



# CREATINE SUPPLEMENTATION - NEW INSIGHTS AND PERSPECTIVES

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Creatine is a nitrogen-containing compound typically consumed in the diet (~ 1-3 g/day) primarily from red meat and seafood<sup>10</sup> or through commercially manufactured dietary supplements, in the form of creatine monohydrate.<sup>9</sup> Creatine monohydrate is one of the most widely researched dietary compounds (> 1000 peer-refereed publications involving creatine<sup>10</sup>), with the vast majority focusing on exercise and sports performance primarily in young adult males.<sup>11</sup> Accumulating research suggests that creatine monohydrate supplementation can also provide benefits to females across the lifespan<sup>13</sup> and during the aging process.<sup>2</sup> Furthermore, creatine supplementation can increase brain creatine content which may help improve measures of cognition and memory and treat symptoms from traumatic brain injury and depression.<sup>8</sup> However, awareness about these benefits is low.<sup>11</sup> Further, there continues to be unsubstantiated claims and misconceptions about creatine supplementation.<sup>1</sup> Below, Dr. Darren Candow, Professor in the Faculty of Kinesiology and Health Studies at the University of Regina will discuss the effects of creatine monohydrate supplementation in females and aging adults as well as its potential to improve aspects of brain function and health.

## CURRENT UNDERSTANDING OF CREATINE MONOHYDRATE SUPPLEMENTATION

- It is well established that creatine monohydrate supplementation (i.e. 20 grams/day for 5-7 days and/or 3-5 grams/day), primarily when combined with resistance-exercise training, increases measures of lean tissue and muscle thickness, maximal muscle strength, endurance, power and indices of physical performance.<sup>10</sup>
- The vast majority of creatine research has focused on young adult males.<sup>11</sup>
- The timing of creatine supplementation is not a major issue of concern.<sup>3</sup>
- To date, the safety profile of creatine monohydrate across the lifespan is excellent.<sup>9</sup>
- Despite evidence-based research, myths and misconceptions regarding the efficacy and safety of creatine monohydrate supplementation still exists.<sup>1</sup>

## NEW INSIGHTS AND PERSPECTIVES

- Accumulating research indicates beneficial effects from creatine supplementation, with and without resistance-exercise training, on measures of exercise and muscle performance in young adult females.<sup>13</sup>
- There is evidence that creatine supplementation increases muscle/lean tissue mass, muscle and bone strength and improves physical performance in aging adults.<sup>3,4,5,6</sup> Subsequently, speculation exists that creatine supplementation may have application for treating age-related conditions such as sarcopenia, osteoporosis, and frailty.<sup>2</sup>
- Creatine supplementation has recently been shown to increase brain creatine content which may have application for improving measures of cognition and memory in aging adults and during times of acute metabolic stress (i.e. sleep deprivation).<sup>7,8,12</sup>
- There is preliminary evidence that creatine supplementation has some potential for treating symptoms of traumatic brain injury, certain neurological diseases, depression and anxiety.<sup>7,8,12</sup>

## FUTURE DIRECTIONS

- Determine the mechanistic effects of creatine supplementation in females across the lifespan and whether sex differences exist in response to creatine.
- Determine whether creatine supplementation is a viable and effective intervention in aging adults diagnosed with sarcopenia and/or osteoporosis.
- Determine the optimal creatine supplementation protocol (dosage, duration and frequency) to increase brain creatine content across a variety of clinical populations.
- Determine whether creatine supplementation prior to and following traumatic brain injury has long-term therapeutic effects in humans.

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