: <http://www.earlychildhoodobesity.com/>

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## Jobs

PhD opportunity (with stipend) – Institute for Physical Activity and Nutrition (IPAN), Deakin University

Secondary prevention is the term used to describe the targeted treatment of many non-communicable diseases such as cardiovascular disease. There is clear and definitive evidence and clinical guidelines that document the treatments patients should receive after a heart attack; however 33% of people a year after their heart attack are not taking evidence-based medications or participating in centre-based cardiac rehabilitation. Innovative, cost effective and practical solutions are needed to address this gap. Given the challenges of engaging people face-to-face, digital interventions, in particular mobile health, offer promise for improving cardiovascular risk-factors including obesity. While a number of such interventions have been developed in the Australian context, no central platform brings these together for enhancing self-management. Work is required to develop a digital platform for the delivery of theory-and evidence-based self-management interventions, offering people the opportunity to pick and choose from a suite of programmes that meets their needs. This PhD will explore technological solutions for improving self-management in people with heart disease.

- Applicants must hold a Bachelor's degree with Honours or a Master's degree with a substantial research component, or equivalent, in exercise science, health sciences, public health, epidemiology, engineering (data mining), statistics
- Applicants must be Australian or New Zealand citizens, or Australian permanent residents
- Fluency in English (evidence of English proficiency is required), highly motivated, and able to work in a multidisciplinary team
- Previous research experience in physical activity and/or dietary behaviour is desirable but not essential
- Previous research experience working in clinical settings is desirable but not essential
- Having a level of competence in data analysis, data mining, or statistical analyses would be also desirable

For further information, please contact Ralph Maddison, Professor in Physical Activity and Disease Prevention

Institute for Physical Activity and Nutrition (IPAN), Deakin University, Melbourne

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## PhD Completers - Congratulations

- ERIN HOARE
    - Obesogenic risk and depression: patterns and prevention among adolescents Erin Hoare, BPsych (Hons) School of Health and Social Development Deakin University
- Supervisors: Professor Steven Allender, Professor Helen Skouteris, Dr Lynne Millar, Dr Melanie Nichols and Dr Matthew Fuller-Tyszkiewicz (all Deakin University)

### Synopsis

Adolescence is a transitional life phase that poses specific health risks including onset of mental health disorders. Significant life events occurring during this age period that contribute to health vulnerabilities include; exposure to tobacco, alcohol and drugs, increased independence, education/employment transitions, and physical and emotional changes occurring during puberty. Such experiences are understood to interact with mental health and it has been reported that mental disorders often first appear during this age period and track into adulthood. An understanding of mental health experiences during adolescence is of critical importance. Increasing burden of common mental disorders and complexity in underlying causes has led to novel approaches in the study of mental health. It is now understood that modifiable lifestyle behaviours including physical activity, sedentary behaviour, and diet contribute to an individual's mental health. Importantly, such lifestyle behaviours are considered risk factors for obesity, and are therefore referred to as obesogenic. Looking to modifiable lifestyle behaviours may offer complimentary benefits to improved physical health outcomes. The research findings from this thesis demonstrated that such behaviours could be targeted to improve and potentially protect adolescent mental health. Such an approach offers opportunity to align mental health with other current public health initiatives, such as obesity prevention, and therefore holds important population health implications. It is critical that the reciprocal relationships between mental health and lifestyle behaviours are represented in public health discussion, so that the maximum support and prevention is available to young people whom experience unique and significant health vulnerabilities.