

Gender, genes, and extracellular vesicles: redox regulation of aging

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Aging is a physiological process associated with different changes that occur at the molecular and cellular levels that end up causing dysfunction of cells and tissues. As it is a very complex process, many theories have been proposed to explain it. Moreover, underlying mechanisms of aging as common denominators in mammalian aging have been described: genomic instability, telomere attrition, epigenetic alterations, loss of proteostasis, deregulated nutrient sensing, mitochondrial dysfunction, cellular senescence, stem cell exhaustion, and altered intercellular communication. Our group has tackled most of these mechanisms in the past. We showed that females were protected against oxidative stress compared with males because their estrogens induce the overexpression of antioxidant enzymes. We have also shown the role of other processes in aging such as those related to p53, GRF-1, and telomerase. Finally, we have studied the role of intercellular communication in aging through the intervention with extracellular vesicles derived from stem cells.

All these studies have shown that redox regulation is involved in all the processes, meaning that it plays indeed an important role in aging.