

# NEUROCEREBRAL PATHOLOGY DETERMINED BY THE PROCESS OF BIOLOGICAL INVOLUTION IN THE SEXUAL DECLINE OF THE ELDERLY - Points of view-

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*The biological process of involution modifies, first of all, the morphophysiology of cellular receptors, decreasing the intensity and quality of external stimuli perception, which, in this context, reduce their effectiveness both locally and in terms of integration and processing of information in the brain.*

*As a result, the state of erotic tension is triggered with difficulty, with negative repercussions on the sexual behavior of the elderly.*

*Cellular changes are the result of cell degeneration and destruction due to the apoptosis phenomenon, according to genetic programming for each tissue, from skin receptors to brain structures, this deteriorating process causing comorbidities.*

*In humans, the number of specialized sensory receptors located in the cephalic extremity and in the pubic region and genitals normally have a higher cerebral representation than other somatic areas. In fact, there are a multitude of erogenous zones all over the body.*

## **Keywords:**

*nuclear receptors, hypogonadism, nervous impulse, protein macromolecules, stereospecificity, intracytoplasmatic*

**The plurietiological hyposexuality of the elderly man** is accentuated by the biological process of involution, which gradually reduces the number of hormone receptors, and the morphofunctional alterations of the cellular structures involved in determining the state of arousal decrease the sensitivity of cellular receptors, both at central and peripheral nervous level.

This aspect is pathognomonic in the glans penis and, respectively, in the vulva, which, normally, through their structure, represent the most important sources of sensitive nerve impulses having the role of triggering and maintaining the erection, respectively the initiation of sexual intercourse.

In the elderly, the administration of sex steroids (testosterone, estrogen) without a well-defined medical justification, such as simple hypogonadism, explains the occurrence of prostate cancer or of breast cancer (in women).

So, the biological process of involution characteristic of “physiological aging” is achieved by changes in specific tissue receptors, respectively by decreasing the number and affinity of available receptors.

The sensitivity of cellular testosterone receptors is reductive (down-regulation) requiring a higher serum concentration and amount of hormones in order to obtain the previous sexual virility.

It has to be mentioned that cellular receptors are protein macromolecules, with binding sites that have stereospecificity for hormones and are located at the cell membrane (Sutterland-Nobel Prize, quoted by Coiculescu) or intranuclear or intracytoplasmic, endocrine receptors being nuclear receptors

(for fat-soluble hormones).

Histologically, the brain consists of neurons, the fundamental elements of the central nervous system (CNS) and of glial cells (astrocytes, oligodendrocytes, microglia). The weight of the brain decreases progressively with age, due to morphological changes, represented, in particular, by the loss of neurons, so that at the age of 80-90, the human brain has a weight deficit of over 100-150 grams.

Neuronal destruction begins in childhood, affecting, at first, a smaller number of cells, then an increasing number, as well as other structural elements suffer in the process of senescence, their tissular degradation negatively influencing the morphophysiology of the human body, in its entirety.

In general, the destruction of neurons in the brain is related to race and especially to the age of people, showing a higher frequency of metabolic disorders that affect the nutrition process of the nerve cells, thus causing an increased incidence of CNS diseases.

The affected neurons cannot recover. According to some authors, the recovery of the hippocampal neurons would still be possible.

“The physiological” destructions of the cortical neurons, through the process of apoptosis (programmed death), are compensated during the evolutionary beginnings of life, through the maturation and the growth in size of the remaining neurons, and subsequently, mainly, by the organization and reorganization of the neural network.

In senescence, under the action of hypoxia, the decrease of the cerebral flow is accentuated, as well as other physiological functions

suffer, respectively: the respiratory function (which reduces between the age of 20-60 years), the vital capacity decreasing by 175 cm<sup>3</sup>/sqm of body surface per year; the cardiac output diminishes after the age of 20 by 1.3% per year; also, after the age of 30, the muscle strength progressively decreases, as does the muscle tone; also, it reduces the mechanical strength of the bones reduces as well as the accommodation capacity of the lens, etc.

At the age of 75 years, the number of neurons is reduced by 10-17% in some areas, and in others, by 25%-30%, which overloads the remaining neurons and requires the intervention of certain clearing processes to carry out their activities.

The excitability threshold (the ability to capture messages) of the tactile, painful, gustatory, olfactory receptors increases with senescence, the visual and auditory acuity decreases, namely the ability to receive a signal (sensitivity), thus reducing the information processing capacity at the level of the nerve centres.

The conduction velocity in the peripheral nerves also decreases with age, being 7.5 m/s at the age of 20-30 years and 5.2 m/s after the age of 80 years.

All these influence the major decline of the sexual activity negatively and directly, especially after the age of 80-90 years, affecting especially the libido and the erection. To strengthen the explanations offered, I give the example of the penile tactile sensitivity decrease by 20-30% in male over the age of 65-70 years.

The decrease in the number of neurons and the demyelination (the myelin sheath allows ionic discharges outside the Ranvier

strangulations), which makes the transmission of nervous influx to take place by continuity and not by contiguity, reduces not only the capacity of the information processing at the nerve centres, but also the conduction velocity and the quality of the information, a context in which we think slowly and the ability to memorize decreases.

By the changes in the hippocampus, where new memories are fixed, recent data come back to our memory with difficulty, often remembering the past more easily. Let us not forget the changes that affect the glial cells that surround, isolate, support and nourish the neurons, maintain the homeostasis of the extracellular space and the pH.

Changes in the vascular communication structures that are crossed by nutrients passing to the neuron, which the astrocytes provide with the energy and the necessary nutrients for its activity, namely the electric action biopotential which plays an important role.

In the brain, especially the cortex, by the loss of neurons, "yes" or "no" answers will be harder to obtain because the signals passing through the remaining responsive neurons are much lower, and the signals not received will try to move to the paths of the other neurons.

Normally, the information arrived at the analyzer is 1,011 bits/second, and the information arrived at the nervous system is 107 bits/second.

This deficiency is even more increased as the loss of neurons is higher. The volume and the speed of information that the nervous system can process in a highly active period is 15-30 bits/second, so lower than a computer, but everything fits into normality, and to

a lesser extent in the emphasized processes of involution.

All this is due, primarily, to the information velocity that in the computer is thousands of kilometres/second, while in the nervous system it is 2 m/s, due to the complex chemical reactions occurring at each synapse.

Regarding the mistakes in the thinking process, only present in humans, unlike the computer, these are more frequent and more numerous as the neuronal level of destruction is higher.

I mention that the brain determines these mistakes, because the information processing is done randomly, in relation to the present state of the individual at that time, namely his health condition, his physiological needs, his emotional, his affective states, etc.

This explains why as we grow older we receive and transmit the endogenous and exogenous erotic excitations harder, which directly influences the qualities and the sexual behavior of the individual.

The decrease in the synthesis of Testosterone and Dihydrotestosterone, if present in the elderly, is small, so it contributes little to the decline of male sexual function. Exogenous testosterone administration does not correct sexual dysfunction disorders due to the presence of specific hormone receptors in the brain, not just peripherally.

The decrease of the sensitivity of the receptors in the brain of the sex hormone, reduces the correction possibility of the neurohormones by the feedback mechanism of the gonadotropins, changing the testicular hormones secretion, namely the sexual behavior.

The involutive process alters the neuro-

transmitters function of certain brain areas (such as the percentage of dopamine in the substantia nigra, norepinephrine in the locus coeruleus, etc.).

In this process of involution, the changes in the analyzers play an important role in reducing sexuality with the age.

Thus, in the visual analyzer, which is prevalent and the most sophisticated one, providing more than 85-90% of the information, the pupil shrinks, the lens diminishes its ability to accommodate,

The retina loses cells, the accommodation of near vision becomes difficult, limiting the perception of details, and the need for light increases by the reduction of the pupil and the changes of the eye transparent media. At the age of 80 years we need 3 times more light than the light we need at the age of 20 years, the eye adapting harder to variations in light, and we need 3 times more time to adapt to darkness than we used to need at the age of 25 years. The sight is less clear, even after the adaptation process, and the ability to distinguish colours is reduced.

All these decrease the intensity and the quality of the erotic visual stimuli excitations which reduce the intake of information and change the sexual behavior.

Hypoacusis, a characteristic of old age, decreases the sensitivity to sounds at high frequencies, making the decoding of words, and the perception of stimuli, in our case the erotic stimuli, more difficult.

In this context, the auditory system, which does not have many nerve fibres (about 25.000), because of the degeneration of the ciliated cells, just like the loss of neuronal population, especially from the spinal ganglion

reduces the qualitative potential of sexuality, causing a more difficult reach of the erotic state, because in the auditory cortex of the superior temporal gyrus towards the insular cortex region the image of pronounced words is formed harder.

The involution processes also affect the smell and tactile senses, having the same negative effects over time on the sexual life of the elderly.

The cardiovascular involution changes add up to all these manifestations, where the hypoxic disorders determine, among other things, mental confusion, lipotimic states, delirium, loss of consciousness.

Lungs, bones, joints etc., suffer changes that lower the biological potential of the elders and their interest in sexual life, some not being even able to achieve it. The situation is somewhat paradoxical because the real libido, of lower intensity is yet maintained, and the effort to maintain sexual relations is rewarded by the relief of symptoms of certain chronic or intercurrent existing diseases.

The involutive changes determine increased irritability, fatigue and depressive moments with adynamia, mental instability, yet reduced by the sexual intercourse.

The decline in sexual activity manifested clinically by the decreased libido, the erection, the copulation, the reduction of seminal fluid released, and by the orgasm, is the result of certain complex biological factors, especially of the decrease of androgens in the serum and the urine, obviously after the age of 40 years and accentuated while aging.

This led initially to the treatment of old people with testicular extracts from animals (Brown- Séquard) getting a good momentary

potency and increased mental activity, but which caused prostate cancer in time. This example specifically sets the use of testosterone in the treatment of sexual dysfunction.

At the same time, decreased sexual potency in young people, with normal levels of testosterone, proves that the sexual decline is not only determined by testosterone, but also by other factors, such as the decreased sensitivity of the receptors in the brain, the reduction of the correction factors of neurohormones and neuromodulators, an increase of the excitation threshold of the tactile receptors, a decrease of the conduction velocity of the central and peripheral nervous impulse, a decrease of the cerebral vascular flow that causes hypoxia, etc. – all requiring an accurate diagnosis and an appropriate treatment.

The phenomena of involution comprising the cerebellum, determine changes in the voluntary movements accuracy and reflexes, balance (flocculonodular lobe) and muscle tone, obvious in people aged 50-60.

In view of all these changes in the complex process of involution, we will understand why, while aging, the potency is reduced, and also the ability to perform a sexual intercourse, and that the only improvement of these deficiencies is a comprehensive treatment that includes, first of all, healing diseases, some of which often have as an onset symptom a sexual dysfunction, changing nutrition and lifestyle, and not the administration of a tablet of “erection”.

Incidentally, self-treatment explains many accidents, some even resulting in death.

### **Conflict of interest**

The author has no conflict of interest to declare.

## References

1. V. Nițescu, Treaty of Clinical Sexology, The Publishing House of the Romanian Academy, 32- 38, 2018.
2. V. Nițescu, Totul despre sexualitatea normală și patologică, 80- 81,86- 88, ISBN 973-692-055-0, Ed.Muntenia, 2004.
3. R. Benson: Current Obstetrics Gynecology diagnosis & treatment, 2nd edition, 26, 1978.
4. A. Guyton & J.Hall Tratat de Fiziologie a omului, Ed.Medicală Callisto, 2007,1023, ISBN(13) 978- 973-87261-4-7.
5. J. S. Berek: Berek and Novak's Gynecology 15th Edition, ISBN: 9786068043159, Editura Medicală Callisto, 2015.
6. Vasile Nițescu: Decline of Sexual Function in Men Between Physiological Senescence and Plurietiological Hyposexuality - Part II-, Journal of Clinical Sexology, Vol.3, No.3 89-103, DOI:10.37072/JCS/2020.03.01 ISSN Online 2668-0394, 2020.
7. Vasile Nițescu: Analyzers' pathology caused by the process of biological involution (senescence) - the cause of the sexual decline of the elderly, Vol.3, No.4,135-143, DOI:10.37072/JCS/2020.04.01
8. M. Coculescu: Neuroendocrinologie Clinică, 293, Ed. Științifică și Enciclopedică, 1986.
9. J. X. Pan, R. M. Lechan, H. D. Lin: Endocrinology, 116, 4, 1663, 1985.