

Investigation of the roles and applications of Extracellular Vesicles (EVs) in eliminating senescent cells in liver during aging

Ageing is the most significant risk factor for driving the development and progression of majority of human diseases, including cancers. Hence, the continued and steady rise of the ageing population worldwide will pose major challenges to societies caused by the dramatic increase in ageing-related disease burdens in the coming years.

Senescence cells secrete multitude of factors, collectively known as **senescence associated secretory phenotypes (SASPs)**, that serve diverse functions. Although senescence is an important physiological mechanism in preventing the growth of tumours and promoting tissue regeneration during wound healing, excessive accumulation and decelerating removal of senescent cells in aging tissues are thought to play a key role in facilitating development and progression of a wide variety of diseases in the ageing population.

Recent studies have demonstrated the potential of Extracellular Vesicles (EVs) derived from various tissues to be effective as anti-aging agents by improving health and life span of aging mice. EVs are phospholipid bilayer vesicles naturally secreted by cells in all tissues, from which they preserve key surface attributes that are subsequently used in their intracellular trafficking and in cell-to-cell communication mechanisms. EVs had been shown to display a multitude of biological activities including elimination of senescent cells. In addition, emerging evidence also suggests that EVs have the potential to serve as vehicle for delivery of drugs to target tissues.

In this project, we will explore whether EVs derived from various tissue sources will have an impact on hepatic senescent cells and whether the encapsulation of chemical senolytic agents will have a synergistic effect with EVs both *in vitro* and *in vivo*.

We are seeking a highly motivated student to take up this project leading up to a PhD degree. Students who have strong interest in learning and applying state of the art techniques in cell biology and biochemistry to answer questions towards understanding the roles of EVs in regulating senescence of hepatic cells are urged to contact A/P Giorgia Pastorin (phapg@nus.edu.sg) and A/P Victor Yu (phayuv@nus.edu.sg). Only shortlisted candidates will be notified.