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ADMINISTRATION OF BRANCHED-CHAIN AMINO ACIDS AND DI-ALANINE MITIGATES MUSCLE ATROPHY IN A MOUSE MODEL OF CANCER CACHEXIA

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Cancer cachexia is a complex metabolic syndrome characterized by progressive skeletal muscle wasting driven by systemic inflammation and activation of proteolytic pathways. To date, effective therapeutic strategies remain limited. Nutritional approaches based on branched-chain amino acids (BCAA) have been proposed to mitigate muscle loss, although their efficacy remains controversial. In addition, the potential contribution of di-alanine (Di-Ala) has not yet been fully explored.

In this study, we evaluated the effects of BCAA administration, alone or in combination with Di-Ala, in a murine model of cancer cachexia induced by C26 colon carcinoma cells. Muscle wasting was assessed through morphological, biochemical, and molecular analyses.

Our results demonstrate that BCAA administration exerts a protective effect against muscle loss, which is significantly enhanced when combined with Di-Ala. This combined treatment not only improves muscle morphology but also attenuates inflammatory responses and signaling pathways associated with muscle atrophy. In particular, protein degradation pathways were downregulated, suggesting reduced catabolic activity.

Taken together, these findings indicate that Di-Ala potentiates the effects of BCAA administration, suggesting a strategy that may effectively counteract muscle atrophy and represent a promising therapeutic approach for cancer cachexia.

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