

Anesthesia and Quantum Diversity Mechanism in Neurodegenerative Diseases. Review

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Abstract

As the population ages, dementia is skyrocketing, becoming the fifth largest cause of death in the world. Alzheimer's disease accounts for about 70 percent of these cases, but we don't know what causes it. Parkinson's disease is the second neurodegenerative disease after Alzheimer's disease. The cause of degeneration is not known and the disease is incurable. In studies on photosynthesis, smell and magnetic direction detection in migratory birds, it has been shown that the laws of quantum physics can operate in biological structures. Quantum physics is involved in the normal functioning of the brain and painful brain conditions such as dementia neurodegenerative diseases can be explained by quantum physical pathology. The dynamics of proteins in the cytoskeleton of a neuron is controlled by quantum forces called van der Waals-London forces-the forces of intermolecular and interatomic interaction with energy. Structural-morphological changes in the brain in these diseases have in common a dysfunctional neuronal behavior, but clinic of pathology is different depending on the localization process in the brain [17]. One of the basic principles of the quantum effect is the inability to understand the properties of a living system without changing it, affecting a complex of therapeutic and non-surgical methods We must find ways to prevent postoperative cognitive impairment, rather than treat them.

Keywords: *Neurodegeneration; Cognitive Impairment*

Introduction

As the population ages, dementia grows rapidly, becoming the fifth largest cause of death in the world. Alzheimer's disease accounts for about 70 percent of these cases, but we do not know what causes it (Figure 1) [1]. A condition that leads to progressive memory loss and cognitive dysfunction. It is known that this leads to the accumulation of two types of proteins - called amyloid and tau in the brain. Chronic conditions that alter or damage nerve cells and synapses involved in cognition are the biological basis of Alzheimer's disease. Currently, there are no effective treatments to prevent or reverse neurodegenerative diseases of aging. An increase in life expectancy leads to an increase in the number of elderly people suffering from this pathology.

Parkinson's disease affects more than 1 percent of the world's population and is the second neurodegenerative disease after Alzheimer's disease and affects more than 6 million people in the world. [2]. Severe tremor, rigidity, hypokinesia, postural instability, as noted, is associated with degeneration of the nigra (substantia nigra). Due to lack of knowledge, AD treatment is aimed only at inhibiting and reducing neurodegeneration in nigrostriatal neurons (neuroprotective therapy) and normalizing biochemical imbalance (symptomatic

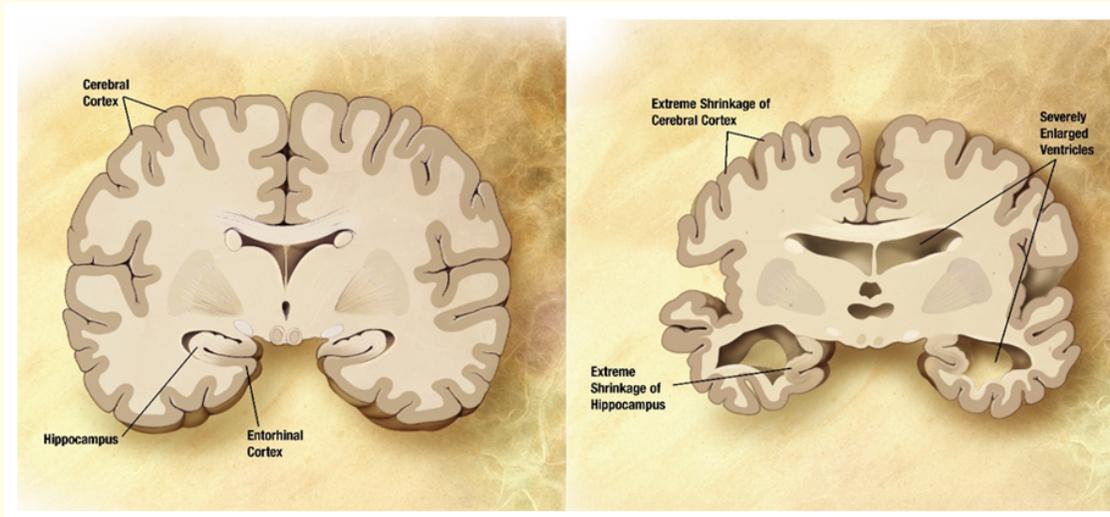


Figure 1: Alzheimer's disease (norm and pathology) [1].

therapy). The cause of degeneration is not known and the disease is incurable. Thus, all of the above ideas and hypotheses should be deeply studied and scaled as another (and not the only true) mechanism for the development of this pathology.

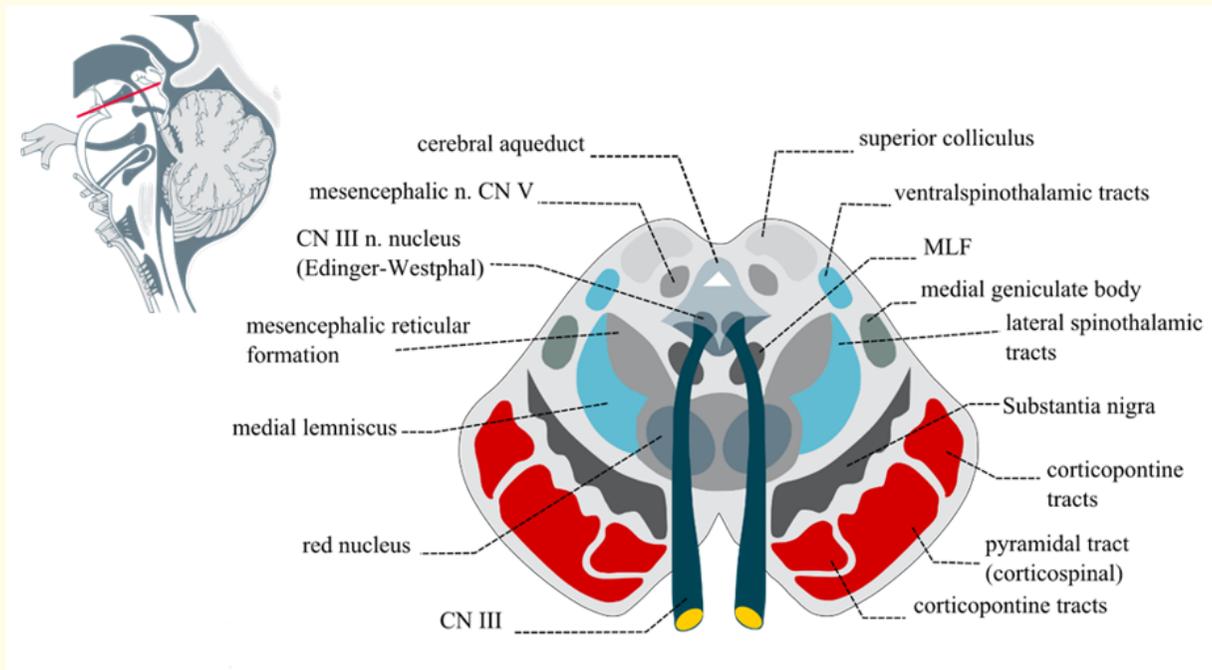


Figure 2: Rice number 2. Parkinson's disease (degeneration of the "nigra").

Anesthesia is one of the greatest miraculous pharmacological discoveries in the world, selectively and reversibly blocking consciousness, while preserving the unconscious brain activity that allows for modern anesthesia and surgical operations. However, the mechanism by which anesthesia works, and how the brain produces conscious experience, remains unexplored. The nature of consciousness and its origin in the brain and its final place in the Universe are unknown. In the mid-1990s, it was suggested that consciousness depends on biologically “organized” coherent quantum processes in the cytoskeleton (microtubule) of brain neurons, that these quantum processes correlate with and regulate neural synaptic and membrane activity. Understanding anesthesia can help explain consciousness and vice versa. At a more practical level, the discovery of mechanisms of anesthetic action can help in making clinical decisions (for example, choosing an anesthetic in patients with neurodegenerative diseases), lead to new anesthetics and reduce the risk of postoperative cognitive dysfunction (POCD) [3].

The topological structure of the human brain changes throughout life, with age, first of all, a decrease in its volume and mass occurs, which causes smoothing of furrows and convolutions, expansion of subarachnoid spaces and ventricles, determined during neuroimaging studies of the brain.

The thickness of the cortical and subcortical layers of the brain can vary within one year by 0.5 - 1.05%, which is accompanied by a decrease in the number of synaptic connections and modules of neurons, including those responsible for the control of cognitive activity, and, accordingly, a decrease in interneuronal contacts and connections [15]. Research data demonstrate a decrease in the total number of neurons in certain cerebral regions by 45% by the age of 90 [4,5].

With normal aging, certain features of the human cognitive sphere are observed: slowing down the reaction rate, processing information and the pace of activity, more fatigue, slower learning of new skills and reduction of the so-called “moving” intelligence - the ability to solve problems without relying on existing knowledge or experience [5]. With age, there is a decrease in the amount of RAM, certain problems when learning and remembering current information, some rigidity of thinking or difficulty when changing the program of ongoing or planned actions. Slowing the pace of cognitive processes in people in the elderly and senile age also leads to a decrease in integrative creative abilities. Possible mechanisms underlying the age-related changes in cognitive functions in humans are a decrease in the level of energy supply for integrative and mental activity and the predominance of inhibitory processes in cerebral activity, the nature and degree of which are quite variable. The presence and duration of hypertension contribute to the formation of subcortical and periventricular leukoariosis. Moreover, even an episodic increase in blood pressure (BP), including during sleep, is accompanied not only by the development of leukoariosis, but also cerebral atrophy [5,8]. Available data indicate the importance of identifying and subsequent treatment of vascular risk factors for cognitive deficiency (KN), which reduces the risk of dementia in the elderly and senile [9,10], with particular attention being paid to adequate correction of blood pressure, which prevents further development of leukoariosis and cerebral infarction.

Cognitive, or cognitive, functions are the most complexly organized functions of the brain, with the help of which the process of rational cognition of the world takes place and targeted interaction with it is ensured. One of the factors determining the degree of cognitive and neuroplastic potential and providing learning and memory processes is the adequate functioning and plasticity of synapses in the structures of the central nervous system (CNS) [11]. Therefore, it is not surprising that a significant loss of these neuronal formations during aging and diseases of various etiologies (primary degenerative, including Alzheimer’s disease, vascular, viral, traumatic, etc.) can be clinically expressed by the development of neuropsychiatric syndromes. In particular, in Alzheimer’s disease, the loss of synapses is closely correlated with the severity of a cognitive defect. Chronic conditions that alter or damage nerve cells and synapses involved in cognition are the biological basis of dementia. Currently, there are no effective treatments that prevent or reverse the underlying disease process for the most common neurodegenerative aging diseases that cause dementia.

Goal of the Study

How structural and functional relationships change in cognitive impairment (CI) and neurodegenerative diseases during anesthesia, contributing to loss or impairment of consciousness in the postoperative period.

Quantum brain theory: In the everyday, “classical” world, the physical laws of Newton and Maxwell accurately and logically predict the behavior of objects and energy. However, at the microscale (for example, at the level of atoms and subatomic particles) the laws of quantum mechanics seem strange and paradoxical. There are two different realities, “classical” and “quantum” but how are they related? Quantum phenomena were phenomenally incomprehensible to many. The first is wave-particle duality, in which light can act as particles, and particles, such as electrons, are similar to light waves. The wave function is considered nothing more than a tool for predicting the results of observation and does not look like reality [12].

This theory, put forward by Bohr and Werner Heisenberg in the 1920s, argues that physical systems have only probabilities and not specific properties until they are measured. Bohr argued that we can only have prior knowledge of the system: in Schrödinger’s thought experiment, the cat in the box is both dead and alive until they see it. Quantum theory had the strangest origin: “There is no quantum world. There is only an abstract quantum physical description” [Niels Bohr].

Studies on photosynthesis, smell, and detection of magnetic directions in migratory birds have shown that the laws of quantum physics can act in biological structures. Quantum physics is involved in the normal functioning of the brain and painful states of the brain, such as Mr. Alzheimer’s dementia, Mr. Parkinson’s dementia can be explained by quantum physical pathology, and the diseases themselves can take on the most bizarre forms of quantum behavior. The fundamental laws of physics provide an answer to this question - quantum diversity in these diseases. Late stressors include voluntary or forced retirement, chronic illnesses, decreased cognitive abilities, loss of independence, and bereavement. These may include genetic changes, inflammatory processes, or problems with the transmission of messages between brain cells - this is the essence of quantum diversity. An increase in life expectancy leads to an increase in the number of older people suffering from these diseases.

The dynamics of proteins in the cytoskeleton of a neuron is controlled by quantum forces called the forces of Van der Waals-London (Van der Waals forces) - the forces of intermolecular (and interatomic) interaction with energy. Quantum effects begin where the neuron connects to the synapse and where the quantum vibrations of protein polymers inside the neurons of the brain that control the synapses [16]. This work is regulated by complex control mechanisms, release of the mediator and its reuptake by the presynaptic membrane. The process of neurodegeneration leads to microvascular and metabolic changes and to structural degeneration, part of the neurons.

General anesthetics interact with quantum particles in addition to classical ones. Anesthetic molecules disrupt the transfer of energy, and their kinetics are rearranged during anesthesia against the background of a neurodegenerative process. Structural and morphological changes in the brain in these diseases have a common feature of dysfunctional neuronal behavior, but the clinical manifestations of the pathology and the name are different, depending on the localization of the process in the brain. These diseases live in uncertain quantum states like the notorious Schrödinger cat (both “living” and “dead”). One of the basic principles of the quantum effect is the inability to understand the properties of a living system without changing it, acting on a set of therapeutic factors and neuroimaging.

This opacity of quantum influence is not the brain obvious. Science, for example, shows us only the structure of the physical world, and not its internal property. She, for example, explains what the mass is responsible for, but does not answer the question of what it is in itself.

Gravity We know what she does, but we don’t know what it is.

We do not understand how a quantum signal flows - this is a mystery of the brain. Seeing it is about how to photograph the line of sight shared by two people in a crowd. It is possible to observe a certain signal. But what mechanism leads to the possible appearance of this effect, we do not know. It’s like sex, the voice of nature, but we don’t know its language.

Because the neuronal cytoskeleton is extremely complex, it is not surprising that a striking number of neurodegenerative disorders (including, but not limited to, Alzheimer's disease, Parkinson's disease and Huntington's disease) share a common feature of a dysfunctional neuronal cytoskeleton. It has been proven that there are links between anesthesia, postoperative cognitive dysfunction and exacerbation of neurodegenerative disorders [16].

During anesthesia at the cellular level, energy-generating organelles, mitochondria, are disabled. This causes apoptotic or excitotoxic neurodegeneration caused by the launch of mitochondrial-dependent, trophic and metabolic factors of the brain. Perhaps this is the only complete model and hypothesis that can explain the mysterious properties of the occurrence of degenerative processes in the brain during anesthesia. The main neuroimaging sign of degenerative brain diseases is a progressive atrophic process, localization, the nature and degree of which depend on the nosological form and severity of the disease.

Marked by acute temporary confusion, disorientation and/or agitation, postoperative delirium is the most common postoperative complication in older people, affecting up to half of adults over 65 who undergo such risky procedures as cardiac surgery or hip arthroplasty. Postoperative delirium is also closely associated with Alzheimer's disease. Although each may occur independently, Alzheimer's disease is a leading risk factor for delirium, and an episode of delirium puts patients at an increased risk of cognitive decline and Alzheimer's. However, the physiological mechanisms linking delirium and Alzheimer's disease remain largely unknown. The practical significance of the concept of POCD consists precisely in the early diagnosis of risk factors for the development of cognitive disorders, determining the initial state of mental functions of patients and the early initiation of neuroprotective treatment [13,20].

The role of quantum rearrangements and the effect of anesthesia on the functional structures of the central nervous system.

None of the theories of anesthesia proposed by pharmacologists is able to exhaustively explain all the observed effects of general anesthesia and, therefore, the mechanisms of its development. First of all, with the improvement of preparations and methods, the idea of the components (components) of anesthesia has become firmly established, the main of which today include sleep (hypnosis), anesthesia (analgesia), and suppression of autonomic reflexes [19].

Professor S Hameroff (USA), an anesthetist by profession, considers the human brain as a quantum computer, for which individual quantum consciousness is responsible. According to Hameroff, "microtubules" are apparatus for computing and integrating information in the brain, as well as carriers of human memory. The cytoskeleton can be considered as "quantum switches" operating within the framework of the uncertainty of quantum energy that arises under the influence of Einstein's gravitational principles. In our own brain, the process that causes consciousness connects the biology of the brain (quantum computing in microtubules) with the large-scale structure of space-time geometry (Figure 3) [14-18].

The quantum relationship between anesthesia, POCD and exacerbation of neurodegenerative disorders is one of the main problems [15]. After surgery, at least 30% of adults exhibit cognitive dysfunction two days after surgery and last up to 3 months in 12% of cases in the elderly. This is clearly problematic for patients with neurodegenerative conditions, and anesthesia has a significant effect on the progression of the disease and a decrease in cognitive ability [6].

The general principles of management of patients with cognitive impairment (CI) are the determination of the etiopathogenetic cause, nature and severity of existing disorders, reducing the degree and prevention of cognitive deficit progression, affecting vascular risk factors and, thus, improving the quality of life of this category of patients. A necessary step in the diagnostic algorithm is neuroimaging research methods (magnetic resonance imaging, multisystem computed tomography, less commonly, positron emission tomography). This allows you to clarify the localization and severity of structural changes in the brain and to detect potentially curable causes for the development of CN, for example, a tumor, hydrocephalus or subdural hematoma, which require the involvement of neurosurgeons to de-

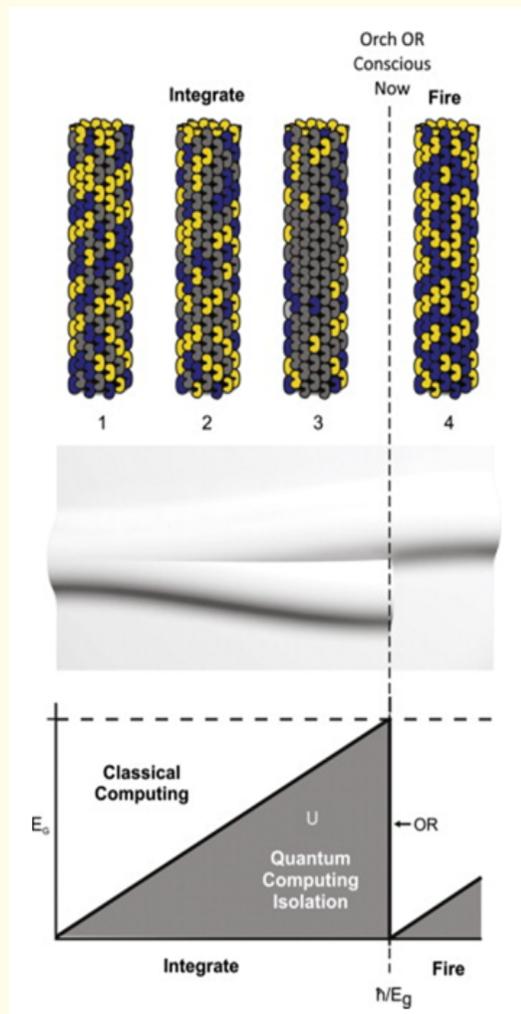


Figure 3: Quantum computing in the cytoskeleton of a neuron.

termine the tactics for further treatment of these patients. People get older these days, which is very good in principle. One hundred years ago, people died much earlier from other diseases that are now treatable, which extends our lifespan, giving age-related neurodegeneration enough time for development [20-22].

Conclusion

One of the basic principles of the quantum effect is the inability to understand the properties of a living system without changing it, acting by a complex of therapeutic and non-visualization methods. We must find ways to prevent postoperative cognitive impairment, and not cure them. Our ability to protect the brain during anesthesia in patients with neurodegenerative diseases is limited.

Our ability to exacerbate damage is truly limitless.

It is necessary during anesthesia to carefully maintain physiological homeostasis.

Despite this, we have not made much progress in understanding the quantum mechanisms of brain protection.

Understanding the molecular mechanism underlying this process is crucial.

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