M27 Quorum Sensing Molecules as a novel player in sarcopenia

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Abstract body

Objective: An accelerated muscle decline with aging, called sarcopenia, is an important clinical problem because of its increasing prevalence (global human aging) and its association with physical disability, poor quality of life and all-cause mortality. Unfortunately, until now, a lack of pathophysiological knowledge hampers a targeted diagnosis and therapy of this geriatric syndrome. Recent studies suggest a role for the microbes in the gut, the so-called microbiome, in the pathogenesis of sarcopenia, without the mediator of this gut-muscle axis being identified. We hypothesised that quorum sensing molecules (QSM) might be one of these mediators. QSM are bacterial products, constitutively produced by living bacteria, and increased in bacterial “stress” conditions. Our objective was to investigate the effects of QSM on host muscle homeostasis.

Methods: Both C2C12 muscle cell in vitro and C. elegans in vivo experiments were conducted. In vitro read-outs were focused on the main biological systems disturbed in sarcopenia: viability, differentiation, inflammation, mitochondrial changes and protein degradation. In vivo read-outs were mobility-associated variables.

Results: 30 QSM of the 75 QSM screened showed effects on C2C12 cells. Most of these QSM are known to be produced by species of the genus Staphylococcus, Streptococcus, Enterococcus, Bacillus, Lactobacillus or Escherichia. C. elegans experiments on selected QSM confirmed the in vivo relevance of these findings.

Conclusion: These findings are exciting as they provide the first evidence that QSM produced by gut bacteria play a role in the gut-muscle axis, opening a new diagnostic and therapeutic dimension in the complex syndrome of sarcopenia.