Plenary Lecture Abstract

Senescent cells as drivers of inflammaging

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Cellular senescence, like inflammation itself, is an integrated response to both deleterious stressors as well as certain beneficial physiological signals. In either case, senescent cells adopt a tripartite phenotype, which includes an essentially irreversible arrest of cell proliferation, relative resistance to apoptotic cell death, and a complex senescence-associated secretory phenotype (SASP). Senescent cells are known to increase with age in many tissues, and the SASP includes a large number of molecules that are potent initiators or mediators of inflammation. Thus, senescent cells are thought to be an important source of 'inflammaging' – the low-level chronic inflammation that is a hallmark of most aging tissues. The recent development transgenic mouse models -- and a relatively new class of drugs termed senolytics -- have allowed the selectively elimination of senescent cells, and thus have now made it possible to show a causal role for senescent cells in a growing number of age-related pathologies – at least in mice and isolated human tissues. A major challenge for the refinement of these approaches is to obtain a better understanding of the complexity, specificity and heterogeneity among senescent cells in order to more selectively suppress their deleterious effects, particularly their stimulation of inflammaging, while preserving their beneficial physiological functions.