

Shweta Patel, Inderjeet Nandal
SENOTHERAPY AND ITS FUTURE PROSPECTIVES

Tutor: PhD, associate professor Vauchok A.V.

Department of Pharmacology

Belarusian state medical university, Minsk

Cellular senescence is one of hallmarks of tissue aging and accumulation of senescent cells with age leads to organismal aging, as well as triggers the development of various age-related diseases. Senotherapy is a promising approach for treating age-related diseases and conditions by targeting senescent cells which produce harmful substances like pro-inflammatory molecules that contribute to the aging process.

Senescent cells are believed to play a role in the development of various age-related diseases, including cancer, Alzheimer's disease, and osteoarthritis. Senotherapy has the potential to treat or prevent these conditions by eliminating senescent cells. It also has unique property of Selective targeting which allows senotherapeutic agents to selectively target senescent cells without affecting healthy cells, they are known as Senolytics.

By eliminating senescent cells, senotherapy should improve overall health and lifespan by reducing the burden of age-related diseases and increasing resistance to stress and damage.

Senotherapy has been shown to have minimal side effects, making it a safe option for treating age-related diseases. Various Pharmacological agents have been studied for their potential to slow down or reverse aging-related processes, as well as for their ability to treat age-related diseases like:

Metformin – it is commonly used to treat type 2 diabetes, but it has also been shown to have potential senotherapeutic effects. Metformin has been shown to improve cellular health, slow down aging and extend lifespan in various animal models (Cabreiro et al. 2013).

Rapamycin – this medication is an immunosuppressant that is used to prevent organ rejection in transplant patients. Rapamycin has been shown to extend lifespan and delay age-related diseases in various animal models (Harrison et al. 2009).

Resveratrol – this compound is found in red grapes and other foods, and it has been studied for its potential anti-aging effects. Resveratrol has been shown to improve cellular health and extend lifespan in various animal models (Gomez et al. 2016).

Nicotinamide adenine dinucleotide (NAD⁺) precursors – these compounds, such as nicotinamide riboside, have been shown to increase NAD⁺ levels in cells. NAD⁺ is a coenzyme that plays a key role in cellular metabolism and energy production, and its levels decline with age. Increasing NAD⁺ levels have been shown to improve cellular health and extend lifespan in various animal models.

Senolytics have been shown to improve tissue function and extend lifespan in various animal models-: senotherapy is a promising approach for improving health and lifespan by targeting the underlying mechanisms of aging. Senotherapy holds promise as a novel approach to prevent or treat age-related diseases and improve health and lifespan. However, more research is needed to optimize the efficacy, safety, and specificity of senotherapeutic interventions, and to identify the most appropriate targets and biomarkers for senescence and SASP modulation.