Diseases of cellular response to stress

Diseases of Cellular Senescence

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**Introduction**

Reactome is open-source, open access, manually curated and peer-reviewed pathway database. Pathway annotations are authored by expert biologists, in collaboration with Reactome editorial staff and cross-referenced to many bioinformatics databases. A system of evidence tracking ensures that all assertions are backed up by the primary literature. Reactome is used by clinicians, geneticists, genomics researchers, and molecular biologists to interpret the results of high-throughput experimental studies, by bioinformaticians seeking to develop novel algorithms for mining knowledge from genomic studies, and by systems biologists building predictive models of normal and disease variant pathways.

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**Literature references**


Reactome database release: 73

This document contains 2 pathways ([see Table of Contents](#))
Cells are subject to external and internal stressors, such as foreign molecules that perturb metabolic or signaling processes, cellular respiration-generated reactive oxygen species that can cause DNA damage, oxygen and nutrient deprivation, and changes in temperature or pH. The ability of cells and tissues to respond to stress is essential to the maintenance of tissue homeostasis (Kultz 2005) and dysregulation of cellular response to stress is involved in disease.

So far, we have captured diseases of cellular senescence. Impaired cellular senescence contributes to malignant transformation and cancer development by enabling continuous proliferation of damaged cells. On the other hand, presence of an excessive number of senescent cells that are not cleared by the immune system promotes tissue inflammation and creates a microenvironment suitable for growth of neighboring malignant cells. In addition to cancer, senescence is also involved in other age-related diseases such as atherosclerosis, osteoarthritis, chronic obstructive lung disease, and diabetes (Childs et al. 2015, He and Sharpless 2017, Hamsanathan et al. 2019, Faget et al. 2019, Gorgoulis et al. 2019, Rhinn et al. 2019). Senotherapy is a new field of pharmacology that aims to therapeutically target senescence to improve healthy aging and age-related diseases (Schmitt 2017, Gorgoulis et al. 2019).

**Literature references**


**Editions**

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Diseases of Cellular Senescence

Location: Diseases of cellular response to stress

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Diseases: cancer

Cellular senescence plays an important role in normal aging, as well as in age-related diseases. Impaired cellular senescence contributes to malignant transformation and cancer development. Presence of an excessive number of senescent cells that are not cleared by the immune system, however, promotes tissue inflammation and creates a microenvironment suitable for growth of neighboring malignant cells. Besides cancer, senescence is also involved in atherosclerosis, osteoarthritis and diabetes (Childs et al. 2015, He and Sharpless 2017).

Literature references


Editions

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