شبكة المعلومات الجامعية

بسم الله الرحمن الرحيم

شبكة المعلومـــات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

﴿ قَسَـــم ﴾

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأفلام قد اعدت دون آية تغيرات

يجب أن

تحفظ هذه الأفلام بعيداً عن الغبار

في درجة حرارة من 15 – 20 مئوية ورطوبة نسبية من 20-40 %

To be kept away from dust in dry cool place of
15 – 25c and relative humidity 20-40 %

بعض الوثائق الأصلية تالفة

بالرسالة صفحات

لم ترد بالأصـــل

Alteration of Antioxidant system by Aging in Rats

Thesis

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By

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Contents

INTRODUCTION

AGING

Aging and senescence are terms which are frequently used without much more care as to their meaning [1]. Strictly, senescence in animal biology is the post-reproductive phase of the life span and might be very variable for male and female [1]. Aging, however, implies a decreased viability and/or increased vulnerability to stress which may be internal or external; aging has also been defined as a decreased ability to maintain homeostasis [1]. Most authors use the term aging as a general term to include all periods in the life history. Senescence, on the other hand, usually refers to the post-maturation physiological deterioration; both terms are imprecise [2].

THE WORLD HEALTH ORGANIZATION (WHO) REGARDS: 45-59 years as middle age, 60-74 years as elderly, 75-89 years as old and 90 + years as very old [1]. Hippocrates classified aging differently in that up to 70 years is the spring time of old age, 70 –75 years is green old age, 75-80 years is real old age, 80-90 years ultimate old age, and 90 + senility [1].

Aging is a physiological process, which takes place at the cellular level. It starts at the onset of life and terminates only by death [3]. Morphologic and physiologic changes from youth through maturity to old age are continuous and affect organs at different rates and different times of life [4]. It is the whole body which must be considered in gerontology and not simply one unhealthy organ [5].

CRITERIA OF AGING :

Not all the changes that occur as an individual grows older can be regarded as strictly aging changes [1]. Many old people suffer debilitating diseases and there is much confusion as to what is a disease and what is a

part of the aging process. Perhaps, it will help to define four criteria which need to be met before a change can be regarded as aging [1].

← **Firstly**, it should be universal. This does not necessarily mean that all individuals should have the same change to the same degree. Considering natural hair colour; some individuals are completely grey at 40 years, while others do not show many grey hairs until they are 70 or over.

Nevertheless, if one waits long enough grey hairs come to all it can therefore be regarded as an aging change.

← **Secondly**, the change should be intrinsic to the organism. Ultraviolet light has different effects on the physical and chemical properties of the collagen in the skin. This is brought about because of changes in the skin collagen with age. The response to the external stimulus is altered because of the internal or intrinsic change.

← **Thirdly**, the change should be progressive and irreversible. Ideally the change should be slowly progressive and continuous and not a sudden dramatic change. In this respect occlusion of the coronary or cerebral arteries could be regarded as disease, although atheroma might arguably be regarded as an aging process.

← **Finally**, to be classified as aging, a change should be deleterious to the organism. Reduction in muscle mass, decreased number of neurons, and a decrease in cardiac performance can all be regarded as deleterious.

Aging is characterized by increasing mortality rate [2]. Mortality from various causes, including disease, increases exponentially with age, but aging is a process which is quite different from disease [2]. A well documented, but very poorly understood character of aging, is the increased vulnerability to many diseases with age [6].

The ability to respond adaptively to environmental changes reduces, and this is perhaps, the hallmark of aging; this can be demonstrated at all levels from molecule to organism [7].

THEORIES OF AGING:

There is, currently, no adequate theory of biological aging [2]. If we, really, understood more about aging, there would be fewer hypotheses about its cause. Three hundred hypotheses refer to aging of cells or aging of the organisms [1].

Different authors have used different classification systems for the theories of aging. All are useful and all have inherent difficulties. One effective way to present these informations is to group multiplicity of theories into 2 classes [1]

I. HYPOTHESES OF CELLULAR AGING :

These hypotheses assume that there is a time-dependent degradation of cellular information. If this leads to death of the cell, it can become very significant, if similar cells cannot reproduce, to cope with the loss.

They can be divided into:

(1) **ERROR THEORIES :** In general, these postulate some errors or damages in cells which either get passed on or are so catastrophic that the cells die immediately. A group of theories postulate that there is some deterioration in the information carried by the deoxyribonuclic acid [DNA] and that this error is passed on to the next generation. Damage could be from mutation, breaking or cross-linking of DNA strands. This will lead to 2 facts: the transfer of information from DNA to ribonucleic acid [RNA] is not perfect; and That protein themselves are involved with information transfer. A low level of synthesis of aberrant proteins was proposed to

lead eventually to catastrophic production of mal functioning proteins. There are several protein modifications which increase with age and accumulate within cells. There may also be changes in protein degradation.

Accumulation of errors with decreased capacity of repair results from either defects on genes or environmental insult e.g. free radicals, and age pigments. This will lead to structural changes of cells and a decline in their physiological functions.

(2) **PROGRAMMED THEORIES** : There is no doubt that some cells are programmed to die e.g. death of cells between digits in developing mammals.

Some genes are repeated many times in cells. It has been suggested that selective damage to one of these repetitive genes will result in activation of another copy. Where the last copy has been used, if the gene product is important, then the cells die.

II. AGING OF THE WHOLE ORGANISM :

This set of hypotheses concentrate on the changes in a whole tissue, or changes widely disseminated throughout the body.

(1) WEAR AND TEAR : Aging is simply due to wearing out of body parts which are non replaceable. Loss of elastin from skin, arteries, and lens is a classical example. It could be objected however that wear and tear is a result rather than a cause of aging.

(2) EXCESS ACCUMULATION of substances in abnormal or inappropriate places has been suggested as a cause of aging. Collagen is laid down between myocardial cells, amyloid is laid down in brain plaques, and

calcium may be found in media and subendothelial layers of large arteries and may predispose to lipid deposits. Again, however many of these changes may be a result rather than a cause of aging.

(3) ENDOCRINE CHANGES : Hormones are important in homeostasis, and homeostatic mechanisms are disturbed in aging. Perhaps hormone loss can cause aging changes. While some changes in the aging process can be reversed by hormone supplementation, the general patterns of aging cannot.

Plasma concentration of some hormones does not change significantly with age, but there is sometimes change in the sensitivity of receptors with age e.g., insulin receptors.

Development of these theories is the concept of neuroendocrine clock (which is entirely different from circadian rhythm). Neuroendocrine clock would control neurotransmitters and hormones which could cause homeostatic changes throughout the body. So, perhaps, aging could be controlled by biofeedback techniques.

(4) AGING AND THE IMMUNE SYSTEM : This hypothesis bridges the cellular and overcome all theories of aging. Damage to lymphocytes might cause formation of abnormal antibodies perhaps even against the individual own tissues. Alternatively manifestation of abnormal proteins on cell surface could stimulate antibodies formation and cells would be no longer recognize them as belonging to that individual. Aging would be viewed as an autoimmune disease.

Some diseases associated with aging is related to immunological disorders e.g. type II diabetes mellitus.