

Transfer of aging: New drug class prevents key aging mechanism in organ transplants

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A novel study has shown that Senolytics, a new class of drugs, have the potential to prevent the transfer of senescence, a key mechanism of aging, and the associated physical and cognitive impairments in recipients of older donor organs.

The pioneering research, presented at the [European Society for Organ](#)

[Transplantation \(ESOT\) Congress 2023](#), opens promising avenues for expanding the organ [donor](#) pool and enhancing patient outcomes.

By transplanting older donor organs into younger recipients, researchers from Harvard Medical School and the Mayo Clinic investigated the role of transplantation in inducing senescence, a biological mechanism linked to aging and age-related diseases. The researchers conducted age-disparate heart transplants from both young (3 months) and old (18–21 months) mice into younger recipients.

Recipients that had received old hearts showed augmented frequencies of senescent cells in draining [lymph nodes](#), livers, and muscles, in addition to augmented systemic mt-DNA levels, when compared to recipients that had received young grafts. Strikingly, transplanting old organs led not only to advanced physical but also cognitive impairments in recipient animals.

The research also uncovered a potential solution to this process by utilizing Senolytics—a new class of drugs designed to specifically target and eliminate senescent cells. When old donors were treated with Senolytics (Dasatinib and Quercetin) prior to organ procurement, the transfer of senescence was significantly reduced through a diminished accumulation of senescent cells and mt-DNA.

Recipients who received old organs treated with Senolytics showed improved [physical fitness](#) that was comparable to observations in recipients of young organs.

Maximillian J. Roesel, presenting the study as part of the group at Brigham and Women's Hospital, Harvard Medical School, commented, "Donor age plays a crucial role in the success of transplantations, with recipients of older organs facing worse short- and long-term outcomes. Nevertheless, the use of older donor organs is essential to tackle the

global organ shortage, and this research illuminates fundamental challenges and potential solutions for utilizing older organs."

Throughout Europe, the demand for [organ transplantation](#) is on the rise, driven by an increase in chronic diseases. Moreover, this growing need far surpasses the available supply of organs, with recent data demonstrating that across Europe an average of 21 people die each day waiting for a transplant.

"Moving forward, we will delve deeper into the mechanisms underpinning our current findings, with a particular focus on the potential role of Senolytics in preventing the transfer of senescence in humans. This research is extremely exciting and clinically so relevant as it may not only help us to improve outcomes but also make more organs available for transplantation," concluded Stefan G. Tullius, the senior and lead author of the study.

More information: Roesel M, et al. 'Spreading' aging with the transplantation of old organs: An experimental reality. Presented at the European Society for Organ Transplantation Congress

Provided by European Society for Organ Transplantation

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