

Understanding the senolytic and senomorphic effects of Zoledronate treatment in an ageing mouse model using spatial transcriptomics

Bisphosphonates such as Zoledronate are commonly used to treat osteoporosis; however, treatment with bisphosphonates has also been shown to reduce the incidence of cancers, cardiovascular disease and mortality. The mechanisms underlying these effects are not fully understood; however, the proposed senolytic and senomorphic actions of bisphosphonates may play a role in destroying senescent cells and inhibiting the secretion of senescence-associated secretory phenotype (SASP) within ageing tissue.

To investigate the effects of Zoledronate treatment in vivo, all organ tissues were harvested from an ageing mouse model treated with either Zoledronate or vehicle over 8 weeks. Spatial transcriptomic analysis was performed on these tissues, focusing on the expression of senescence-associated genes and SASP markers. The outputs from this study will be used to elucidate the effect of Zoledronate treatment across different tissues and allow us to better understand the effect on the ageing mouse model for this and future therapeutic studies. Ultimately it is hoped that these outcomes could be used to identify new or repositioned drugs as potential therapeutics for age-related diseases.