

Senolytics- How can aged cells be killed?

Victor Björk

Popular Science Summary of Independent Project in Biology 2018, Biology Education Centre, Uppsala University

Senescent cells are cells that are not dead but do no longer participate in the cell cycle or contribute to tissue function. When the human body ages, senescent cells accumulate in tissues and organs. While the body normally kills cells through apoptosis and replaces them regularly the senescent cells are defined as resistant to the body's normal mechanism for apoptosis. Studies show that these types of cells are harmful to the body and contribute to a host of age-related diseases. Senescent cells secrete inflammatory substances due to what is called the senescent cell secretory phenotype, SASP, that has been linked to atherosclerosis, cancer and a large number of other age-related pathologies. Despite that the senescent cells are few in number the inflammatory substances they produce affect surrounding tissues in organs and are associated with many disease processes. The rise in low-grade systemic inflammation throughout aged tissues in the body, inflammaging, and intervening in this phenomenon through removal of senescent cells represents a new target of research.

Research today is ongoing to develop senolytic therapies, which are aimed towards selective destruction of senescent cells in order to possibly reduce the impact of several age-related diseases simultaneously. Studies of senolytic therapies applied on aged mice show dramatic improvements in health and functionality of the cardiovascular system, cartilage, fur and osteoporosis. The treated animals show an extended healthspan of up to 25% while appearing more youthful physiologically. These results demonstrate that health improvements can be achieved through killing senescent cells while causing minimal to no destruction of healthy tissues. Clearance of senescent cells can be achieved both through pharmaceutical methods as well as gene therapy.

If senolytic therapies could be implemented in humans there would be a new way of potentially reducing the enormous disease burden of the rapidly aging population. Since age-related diseases represent a major burden for most countries in the present-day world it is justified to increase research in how to develop real innovative solutions to combat age-related ill health.

Further reading

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Björk V. 2017. Senolytika- Vilken roll spelar senescenta celler i uppkomsten av åldersrelaterade sjukdomar och hur kan de elimineras? Uppsala universitet