The discovery of new ways to enhance the quality of human life by stunting inevitable aging processes, such as sarcopenia, is a subject of great interest to nutritional companies. β-Hydroxy-β-Methylbutyrate (HMB), a derivative of the amino acid leucine, has been found to enhance and prolong muscle function when administered to laboratory rats and mice. Studies questioning the effect of HMB on the fruit fly, *Drosophila melanogaster*, have not yet been performed. In this preliminary study, Abbot Nutrition, via the Vigoreaux Biology Lab at the University of Vermont (Burlington, VT), explored the effect of HMB on *D. melanogaster* flight ability and lifespan to determine whether HMB has reversing effects on age-related muscle deterioration and mortality, and to determine whether *D. melanogaster* may serve as an effective model system for future studies regarding the efficacy and biology of HMB. To perform this study, fly food was supplemented with various concentrations of HMB [0mg/mL (MB00), 1mg/mL (MB01), 5mg/mL (MB05) and 10mg/mL(MB10)], from eclosion to death (Study I), and from median age to death (Study II). Flight tests were performed weekly, and numbers of flies dead were recorded every other day. Treatment groups were compared using JMP Pro10 Software t-tests and median tests. Study I found that female MB10 flies had enhanced flight ability during weeks 4 ($p=0.0152$) and 5 ($p=0.0469$) when compared to MB00 flies. Only male MB10 flies had an increased median age when compared to MB00 flies ($p<0.0239$). No difference in flight ability or median age was observed between treatment groups of Study II. These findings not only suggest that10mg/mL HMB is sufficient to provoke a physiological response in *D. melanogaster*, enhancing flight ability and longevity in a sex-dependent manner, but that *D. melanogaster* may serve as a reliable, cost-effective tool to further investigate the biological mechanism of HMB action.