6. Effects of HMB on muscle damage and functional recovery

Data suggests that HMB may help reduce muscle damage and promote muscle recovery. Indeed, two studies support the hypothesis that HMB supplementation helps prevent exercise-induced muscle damage and improves recovery following exercise [56,57]. Supplementation with 3 g of HMB-Ca resulted in a decreased creatine phosphokinase (CK) and LDH response after a prolonged run [57], and HMB-Ca protected against the exercise-induced rise in CK in men [56] in response to progressive resistance-exercise training. Panton et al. [58] reported that men and women who supplemented for four weeks with 3 g HMB-Ca in conjunction with progressive resistance training saw a significantly decreased CK response following the intervention. Furthermore, compared to a placebo group, 14 days of HMB-Ca supplementation (3 g/d) prior to an eccentric bicep curl exercise reduced the subsequent CK elevation, which corresponded with better maintenance of 1-repetition maximum (1-RM) curl strength and reduced soreness compared to placebo during a 72- hours of recovery [59]. Additionally, a muscle-damaging bout of isokinetic, eccentric knee extensor and flexor exercise was performed by 16 untrained participants who were given 3 g of HMB-Ca 60 minutes before or immediately after exercise. In contrast to the post-exercise feeding group, those who supplemented with HMB pre-exercise showed lower elevations in LDH in recovery [60]. Recently, Tsuchiya et al. [61] supplemented untrained males with 3 g/d of HMB-Ca for 2 or 4 weeks before an eccentric upper-body muscle damaging protocol. The results indicated that both 2 and 4 weeks of HMB supplementation improved the recovery of MVC torque and range of motion compared to a placebo while reducing muscle stiffness and swelling. Moreover, while most investigations to date utilized a 3 g/d dose of HMB, a subsequent study from these researchers investigated the efficacy of a 1.5 g/d HMB dose taken for two weeks before eccentric damage to the elbow flexors. Interestingly, the low dose of HMB was also efficacious for improving functional recovery, including improvements in maximal voluntary contraction and range of motion of the elbow flexors in these untrained males [62].

While some protective effects of HMB have been shown in untrained participants, current data are mixed regarding resistance-trained individuals. One study in NCAA Division I football players found no effect of 28 days of HMB supplementation on markers of muscle damage or measures of strength and power performance [19]. Hoffman et al. [63] investigated whether HMB-Ca could provide a protective effect during a pre-season summer football training camp, which commonly consists of two practices per day. Results from this study indicated HMB had no benefit regarding physical performance, CK, myoglobin, or hormonal status. Some have postulated that since resistance-trained athletes have acquired more protection against muscle damage via the repeated bout effect, these individuals may need to be subjected to a profound amount of stress or training to experience an ergogenic effect from HMB. As such, Wilson et al. [27] provided 3 g/day of HMB-FA or placebo to trained males before and for two days after a strenuous lower body resistance exercise session. At 48-hours post-exercise, CK levels were significantly higher in the placebo group while perceived recovery was greater in the HMB-FA group. However, when utilizing a similar supplemental dose of HMB-FA, no reduction in inflammatory cytokines, CK, myoglobin, C-reactive protein, or squat performance 24 and 48 hours following the muscle-