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Molecular Insights into Jub's Role in Sarcopenia and Nutritional Interventions

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Jub, a LIM domain-containing scaffold protein, has been implicated in cytoskeletal regulation and cell signaling, yet its role in muscle aging and nutritional modulation has remained largely unexplored. In our recent work, we identified Jub as a diet-responsive gene biomarker through integrative metabolomic and transcriptomic profiling in sarcopenic obesity models. We observed that Jub expression was markedly downregulated by supplementation with functional food, coinciding with enhanced AMPK activation and preservation of muscle mass. Functional analyses revealed that Jub overexpression impaired metabolic flexibility and promoted catabolic signaling, whereas its downregulation favored anabolic and energy-efficient states. Moreover, Jub was associated with muscle frailty pathways in human cohort data, further underscoring its translational significance. Importantly, Jub does not appear indispensable for basal muscle maintenance; rather, it acts as a switch governing the susceptibility of skeletal muscle to age-related decline. Collectively, these findings position Jub as a promising nutrition-responsive biomarker and potential target for dietary strategies to mitigate sarcopenia.