

**Viewpoint** | Published 12 May 2017 | doi:10.4414/smw.2017.14468

**Cite this as:** Swiss Med Wkly. 2017;147:w14468

## Swiss Medical Weekly recognizes Prof Andrea Alimonti, recipient of the Dr Josef Steiner Cancer Research Foundation Award 2015

Douglas Hanahan

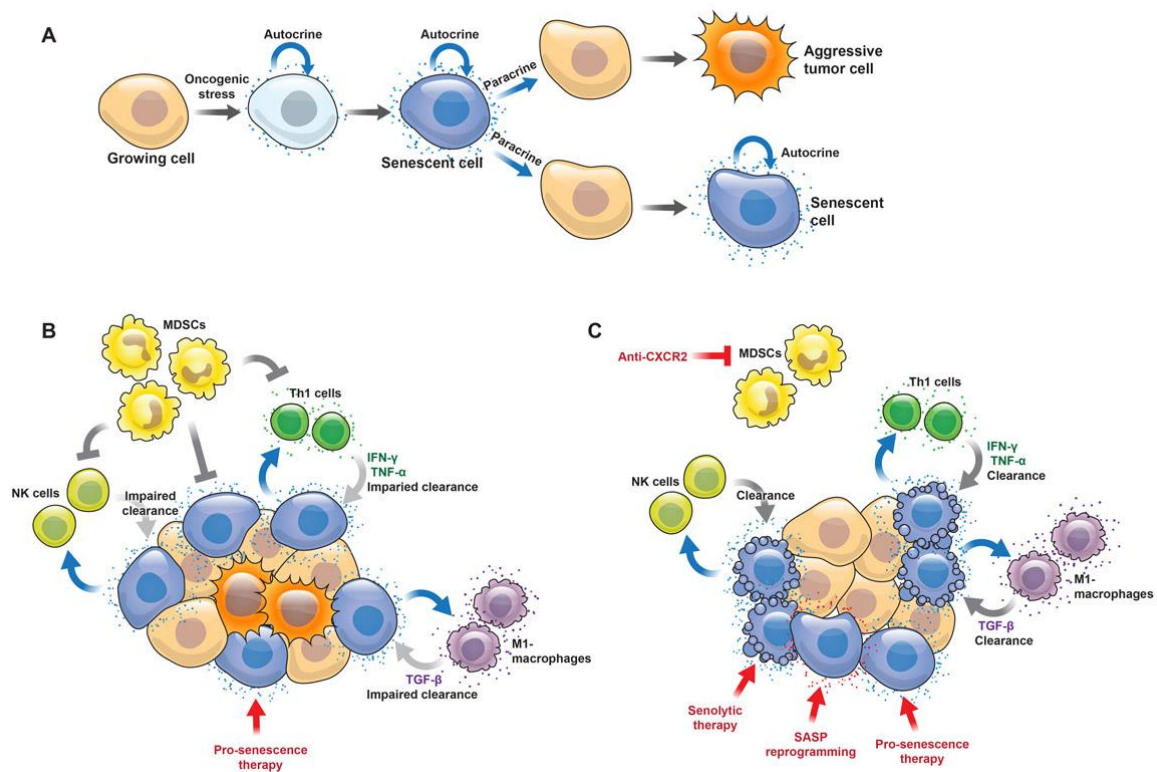
Swiss Institute for Experimental Cancer Research (ISREC), Centre médical universitaire (CMU), Geneva, Switzerland

Since 1986, the Bern-based Dr Josef Steiner Cancer Research Foundation has presented a annual/biennial award to a young scientist of exceptional accomplishment and promise who leads a cancer research group typically based in Europe. The generous award provides four years of support for an innovative project at the frontiers of translational cancer research, plus a personal prize.

The award in 2015 went to Andrea Alimonti, who works at the Institute of Oncology Research within the Oncology Institute of Southern Switzerland in Bellinzona. Alimonti studies prostate cancer, and his prize-winning work involved the elucidation of complex tumor-promoting and tumor-antagonizing effects of cellular senescence, in which cells become irreversibly non-proliferative but don't die; the complexity Alimonti reports involves cells of the adaptive and innate immune system – T lymphocytes, NK cells, immature (immunosuppressive) myeloid cells, and macrophages – that respond inappropriately to the senescent prostate cancer cells. In brief, Alimonti has shown that senescent cancer cells can be a double-edged sword: they can't proliferate themselves (which is good), but they secrete potent immunoregulatory factors that modulate the immune system, biasing the immune response in favor of promoting proliferation of the remaining non-senescent cancer cells, consequently facilitating tumor progression (which is bad) (fig. 1A). He further demonstrated that the beneficial growth-limiting effects of senescence-inducing chemotherapies can be significantly limited – in a form of adaptive resistance – by recruitment of innate immune (myeloid) cells that collaborate with the cancer cells to fuel therapeutic relapse by suppressing T and NK cell mediated killing (fig. 1B). Alimonti plans to pursue these revelations, developing and testing a multifactorial therapeutic strategy that would drive cancer cells into a non-proliferative senescent state with chemotherapy, while concomitantly blocking the tumor-promoting capabilities of such senescent cells, instead orchestrating immune-mediated killing of the residual non-senescent prostate cancer cells (fig. 1C).

*Swiss Medical Weekly* has elected to recognize Steiner laureates by publishing an invited review/perspective that provides a synopsis of the laureate's award-winning research and its future horizons. Andrea Alimonti's article, from which figure 1 was taken, was published recently [1].

Additionally, [the announcement](#) by the Dr Josef Steiner Cancer Research Foundation of the 2015 award to Dr Alimonti can be downloaded from the Foundation's website at <http://www.steinerstiftung.unibe.ch>.



**Figure 1: Combinatorial approach to enhance the efficacy of pro-senescent therapy.** (A) Oncogenic stress drives growing cells into senescence. Senescent cells actively communicate with their microenvironment through the SASP. Depending on the composition of the SASP, secreted factors can either drive both autocrine and paracrine induction of senescence, or enhance the aggressiveness of neighbouring tumour cells. (B) **Senescence induction in tumours treated with pro-senescent therapy.** Within the tumour microenvironment, senescent tumour cells through the SASP can promote both the recruitment and activation of several immune populations, including M1-macrophages, NK cells, and Th1 cells. Such tumour-infiltrating immune subsets can restrain tumour progression by mediating the clearance of senescent tumour cells, and also promoting senescence. Conversely, MDSCs limit senescence induction in the tumour microenvironment by blocking senescence induction and/or anti-tumour immunity. (C) **Optimisation of pro-senescent therapies for cancer.** Immunotherapies may enhance tumour clearance in tumours treated with pro-senescent therapies. Pharmacological reprogramming of the SASP may increase the anti-tumour immune response in tumours upon treatment with pro-senescent therapies. Senolytic therapies may remove senescence tumour cells in tumours where senescence surveillance is impaired, to avoid negative effects induced by the SASP. Anti-CXCR2 treatment limits MDSC recruitment in the tumour, favouring senescence induction and/or antitumour immunity. From [1].

Ochre cells represent growing cells; light-blue cells show cells undergoing to senescence; blue cells represent senescent cells; orange cells depict aggressive tumour cells.

CXCR = C-X-C chemokine receptor; IFN = interferon; MDSC = myeloid-derived suppressor cells; NK = natural killer; SASP = senescence-associated secretory phenotype; TGF = transforming growth factor; Th1 = type 1 helper T cells; TNF = tumour necrosis factor

#### Correspondence:

Prof. Douglas Hanahan, PhD  
 Swiss Institute for Experimental Cancer Research (ISREC)  
 Centre médical universitaire (CMU)  
 Office 9000, 1, rue Michel-Servet  
 CH-1211 Genève 4  
 douglas.hanahan[at]epfl.ch

#### Reference

- 1 Calcinotto A, Alimonti A. Aging tumour cells to cure cancer: “pro-senescent” therapy for cancer. *Swiss Med Wkly.* 2017;147:w14367. [PubMed](https://pubmed.ncbi.nlm.nih.gov/28111111/) <https://smw.ch/en/article/doi/smw.2017.14367/>