IJAE
Vol. 123, n. 1 (Supplement): 189, 2018
ITALIAN JOURNAL OF ANATOMY AND EMBRYOLOGY

Exploring the role of ghrelin peptides in sarcopenia development during aging

Flavio Lorenzo Ronzoni[1], Gabriele Ceccarelli[1], Laura Benedetti[1], Nicoletta Filigheddu[2], Simone Reano[2], Maria Gabriella Cusella De Angelis[1] and Maurilio Sampaolesi[1]

[1] Universita di Pavia, Sanità Pubblica, Medicina Sperimentale e Forense / Center for Health Technologies (C.H.T.), Pavia, Italia
[2] Universià del Piemonte Orientale, Medicina Traslazionale, Novara, Italia

Sarcopenia is a complex syndrome defined as the irreversible loss of skeletal muscle mass and functionality in aged individuals that results in frailty, mobility disorders, and loss of independence [1]. The pathology is characterized by muscle atrophy and impaired muscle regeneration. The mechanisms involved in its development are not fully understood, although hormonal changes, inflammation, insulin resistance and nutritional deficiencies are surely involved in. In addition, we and other authors showed that aging affect progenitor myogenic cells, including mesoangioblasts (adult vessel-associated stem cells) [2] unable to counteract sarcopenic phenotype. Due to the increase of the elderly population, sarcopenia has an important social impact, greatly affecting the quality of life of aged people and impacting government health care costs. Therefore, therapeutic strategies aimed at preventing and/or counteracting sarcopenia are of pivotal importance.

Acylated and unacylated ghrelin (AG and UnAG, respectively) are circulating peptides codified by the ghrelin gene. By acting through its receptor GHSR1a, AG stimulates appetite, adiposity, a strong release of growth hormone (GH) and has a broad anti-inflammatory activity. UnAG does not bind to GHSR1a however, similar to AG has a direct anti-atrophic effect on skeletal muscle [3].

Our preliminary results show that murine mesoangioblasts treated with recombinant UnAG or AG were able to differentiate spontaneously forming myotubes. In addition, in murine embryonic stem cells and human mesodermal induced pluripotent stem cells subjected to myogenic differentiation, the presence of recombinant proteins resulted in improved myogenic commitment.

Taken together our results candidate AG and UnAG as potent myogenic inducers, able to modulate the gene expression profile in myogenic progenitors, affecting positively the muscle differentiation process.

This work was supported by grant CARIPLO Foundation #2015_0634.

References

[1] Cederholm et al. (2013). Sarcopenia and fragility fractures. Eur J Phys Rehabil Med, 49(1):111-7
[2] Rotini et al. (2018). Aging affects the in vivo regenerative potential of human mesoangioblasts. Aging Cell, 17(2)
[3] Reano et al. (2017). Unacylated Ghrelin Enhances Satellite Cell Function and Relieves the Dystrophic Phenotype in Duchenne Muscular Dystrophy mdx Model. Stem Cells 35(7): 1733-1746.

Key words

Mesoangioblasts; Embryonic stem cells; IPS; Sarcopenia; Ghrelin; Myogenic differentiation.

© 2018 Firenze University Press
http://www.fupress.com/ijae