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## **Replicative Senescence *In Vitro* and *In Vivo***

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Research on aging has become one of the most important scientific fields not only because of its basic scientific importance, but also because of demographic changes in many countries throughout the world. Recent developments in the field of basic aging research have dramatically improved our knowledge about the mechanisms that control this process. Using *in vitro* tissue culture and experimental animal systems, researchers have succeeded in altering aging processes, and the results indicate genetic control and oxidative stress as the major mechanisms of aging at the cellular and organismic level. *In vitro* cellular aging has recently been found as directly connected with aging *in vivo*. Numerous genes involved in cell cycle control and immortalization have been identified, and their role in cell senescence is discussed here. Free radical damage has a strong impact on aging at the organismic level, and simple manipulations, such as calorie restriction diet, significantly extend rodent and insect lifespans. The status of the field with respect to the major hypotheses that have been proposed is discussed in this study.

**Key words:** *aging; DNA; molecular biology; oncogenes*