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Cellular autophagy-treatment target for the aging process

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As life expectancy increases, there is an ever-growing interest in preventing these diseases and multiple studies are looking for the answer to a healthy aging. Recently, several studies have focused on various aspects of ageing and autophagy. Cellular autophagy plays an important role in cyto-protection and in maintaining cellular homeostasis by preventing accumulation of toxic proteins and by eliminating pathogens. We hypothesized that pharmacological stimulation of autophagy may lead to partial regeneration of aged tissues and may stimulate healthy aging from a cognitive, as well as a functional point of view. Our objective was to assess the efficacy of the drug SPT100 to extend life and improve cognitive function and spatial memory (Water-Maze) and motor function (Rotor-Rod), by stimulating autophagy processes at tissue and cellular level in the brain and the liver through transcriptomic, genomic, proteomic and immunohistochemical methods. We found that treatment with SPT100 did not extend the life span of aged rats. However, SPT100 improved the cognitive and motor functions of the aged rats, as assessed with Elevated Plus maze, Latency Curiosity Test and Forced Swim. This compound has also promising anti-inflammatory and anti-apoptotic effects on the central nervous system. We hypothesized that long-term treatment with SPT100 could reduce gene expression of various inflammation markers, including: C11, CR3, Tgfb, Cxcl10, CXCR4, Fcgr3a and Stat. Thus, by RT–PCR, we found significant decreases in the expression of mRNA coding for inflammation and astroglial markers. These results may offer a basis for further studies regarding the protective mechanisms of autophagy stimulation on the aging process.

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