C-PAN

Centre for Physical Activity and Nutrition Research

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LEADING THE INTEGRATION OF NUTRITION INTO MEDICAL EDUCATION

Professor Caryl Nowson, C-PAN member and Chair in Nutrition and Ageing in the School of Exercise and Nutrition Sciences at Deakin University, is leading an Australian government national teaching award project to develop a web-based nutrition competency implementation toolkit (WNCIT) for entry-level medical courses. The project funded by the Office for Learning and Teaching (2013-2015) brings together four key universities responsible for delivering entry level medical training: Deakin University, The University of Queensland, University of Tasmania and Monash University partnered with the Dietitians Association of Australia. The aim of this project is to provide medical schools with the tools and resources to effectively embed nutrition into the medical curriculum.

Current evidence suggests medical graduates in Australia are ill equipped to identify and appropriately manage the nutritional issues of patients. Providing medical graduates with the skills to identify nutrition problems early and effectively manage them has the potential to reduce the burden of disease related to nutrition as well as reduce hospitalisation time. This important project will enable medical graduates to be nutritionally competent. Further information about this project is available at www.wncit.weebly.com.

SUPPORT US

Our research is focused on making a difference to health and quality of life. Your support helps our team of committed and passionate researchers to continue to test new ideas, publish exciting findings and create innovative programs that will improve the health of all Australians. If you are passionate about health and would like to explore opportunities to support us, please email cpan@deakin.edu.au.

IN THIS ISSUE

AN ACTIVE START TO LIFE

Being physically active (e.g. active play) and limiting time spent sedentary (e.g. sitting down, screen-based electronic entertainment) are important for health and wellbeing. The early childhood period, the first five years of life, represents a time of rapid physical, social and cognitive development, when optimal levels of these behaviours may be particularly important. Early childhood is also the period when these health behaviours develop, and consequently holds promise as a time when we could positively impact physical activity and sedentary behaviours, getting them 'right from the start'. Perhaps the biggest hurdle to this is the commonly held perception that these young children are naturally active. Yet the evidence suggests this is not the case with many young children failing to meet recommended levels of physical activity and exceeding screen-based entertainment recommendations.

Study of physical activity and sedentary behaviours in three to five year olds is a relatively new field, and in children younger than three years, research is almost non-existent. C-PAN is at the forefront of this field internationally. We are working to understand children's physical activity and sedentary behaviours from their inception. By understanding children's activity patterns, what influences these and how they change over time we seek to make a positive impact on children's health and wellbeing. We have conducted the first study to objectively assess physical activity and sedentary behaviour in children under the age of two years and have a strong program of research in this early childhood period. Our suite of cross-sectional, longitudinal and intervention studies in this field includes the Healthy Active Preschool and Primary Years (HAPPY) Study and the Melbourne Infant Feeding, Activity and Nutrition Trial (InFANT) Program.

References

1. Hesketh KD, Hinkley T, Campbell KJ. Children's physical activity and screen time: qualitative comparison of views of parents of infants and preschool children. *International Journal of Behavioral Nutrition and Physical Activity* 2012; 9:152.
2. Hnatiuk J, Ridgers ND, Salmon J, Campbell K, McCallum Z, Hesketh K. Physical activity levels and patterns of 19 month old children. *Medicine & Science in Sports & Exercise* 2012; 44:1715-1720.

Key messages

Despite what many people think, young children are not always running around and do need support to achieve recommended daily levels of physical activity and to limit their screen-based and other sedentary behaviours.

C-PAN's research aiming to understand and support children's physical activity and limit sedentary behaviours from their inception is at the forefront of this field internationally.

Funding acknowledgement
Kylie Hesketh is supported by an Australian Research Council Future Fellowship and Honorary National Heart Foundation of Australia Future Leader Fellowship. The HAPPY study is funded by the Australian Research Council and the Melbourne InFANT Program is funded by the National Health and Medical Research Council of Australia.

Contact Dr Kylie Hesketh
Telephone +61 3 9244 6812
kylie.hesketh@deakin.edu.au

STRATEGIES TO REDUCE SALT INTAKE IN VICTORIAN SCHOOLCHILDREN URGENTLY REQUIRED

C-PAN researchers have previously shown that most Victorian primary schoolchildren consume too much dietary salt. This is of concern as a high intake of salt during childhood is linked to raised blood pressure, and overweight and obesity. As blood pressure and obesity both follow a tracking pattern over the life course, to protect future cardiovascular health it is important that strategies to reduce salt intake in children are developed.

Past evidence shows that education messages that target the key sources of salt in the diet, can be effective in reducing salt intakes in adults. However, evidence is lacking regarding the effectiveness of education strategies to lower salt intakes in children. To fill this evidence gap the research team is currently developing online interactive education materials that aim to reduce salt intakes in schoolchildren.

The team's prior work which identified the main sources of salt in Australian children's diets, e.g. bread, processed meats and savoury sauces, will be used to guide the targeted foods included within education materials. The online education resource will be pilot tested in schoolchildren and with parents to assess if there is a change in awareness and knowledge of salt intakes. In the future the team will test the education program to determine if salt intakes are reduced.

References

1. Grimes CA, Riddell LJ, Campbell KJ, Nowson CA. Dietary salt intake assessed by 24 h urinary sodium excretion in Australian schoolchildren aged 5-13 years. *Public Health Nutrition* 2013; 16:1789-95.
2. Forte JG, Miguel JM, Miguel MJ, de Padua F, Rose G. Salt and blood pressure: a community trial. *Journal of Human Hypertension* 1989; 3:179-84.
3. Grimes CA, Campbell KJ, Riddell LJ, Nowson CA. Sources of sodium in Australian children's diets and the effect of the application of sodium targets to food products to reduce sodium intake. *British Journal of Nutrition* 2011; 105:468-77.

Key messages

Victorian primary schoolchildren consume too much salt and this is likely to increase their risk of future cardiovascular disease.

To protect future cardiovascular health, strategies to reduce salt intake in children are needed. Online interactive technologies present an important medium to disseminate educational resources.

Funding acknowledgement
Carley Grimes is supported by a National Heart Foundation of Australia Postdoctoral Research Fellowship.

Contact Dr Carley Grimes
Telephone +61 3 9244 6223
carley.grimes@deakin.edu.au

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FAT TASTE LINKED TO OBESITY

When food is eaten, nutrients (fats, carbohydrates, salts) or their digestive products (fatty acids, sugars, sodium) are 'sensed' by specialised receptor cells within the mouth and in the gastrointestinal (GI) tract. These interactions lead to taste perceptions and alterations in the GI tract, such as the slowing of food leaving the stomach and hormone secretion, which lead to the development of satiety or feeling full.

Impaired oral and GI sensing to the breakdown products of dietary fat (i.e. fatty acids) may be associated with increased energy consumption. In a recent blinded crossover study, participants were asked to consume a high fat, high protein, high carbohydrate and a balanced macronutrient breakfast on four separate days. Following each breakfast, participants were required to consume a buffet-style lunch until they felt comfortably full.

Following the high fat breakfast, participants with an impaired ability to taste fat in foods, consumed significantly more energy (2.1 ± 0.8 MJ) and grams of food (237.70 ± 46.37g) at lunch compared to other participants. There were no significant differences in the amount of energy or grams of food consumed at lunch or in perceived satiety, between participants after consumption of the other breakfasts.

This study demonstrated that impaired fatty acid sensing was associated with excess energy consumption following a high fat meal. As excessive consumption of fat is a common feature in obesity, impaired ability to taste fat may be a causal factor in the development of obesity. While there are undoubtedly many factors involved in the development of obesity, the identification of a potential causal factor is an important finding in the search for strategies to reduce the incidence of obesity.

Reference

1. Keast RS, Azzopardi KM, Newman LP, Haryono RY. Impaired oral fatty acid chemoreception is associated with acute excess energy consumption. *Appetite* 2014; 80C:1-6. doi: 10.1016/j.appet.2014.04.022.

Key messages

There are individual differences in sensitivity to fat that was associated with satiety.

Participants with impaired ability to taste fat consumed significantly more energy.

Impaired ability to taste fat may be a causal factor in development of obesity.

Funding acknowledgement
National Health and Medical Research Council of Australia.

Contact Professor Russell Keast
Telephone +61 3 9244 6944
russell.keast@deakin.edu.au

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THE GOOD OIL ON MUSCLE HEALTH

Skeletal muscle is the largest organ in the body, comprising up to 40% of total body mass. Maintenance of muscle mass and health is essential for healthy aging, prevention of diseases, such as type 2 diabetes, and for maintaining quality of life. Therefore, identifying factors that regulate skeletal muscle size and function is a key research priority.

Our studies have established a critical role for a specific type of fat, known as phospholipid, in regulating muscle size. Phospholipids are found in cell membranes and are important in regulating the physical properties of cell membranes by influencing their strength and flexibility. Although their role in maintaining the physical properties of membranes is appreciated, little is known about the importance of phospholipids in regulating muscle size and function.

Using mice that have been genetically engineered to lack an enzyme involved in membrane phospholipid synthesis, we have found that muscle size is reduced by up to 30%. Functionally, the loss of muscle mass was associated with an impaired exercise capacity. Furthermore, we have shown that the activity of this enzyme is reduced in conditions associated with loss of muscle mass such as denervation-induced muscle atrophy and Duchenne muscular dystrophy.

We are now examining whether activation of this enzyme can improve muscle function and increase muscle mass in animal models of Duchenne muscular dystrophy.

Key messages

Membrane phospholipids play an important role in regulating muscle size and function.

Targeting membrane phospholipids may improve muscle function in conditions where muscle function is compromised.

Funding acknowledgement
Deakin University

Contact Dr Clinton Bruce
Telephone + 61 3 9244 6684
clinton.bruce@deakin.edu.au

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NEWS AND EVENTS

FUNDING SUCCESS

Congratulations to Professor Aaron Russell awarded funding from the French Muscular Dystrophy Association (AFM) AFM-Téléthon for his project *Rescuing the levels of the STARS protein as a treatment for muscular dystrophy*.

AWARDS

• Alfred Deakin Professor David Crawford has been appointed a Fellow of the International Society for Behavioural Nutrition and Physical Activity (ISBNPA), the lead international society in his field. The appointment recognises 12 years of active involvement with ISBNPA.

Alfred Deakin Professor David Crawford

• Alfred Deakin Professor Jo Salmon has been appointed President elect of ISBNPA and will become the new President following the 2015 conference.

• Professor Kylie Ball has been awarded the title of Alfred Deakin Professor, the highest honour Deakin University can bestow on a staff member. Kylie's award recognises her outstanding and sustained contributions to research at Deakin. Kylie is internationally recognised for her research on socioeconomic inequalities in obesity and obesity-risk behaviours. She holds a prestigious NHMRC Principal Research Fellowship (PRF), has attracted well over $10million in funding to Deakin as well as substantial funding in collaboration with other institutions, has published extensively and been invited to present at major national and international conferences.

• Associate Professor Sarah McNaughton was recently awarded the Advanced Accredited Practising Dietitian (AdvAPD) credential by the Dietitians Association of Australia (DAA). The credential recognises proactive leaders who integrate high-level nutrition and dietetic skills to influence the health of the community.

• Dr Catherine Milte is one of only 32 participants worldwide selected to attend the 5th International Course in Nutritional Epidemiology organised by the School of Public Health at the Imperial College London in September. Selection was based on responses to eligibility criteria and motivations for attending. This advanced course is taught by world leaders and aims to give participants a solid grounding in the knowledge and skills required to work as a nutritional epidemiologist.

• Dr Carley Grimes was recently awarded a Nutrition Society of Australia Early Career Travel award to contribute to registration and travel to a nominated international conference.

• Dr Rachel Duckham has been awarded a Plenary Poster Award and a Young Investigators Travel Grant for the 2014 American Society of Bone and Mineral Research Annual Meeting in Houston, Texas in September. These awards are given to the top ranked abstracts for young investigators.

SHOWCASING OUR RESEARCH

• C-PAN recently hosted a free seminar on physical activity and sedentary behaviour in children and youth. Presentations included an overview of the Australian physical activity and sedentary behaviour guidelines in children and youth and latest research.

• C-PAN staff have presented their research at major conferences over the past few months including the International Congress on Physical Activity and Public Health, the International Society for Behavioral Nutrition and Physical Activity conference, the US Experimental Biology Conference, and the Asia-Pacific Diabetes and Obesity Study Group symposium. A number of staff attending overseas conferences also spent time with collaborating research institutes to share expertise and present their research. In addition, Professor Tony Worsley is an invited plenary speaker at the World Horticulture Congress in Brisbane this month. The congress is held every four years.

• Dr Kylie Hesketh and Associate Professor Anna Timperio were part of a team involved in the development of the Active Healthy Kids Australia Report Card 2014. The report card is available from the Active Healthy Kids Australia website www.activehealthykidsaustralia.com.au.

VISITORS TO C-PAN

• As part of the Web-based Nutrition Competency Implementation Toolkit (WNCIT) project funded by the Office for Learning and Teaching and led by C-PAN's Professor Caryl Nowson, C-PAN recently hosted a visit from Dr Martin Kohlmeier. Dr Kohlmeier is a professor in the Department of Nutrition of the Schools of Medicine and Global Public Health at the University of North Carolina (UNC) and is the primary investigator of the Nutrigenetics Laboratory at the UNC Nutrition Research Institute. He is also an expert in and campaigner for embedding nutrition into medical education and has developed a host of nutrition education resources over the past twenty years. Whilst at Deakin University Dr Kohlmeier presented two seminars and attended a dinner with medical practitioners from the local Geelong community as well as key academics teaching into the medical course at Deakin University.

Dr Martin Kohlmeier

• Dr Catherine Woods, Senior Lecturer in Exercise Psychology and Physical Activity for Health in Dublin City University's School of Health and Human Performance recently visited C-PAN to share expertise and learn from C-PAN staff involved in physical activity research and measurement.

Contact details

Centre for Physical Activity and Nutrition Research (C-PAN)
School of Exercise and Nutrition Sciences
Deakin University
221 Burwood Hwy, Burwood, VIC, 3125

Telephone +61 3 9244 6613
cpan@deakin.edu.au
deakin.edu.au/health/cpan

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Our mission

To conduct high quality, multidisciplinary nutrition and physical activity research to actively inform policy and practice to improve health, and build capacity in nutrition and physical activity research in Australia.