Healthy Aging Research

OPEN ACCESS Freely available online

Opinion Article

Evolution and the Diseases of Aging

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DESCRIPTION

The study of aging, or the evolution of aging, tries to shed light on why a harmful process like aging would evolve and why species' lifespans vary so widely. According to the traditional theories of evolution, there will be little pressure to preserve genetic changes that increase longevity because environmental factors like predation, accidents, disease, and starvation ensure that the majority of organisms living in natural settings won't live to old age.

Instead, early maturation and quick reproduction will be greatly favored by natural selection, and most organisms will see a reduction in the selection of genetic features that support molecular and cellular self-maintenance as they mature.

Diseases

Progeroid syndromes: Genetic conditions known as progeroid syndromes are connected to early aging. Progeroid syndromes are distinguished by having characteristics that resemble physiological signs of aging, such as cardiovascular disease and hair loss.

Progeria: A single gene genetic disorder called progeria accelerates many or most signs of aging in children. About 1 in 4–8 million births are impacted by it. A number of symptoms that create anomalies in the joints, hair, skin, eyes, and face are present in those who have this illness, which is characterised by failure to thrive.

Most patients only survive until they are around 13 years old. Although the term "progeria" is frequently used to refer to Hutchinson-Gilford progeria syndrome specifically, it is technically applicable to all disorders with symptoms of accelerated aging. A small face, thin lips, a small chin, and projecting ears are some of the notable facial characteristics that children with HGPS develop. Progeria can affect a child physically, but it has no effect on their motor development or intellectual growth. People with HGPS are more likely to have neurological and cardiovascular conditions. A point mutation in the lamin a protein-encoding gene is the root cause of HGPS.

Werner Syndrome: Another single-gene genetic disorder is Werner syndrome, commonly referred to as "adult progeria." A wrn gene mutation is the cause of it. In the US, it affects roughly 1 in 200,000 persons. This syndrome first manifests in adolescence, inhibiting puberty-related growth in the affected individuals.

The four hallmarks of Werner's syndrome include scleroderma-like skin abnormalities, cataracts in eyes, small stature, and early greying and hair loss. Usually, a person's voice, skin tone, and hair colour change once they reach their twenties. A person with this illness has a 46-year life expectancy on average. The way that the torso, arms, and legs carry weight can also be impacted by this illness.

Other progeroid syndromes: Short height, chromosomal instability, a propensity for malignancy, and sun sensitivity are all features of the uncommon autosomal recessive condition known as Bloom syndrome. The chance of getting chronic obstructive pulmonary disease and other diseases is higher in people with Bloom syndrome, who may also have learning impairments.

A homozygous or heterozygous mutation known as Cockayne syndrome causes short stature, anomalies in head size, and sluggish growth and development. The skin is impacted by the uncommon autosomal recessive condition known as Rothmund-Thomson syndrome. It is distinguished by skeletal deformities, scant hair, juvenile cataracts, and stunted growth.

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Received: 24-Oct-2022, Manuscript No. HAR-22-21458; **Editor assigned:** 27-Oct-2022, PreQC No. HAR-22-21458 (PQ); **Reviewed:** 14-Nov-2022, QC No. HAR-22-21458; **Revised:** 21-Nov-2022, Manuscript No. HAR-22-21458 (R); **Published:** 28-Nov-2022, DOI: 10.35248/2261-7434.22.11.148

Citation: Gagesch M (2022) Evolution and the Diseases of aging. Healthy Aging Research.11:148