New research from scientists at Japan’s Waseda University in Tokyo, suggests there is an optimal time in the day for eating and exercising, indicating that ‘chrono-nutrition’ and ‘chrono-exercise’ may form a recipe for optimal health and longevity.

A team led by Shigenobu Shibata at Waseda University has examined the benefits of timing both food and exercise. Circadian clocks, which control our sleep/wake cycles, are affected by external cues including light and dark, food, stress, and exercise. Dysregulation of circadian cycles is linked to disorders like obesity and diabetes.

Research animals’ internal clocks can be shifted by restricted feeding and scheduled exercise cycles in the laboratory. Mice that received a protein-rich breakfast, compared to dinner, showed higher increases in skeletal muscle volume. Likewise, morning exercise is most beneficial. Mice released for exercise in the morning showed better muscle recovery than those released at noon or in the evening.

“Morning light is known as a strong extrinsic cue for the suprachiasmatic nucleus clock, the main oscillator in the brain [for circadian regulation]. And morning exercise and feeding are known cues for peripheral organ clocks,” explains Shibata.

Research in humans indicates similar benefits of morning feeding and exercise. An ongoing study by Yasuo Kawakami and his team comparing morning and afternoon exercise in elderly individuals suggests that morning exercise is more effective for improving locomotive functions. “This is presumably because of the adjustment of peripheral circadian clocks by morning exercise that stimulates the neuromuscular system for higher adaptability and better performance,” suggests Kawakami.

Circadian cycles also influence and are affected by rhythmic gene expression. Haruko Takeyama and her team aim to supplement the convincing physiological data from Shibata and Kawakami by examining potential links between gene expression and health. “We are focusing on biofactors/profiles in gut microbiota, miRNA profiles in blood, and saliva stress markers related to ageing,” explains Takeyama.

These findings have far reaching benefits, especially for Japan’s rapidly ageing population. “The goal is to provide the perfect combination of food and exercise at the most effective time of day, which will benefit middle-aged and elderly individuals, in particular, who are at risk of frailty, sarcopenia and metabolic syndromes,” says Kawakami.