Altering the timing of meals to improve metabolic and cognitive performance outcomes in shift workers

S. Banks, Behaviour-Brain-Body Research Centre, University of South Australia, Magill Campus, St Bernards Rd, Magill, SA 5072, Australia.

We know that what we eat and how much we eat has significant health consequences. Now we are beginning to understand the implications of chononutrition – that when we eat is also important for health and performance. Meal timing is a novel dietary approach that could be used to better manage health in shift workers and even those people who just eat late into the night. Normal coordination of physiological processes depends on internal “clocks”: There is a “master clock” in our brain and peripheral “clocks” in organs such as the liver, heart, pancreas, muscle and adipose tissues. The master clock orchestrates periods of feeding/ fasting, and peripheral clocks generate 24 hour oscillations of energy storage and utilization. When properly aligned these clocks optimally regulate metabolism and behaviour across the 24 hour cycle. However, staying up late, international travel and shift work cause them to desynchronise, altering metabolic rhythms and inducing insulin resistance and glucose intolerance. Meal timing plays an important role in this desynchrony; as irregular patterns of fasting and feeding can uncouple the master and peripheral clocks. However, new data from animal and human studies suggest that the metabolic consequences of circadian rhythm disruption can be reduced by appropriately timed eating. Data from a laboratory-based, simulated shiftwork study in healthy humans that show metabolic disturbance induced by circadian misalignment can be decreased by altering the timing of meals. Additionally, altering the timing of meals has benefits for cognitive performance.