



MICSE guidelines published in “Cell” provide a universal toolset for cellular senescence *in vivo* research

Targeting cellular senescence as a therapeutic strategy is considered of great promise to address age-associated diseases including cardiovascular, neurodegenerative, pulmonary, kidney or musculoskeletal diseases. But cellular senescence is a coin with two sides. While chronic senescence is widely implicated in tissue pathology, transiently induced senescence is a vital part of the healing process. Therefore, a deep understanding of senescence processes is needed to tackle precisely the right cells at the right time.

Cellular senescence is a state triggered by stress, characterized by stable cell cycle arrest and increased secretory activity. Recent advancements in tools for studying senescence have opened new possibilities for understanding its diverse roles in health and disease and for exploring senescent cells as therapeutic targets. However, identifying and characterizing senescent cells in tissues and living organisms present several conceptual, methodological, and practical challenges. Traditional markers of senescence, which were originally discovered and validated in cell culture models, often do not function well in the natural tissue environment or “*in situ*.”

The newly devised “MICSE” guidelines, short for “Minimal Information on Cellular Senescence Experimentation *in vivo*”, have been developed as toolset that enables a more accurate assessment of the impact of senescent cells on physiological and pathological processes. They provide a comprehensive and updated overview of senescence markers across various contexts and discuss the technical adaptations necessary for the different types of materials available for studying senescence, including biopsies and liquid biopsies like blood samples, and cancer samples, each with their own unique properties and limitations. As there is no single biomarker for cellular senescence, MICSE is based on a uniform toolset of markers and techniques based on multiple indicators that need to be measured simultaneously. The guidelines have now been published in the prestigious scientific journal “[Cell](#)”.

Senescence *in vivo* event and MICSE guidelines were initiated and coordinated by Mikolaj Ogrodnik ([LBG](#)), Johannes Grillari ([LBI Trauma](#), and [BOKU University](#)), Heinz Redl ([LBG](#)), Nadja Ring ([LBG](#)) and Marco Demaria ([ICSA](#) and [ERIBA](#)). They invited scientists from Austria, the United Kingdom, Spain, the United States, Italy, Greece, Japan, Israel, Canada, Germany, and the Netherlands. Fabrizio d’Adda di Fagnana, funded also by AGE-IT, from IGM-CNR and IFOM contributed to it.