**The Biological Theories**

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**13th/12/2020**

**Introduction**

 Biologic theories of aging addresses questions about the basic aging processes, these theories answer the questions like “How do cells age, and what makes cell age” Biological aging is described as the steady and gradual decline in functioning that begins in adulthood and winds up in death. Each of the biologic theories tries to explain a particular aspect of aging from a particular perspective.

**Genetic Theories**

 These theories talk bout how the genes play a major factor in changes that happens when getting old, one of the earliest genetic theories is the programmed theory by Hayflick in the 1960s, Hayflick says that cells are programmed to divided only 50 times in their life span, after reaching these divisions the cells stops diving, then dies, other researchers say this theory implies that the cells are programmed to show different manifestations on the systems one of these manifestations would be the cell dying after amount of time ( 70 – 100 years )

**Apoptosis theory**

 Some of the biologic theories ties the process of apoptosis with again according to these theories apoptosis is a noninflammatory, gene-driven, normal developmental process that occurs continuously throughout life. If this process is regulated right then its beneficial for the body because it can regulate and maintain the cells that should stay alive or the cells that should die, this theory says that when aging or at a certain age apoptosis is not regulated anymore which leads to systems failing leading to death

**Immunological Theory**

The immune system is built to decline with time and aging, and for that with time the human body becomes more susceptible to infections, viral infections and more thus aging and death occurs, its documented that the immune system effectiveness peaks at puberty and gradually starts declining. For example, as one grows older, antibodies lose their effectiveness, and fewer new diseases will be combated effectively by the body, that causes cellular stress and ultimate death.

**Wear and tear theories**

 In the late 1880s, August Weismann suggested that normal somatic cells were defined in their capability to duplicate and work and that death happens due to worn-out tissues that cannot forever renew themselves, in this theory the body can work properly until its worn out can not renew themselves, some parts could be repaired or replaced but eventually our bodies can no longer function well due to the built up wear and tear.

**Free radicals’ theory**

This theory, that was initial introduced by Dr. Gerschman in 1954, however was developed by Dr. Denham Harman  proposes that superoxide and different radicals cause harm to the organic compound parts of the cell, giving rise to accumulated damage inflicting cells, and eventually organs, to prevent functioning. The macromolecules like nucleic acids, lipids, sugars, and proteins are prone to free radical attack. Nucleic acids will get extra base or sugar group; break in a single- and double-strand fashion in the backbone and cross link to other molecules. The body will possess some natural antioxidants in the form of enzymes, which facilitate to curb the harmful accumulation of those free radicals, without which cellular death percentages would be greatly high, and leads to lowering in the life expectancies . But some new experiments results show a different idea from what the original proposal offers, these results say that reactive oxygen species signalling is probably the most critical enzyme/gene pathway responsible for the evolution of cell.

**Cross-linkage Theory**

Crosslinking is damaging to the tissues and involves loss of elasticity, reduced swelling capacity, increased resistance to hydrolases and probable enzymes generally, and therefore an growth in molecular weight and a tendency toward embrittlement. There is a growing amount of direct evidence and much indirect evidence for postulating the relationship between crosslinking and aging. Crosslinking agents present within the living organism include aldehydes, lipid oxidisation products, sulfur, alkylating agents, quinones, complimentary radicals induced by ionizing radiation, polybasic acids, derivatives and polyvalent metals. The latter four sorts of compound are slow‐acting but can also accumulate in the body to create a frozen metabolic pool. decent amounts of of these potential crosslinking materials are present in the body to make the changes of aging unavoidable.

***Pros & Cons***

The biological theories are set to inform about how any why aging happens, it can give us an insight that would help us better the process of aging and death, most of the theories relies on explaining what happens to the cells and organs of the body whether it was from its DNA structure and how its programmed, or from the durability of the cell/organ. Knowing this information helps us to find methods and ways to prevent fast cell aging or wearing out rapidly. However, since the biological theories studies the effects of genes on aging, exploring these theories would be expensive and cost full, and it would not be accurate due to the limited experiment on animals.

**Nurses Role.** Nurses should help older adults understand how dieses happen to them, and why aging could be a good reason of why these diseases happen to them more than other, understanding modifiable risk factors would give higher chances of passing the diseases without any complications and to promote healthy aging among the older adults by basing the care on a holistic aspect and use studies and theories, to minimize and prevent the side effects of aging, and that’s what these theories are here for to help us with.

***Conclusion*** Overall, aging affects all living beings and creatures, and it’s a natural unavoidable process and it will lead to the higher chance to get infected with diseases. And to explain these multiple theories of aging are proposed, at the moment there is no agreement on this issue. several of the proposed theories act with one another in a very complicated way. By understanding and testing the old and new aging theories, it's going to be potential to promote flourishing aging as well as to enhance the life of mankind.

**References**

Bjorksten J. The cross linkage theory of aging. J Am Geriatr Soc. 1968;16:408–427

Rozemuller AJ, van Gool WA, Eikelenboom P. The neuroinflammatory response in plaques and amyloid angiopathy in Alzheimer’s disease: therapeutic implications. Curr Drug Targets CNS Neurol Disord. 2005;4:223–233

Harman D. Aging: a theory based on free radical and radiation chemistry. J Gerontol. 1956;11:298–30

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