



# REDISCOVER DAIRY

The Consumer Education Project of Milk SA

April 2015

## Milk may improve and preserve brain power

A recent study conducted by Prof In-Young Choi and a team of researchers at the Hoglund Brain Imaging Centre of Kansas University (KU) Medical Centre, has identified a link between dairy product intake and the concentration of glutathione in brain tissue of healthy, elderly adults.

### **Glutathione**

Glutathione is a powerful antioxidant which plays a vital role in protecting the human brain against reactive oxygen species (ROS) and free radicals that can damage brain tissue and lead to so-called "oxidative stress". Oxidative stress is associated with a variety of diseases including those that affect brain functioning, like Alzheimer's and Parkinson's diseases and dementia among others.

Scientists have known for a long time that ROS are elevated when humans develop diseases of the brain including Alzheimer's, and also with increasing age. In addition, levels of glutathione tend to decrease significantly in older adults. It has, therefore, been the goal of researchers to seek compounds such as nutrients which could increase glutathione levels in the brain to combat ROS and oxidative stress, and thereby prevent brain cell damage and degenerative brain diseases.

Preliminary studies identified dairy products as the only foods that increased glutathione levels in brain tissue. Because this concept is so revolutionary and so few people, particularly older adults, in the United States achieve the recommended intake of three servings of dairy products per day, the KU team set out to trace glutathione levels in three different areas of the brain in 60 healthy subjects (21 men and 39 women) with an average age of approximately 69 years.

### **Advanced brain mapping techniques**

Thanks to the advanced equipment and techniques available at the Hoglund Brain Imaging Centre, the KU researchers were able to carry out so-called "magnetic resonance (MR) chemical shift imaging (CSI)" to map regions of glutathione concentrations in the living brain tissue of their subjects. The glutathione concentrations of the frontal, parietal and frontoparietal regions of the brain were monitored.

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## **Dietary intake**

The dietary intake of the subjects was monitored before the start of the MR CSI with the aid of 7-day records to classify the subjects into three categories, namely low (<1 serving of dairy/day), moderate (1-2 servings of dairy/day) and recommended ( $\geq 3$  servings dairy/day).

The subjects were also instructed to stop taking any supplements that could influence the glutathione levels in their brains.

Standardised, multiple-pass 24-hour recalls were used to determine dietary intake on 3 occasions. The recalls were administered over the telephone by trained diet-assessment staff.

A statistical analysis was carried out to investigate if glutathione concentrations as determined with MR CSI in brain tissue were correlated with the subjects' intakes of milk, cheese and yoghurt, and the most important nutrients supplied by dairy foods (calcium, vitamin D, riboflavin).

## **Results**

The results showed that glutathione concentrations were highest in the group of healthy elderly subjects who consumed the most milk (in all 3 regions of the brain) and cheese (in the parietal region). These results support the findings of another study, namely that the DASH Diet (Dietary Approaches to Stop Hypertension), which is rich in dairy food, was associated with increased plasma levels of glutathione.

## **New theory**

To date the finding that older individuals have lower glutathione concentrations in their brain tissue has been attributed to lower glutathione synthesis and greater oxidative stress. In the light of the present results, it is possible that older people lack glutathione to protect their brain cells because they do not consume sufficient dairy, particularly milk.

National surveys have found that only 23% of older adults in the USA consume the recommended three servings of milk or dairy a day. Improved intakes of milk and dairy by older adults could have major positive implications for brain health.

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## The future

The KU study will hopefully lead to more detailed research to define the role of milk and dairy in brain health. According to the editorial of The American Journal of Clinical Nutrition which published this ground-breaking study by Choi and his co-authors, the study presents “a provocative new benefit of the consumption of milk in older individuals”. This is indeed a point to ponder for the future of the global population with its ever increasing percentage of older citizens who often suffer from brain damage caused by oxidative stress.

Milk intake may well protect our brains against this kind of degeneration as we age.

Reference: Choi IY, Lee P, Denney DR, Spaeth K, Nast O, Ptomey L, Roth AK, Lierman JA & Sullivan D. Dairy intake is associated with brain glutathione concentration in older adults. Am J Clin Nutr 2015. 101:287–93.

Enquiries:

The Consumer Education Project of Milk SA

Contact: Christine Leighton or Maretha Vermaak on 012 991 4164 (T) or 012 991 0878 (F)

Email: [info@rediscoverdairy.co.za](mailto:info@rediscoverdairy.co.za) Website: [www.rediscoverdairy.co.za](http://www.rediscoverdairy.co.za)

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