Concurrent Session 5: Bone Mass and Body Composition

Relationships between dairy consumption and body composition

KJ Murphy[1], KA Dyer[1], AM Coates[1], TL Pettman[1,2], C Milte[1], AA Thorp[1], NM Berry[1], GMH Misan[1,2], M Noakes[3], JD Buckley[1], PRC Howe[1]

[1]*Nutritional Physiology Research Centre and ATN Centre for Metabolic Fitness, University of South Australia, Adelaide SA 5001 and* [2]*Spencer Gulf Rural Health School, Whyalla SA 5608,* [3]*CSIRO Human Nutrition, Adelaide SA 5000*

Background – Dairy consumption has been shown to be positively associated with a lower body mass index (BMI) and improved body composition but Australian data have not been examined.
Objective – To explore relationships between body composition and dairy macronutrient intakes in Australians.
Design – A retrospective cross-sectional analysis was undertaken with data from food frequency questionnaires and assessments of weight and body composition obtained from overweight or obese adults (366 women, 352 men). Linear regression analyses were controlled for age and total energy intake where appropriate.
Outcomes – Overall dairy consumption was negatively related to BMI (ß= -0.104, P=0.048) in women but no such relationship was observed in men. Consumption of whey-rich products (energy from milk, yoghurt and ice-cream as % of total energy) was associated with lower BMI (ß= -0.114, P=0.036) and hip circumference (HC; ß= -0.208, P=0.02) in women and lower % body fat in men (ß= -0.165, P=0.033). In women, yoghurt consumption (as % total en) was associated with lower waist circumference (WC; P=0.005), HC (P=0.013) and waist/hip (P=0.012) while skim milk consumption (as % total en) was negatively related to BMI (ß= -0.194, P=0.002) and full cream milk was positively related to BMI (P=0.003), % body fat (P=0.003), WC (P=0.0004) and waist/hip (P=0.008). Spread consumption (as % total en) was also positively related to BMI in men (ß= +0.139, P=0.009) and women (ß= +0.116, P=0.034). Dairy protein intake (as % of total protein intake) was negatively related to BMI (ß= -0.228, P=0.00001), WC (ß= -0.231, P=0.002), HC (ß= -0.281, P=0.002) and % body fat (ß= -0.159, P=0.046) in women.
Conclusion – These results suggest that consumption of low fat dairy foods, particularly those rich in whey, may improve body composition.

Prediction of equine body composition with bioelectrical impedance spectroscopy

K Van der Aa Kuhle[1], AJ Cawdell-Smith[1], LC Ward[2] and WL Bryden[1]

[1] *School of Animal Studies and* [2] *School of Molecular and Microbial Sciences, University of Queensland, St Lucia, Qld 4072*

Background – Body composition in horses is usually estimated qualitatively from body condition score. In many situations, including the design of equine feeding and training programs, it is desirable to have an accurate measure of body composition. Recent developments in the human application of bioelectrical impedance analysis (BIA) provide an inexpensive and rapid technique for determining total body water, lean body mass and fat.
Objective – The objective of this study was to define and validate the most correct, safe and applicable measurement protocol for use in horses with particular attention to electrode type and anatomical location.
Methodology – The standard adhesive electrode as used in humans requires the hair directly under the electrode attachment site to be shaved and was compared to a needle electrode (25G, 1.5″ inserted 2-3 mm under the skin), which required no site preparation in 10 yearling and 9 two-year old Australian Stock Horses. Electrode types were assessed for ease of site preparation and tolerance by the horse. Electrode locations compared were: at the carpal and tarsal joints and a poll to dock configuration where electrodes were attached at the wing of the atlas and the point of the tuber ischii using 6 pregnant Standardbred mares. Impedance data in the frequency range 4-1000 kHz, were collected using an ImpediMed SBF7 BIA device. Data for each configuration were assessed for Time required for data collection time, data quality and procedure tolerance by the horse.
Outcomes – Of the two electrode types and configurations that were assessed, the needle electrodes used in the poll to dock configuration enabled quick, reliable data collection that was well tolerated by the horse and easily applied. These configurations were applied successfully in validation studies of the method against reference methods of body composition analysis, *viz* deuterium and naBr dilution for total body water and extracellular water respectively.
Conclusion – The application of the BIS technique of body composition analysis to the horse, together with its validation by isotope dilution measurement of body water volumes, will improve equine welfare through the refinement of equine feeding and training practices.