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Review Article

Theoretical Functions of the Proton and Electron Pair to Mental Disorder with Biophysics

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Abstract

We think the disease not only aging, or gets worse during the aging process like degenerative diseases. Alzheimer's is a typical one, and there are many diseases not known the causes, or not clear. We must consider not only instrument like X-ray and CT scanning, but also causative agents and its mechanism with biophysics. Here we discuss schizophrenia, clinical depression, and Alzheimer's. In the viewpoint, we focus on the receptor and neurotransmitter. We regard the amino acids are arginine, dopamine, serotonin, and Gaba as the neurotransmitter and the cause. Furthermore, we propose the treatment of the disease from chemical bonding strength of the substances. The method is to use the water which can reduce the state of neurotransmitter and receptor with the pair of proton and electron in the hydrogen bond dissociated water.

Introduction

We know the remarkable development of medical treatments recently, such as Intensive Care Unit (ICU), advances in breathing equipment, intravenous hyperalimentation (IVH), chemotherapy, and immunotherapy. However, cancer, monkeypox and covid virus increase in the 21st century. Furthermore, we recognize the increment of neurodegenerative disease which come to light with the scientific development. We focus on brain which must be neurovegetative disease, although the causes are not known present. Among neurovegetative disease, Alzheimer disease, Parkinson's disease, amyotrophic lateral sclerosis (ALS) and Spinocerebellar Degeneration (SCD) are comparatively popular in the world. We understand well enough that brain is the most complex organ and control tower in a human body. We pass those that Parkinson's disease, ALS and SCD are movement disorders of skeletal muscle, in which the functions are controlled by cerebellum, and brain stem ~ spinal cord.

However, we do not offer commentary for each disease, and expect refer to the academic and technical literatures. We just limit autism spectrum disorder (ASD) [1], Alzheimer's Disease [2], and schizophrenia [3] which are neurodegenerative disease, and we are interested in the neurotransmitter, such as dopamine, serotonin, adrenaline, noradrenaline, and acetylcholine (Ach).

We explain the transmitting information mechanisms somewhat through neurotransmitter. Then, we theoretically discuss each substance of neurotransmitter with a mental disease leading to the countermeasure using the proton and electron pair of the hydrogen bond dissociated-water. We call the proton and electron pair "infoton" [4].

General aspects

From viewpoint of physiological description, "emotion" is shortly and strongly physiological response of the brain and hormone in immune system and biological materials [5]; namely, body responses and situational judging to reflect autonomic nerve, such as, sudden emotional movements of anger, fear, joy, and grief. Further, higher cognitive functions treated in cerebral cortex and prefrontal

region are involved from viewpoint of neuroscience.

Meanwhile, pathology points out to call neurodegenerative diseases, which are not to discovered the causes, namely, vascular disorder, infection, and addiction. Then, pathology identifies the mechanisms of the abnormal structural changes in the protein at the molecular level. This point of pathology must be necessary for the mechanisms of information transmittance. We consider ASD, Alzheimer's Disease, and schizophrenia at the molecular level when the substance transmits information and plays a role in the functions.

Materials for information transmittance depicts in Figure 1. We do not introduce detail work of each molecule but discuss the general play because of information movements. We refer a molecule structure to Wikipedia.

Furthermore, here is another precious substance for neurotransmitter. Some molecules involve the work of counteracting; namely, Gaba plays against dopamine to hold it. And there are eleven kinds of the serotonin receptors for central nervous system, although we do not discuss them here.

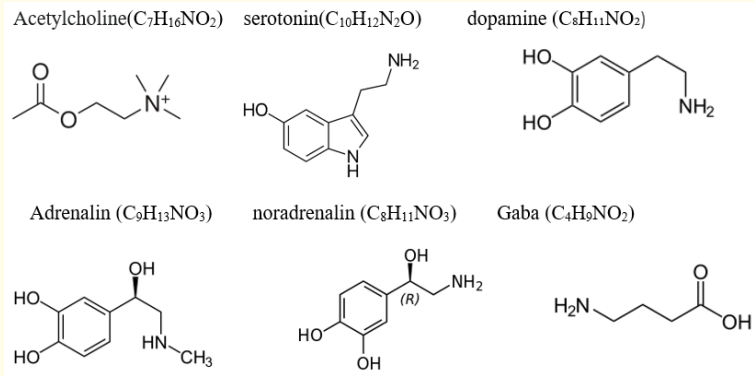

Figure 1: The typical molecules relating information transmittance.
Gaba: γ-Aminobutyric acid.

Functions of a pair of proton and electron

Our model is a concept for infoton, which is neither hydrogen atom nor ions like H^+ and e^-. We report the emitting the wave of terahertz through far-infrared (100 mirometer ~ 10 micrometer of electromagnetic wave) due to the vibration of the particle by proton and electron [6]. We discussed the infoton's stability and continuity [7, 8].

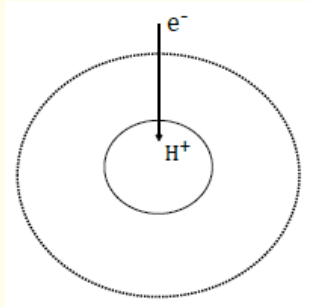

Figure 2: A pair of proton and electron.

The pair of particles plays a role in reduction (anti-oxidation), which is one of its functions in our discussion. For instance, serotonin usually accesses particular receptor, sticking together moving away for information. However, the state of sticking together remains resulting in no work as the neurotransmitter. We call this state "oxidation". Then, the pair of proton and electron plays the role of "reduction," leading serotonin moving away. Water usually moves to brain first, except for the stomach. Thus, the pair helps to the neurotransmitters function smoothly, resulting in producing the remedy for the mental diseases, the present theme.

Mechanism of remedy mental diseases

Mental diseases may associate with the treatment and transmission of information in the limbic system centered on the thalamus, hypothalamus, and pituitary. We discuss schizophrenia and clinical depression. People do not find the cause of them yet. So, here is our hypothesis. The thalamus plays a few roles, like eyesight, hearing, and somatosensory system. We assume the infoton works for the reduction between neurotransmitters and a receptor in the thalamus and hypothalamus. Meanwhile, the hypothalamus adjoining the thalamus works for body temperature control, stress response, feeding behavior, and sleep-wake rhythm.

Now, the substances in a receptor are vasopressin (VP) [9] and oxytocin (OXT) [10] which are peptide hormone. Vasopressin is an anti-diuretic hormone (9 amino acids; Cys-Tyr-Ile-Gln-AsnCys-Pro-Leu-Gly), and blood pressure elevated hormones. The molecule is arginine vasopressin which is synthesized in hypothalamus. Meanwhile, OXT is peptide hormone (9 amino acids; CysTyr-Ile-Gln-Asn-Cys-Pro-Leu-Gly) [10]. We take it function in central nervous system. The oxytocin receptor is a protein which functions as the receptor for hormone and neurotransmitter oxytocin [11, 12].

We depict the receptor molecules such as arginine, dopamine, and GABA in Figure 3.

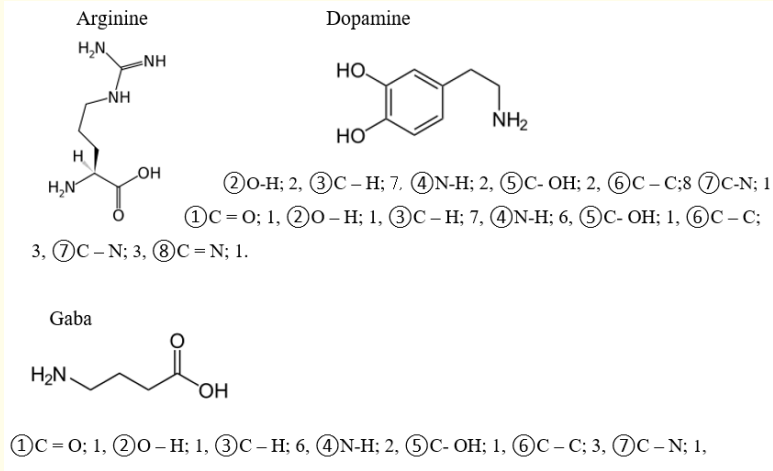

Figure 3: Top: Left; Arginine ($C_6H_{14}N_4O_2$), right; dopamine ($C_8H_{11}NO_2$). Down: Gaba ($C_4H_9NO_2$).

We regard the bonding strength of each bond in order of stronger one as an example (unit = eV); ①C = O; 8.3, ②C = N; 6.4, ③O - H; 4.6, ④C – H; 4.3, ⑤N-H; 3.9, ⑥C- OH; 3.7, ⑦C - C; 3.6, ⑧C – N; 3.2.

We can propose the following results; the number in parenthesis shows the bond amount. 1) Comparing arginine with Gaba, arginine as a receptor possesses stronger bonding, C-H (7), N-H (6) and C-N (3), meanwhile Gaba, C-H (6), N-H (2) and C-N (1).

This may be an essential property as a receptor in thalamus and hypothalamus. 2) The amino groups of N-H and C-N are the same amount, but the number of other bonds is different when we compare Gaba with dopamine. We assume the opposite function between two.

However, too strong bonds may not be good for healthy body, which we call "oxidized condition" shown in previously. Therefore, we can expect the chance of infoton leading to "reduction state".

Let's take dopamine in limbic system. We can see the positive symptom of schizophrenia, namely hallucination or fantasize.

Remedy of Alzheimer's Disease

Amyloid beta (Aβ) originates the protein formed in a brain, but why the causes accumulate in a brain have not been found yet. The protein involves about 40 amino acids [16]. After they dissociate, drained physically usually, but some of them proteins accumulate and become insoluble. They stocked in a brain as amyloid beta (Aβ). But, neither normal function of Aβ nor the cause of disease itself are clearly understood, but amyloid-beta (Aβ) protein is found in the patients as results. There are many reports and papers of Aβ [13-15], although we do not cite all of them.

Here, we develop the disease in the theoretical viewpoints. First, there is the report the interaction of insulin with Aβ in the receptor [17]. The interaction with another substance may become difficult to solve the causes and remedy. Rather than the interaction, what we introduce is astrocytes like star-shaped cells found in the brain. Astrocytes are comprised of synapses, or cell ends that allow for chemical and electrical communication between cells. Astrocytes consist of many dendrites allowing for communications from other cells to be transmitted.

The decrease of acetylcholine (Ach--$C_7H_{16}NO_2$) may relate Alzheimer's disease. Meanwhile, increasement Acetylcholine is considered outbreaking of Parkinson 'disease [18]. Although this material does not relate here, we introduce acetylcholine combines with neurotransmitter.

A shrinkage of the brain (brain atrophy), decreasing ventricles, hippocampus, and the area of cerebral cortex outbreak of neurodegenerative diseases (Figure 4).

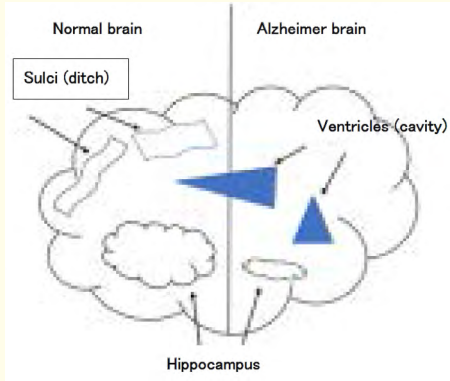

Figure 4: Normal brain and Alzheimer brain.

The secondary amine nitrogen is in the protonated NH_2^+ form under biological conditions, while the R–COOH (or R–CO_2H), with R referring to the alkyl, aryl, or other group.

The carboxyl group is in the deprotonated such as $-COO^-$ form without difficulty. But it may not happen if the infoton exists. Because, the R–COOH is in under the reductive condition.

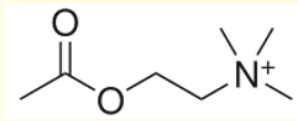

Figure 5: Molecule of Acetylcholine ($C_7H_{16}NO_2$).

Acetylcholine (Ach) is released from the ends of parasympathetic nervous and motor nerve, which is one of neurotransmitter. The Ach is supposed to be dissociated by the effect of the enzyme (cholinesterase = AChE) into choline and acetic acid, then extracted. But, nerve gas like sarin may devitalize the enzyme and Ach is not removed leading to inhibit neurotransmission.

That's where the infoton comes in to dissociate the C – N bonding to take the place of AChE.

Namely, we discuss the bonding states previously and the number of each bonding is as follows;

①C = O; 1, ③C – H; 7, ⑥C – C; 2, ⑦C – N; 4

The weakest bonding amount of C-N is more than the previous neurotransmitters.

Medical and environmental effects of infoton

Many results associating with Aβ in viewpoints of medicals have been developed with effects. On the other hand, no existence of Aβ is reported that the loss of physiology and function do not happen. For instances, activation of kinase [15], protect from the oxidized stress [19], antibacterial activity [20], cholesterol transport: a lead to neurotoxicity [21] etc. have been reported. These results are like our effects of infoton in the dissociated hydrogen bond water.

For instances, anti-oxidization for keeping foods fresh at room temperature [22, 23].

As for bacteria, we discussed the radiation reduction of contaminated soils in Fukushima with non-purple bacteria, although the theme here is different [24].

It is good that phosphorylation necessary to energy for human body may complete before Aβ oligomer [22] works, because the oligomer is the highest toxicity [23, 24]. So, it is important not to form the oligomer by activation of phosphorylation [25]. Furthermore, we must be careful with accumulation of the amyloid in the blood vessels and walls, namely, cerebral amyloid angiopathy. Especially, we need a special care that the Aβ protein accumulates in central nervous system and meninges. Three films from skin, dura mater, arachnoid mater, pia mater have overlapping layer on the born for protecting brain and spinal cord. This is one of cerebral amyloid angiopathy (CAA) [26, 27].

CAA occurs by amyloid protein, which relates to Alzheimer's disease. Cerebral hemorrhage can be often seen in some patients of Alzheimer's disease [28, 29].

But cerebral apoplexy appearing in high blood pressure is a little different since hemorrhage (bleeding) of CAA is usually located in a special cerebral lobe [30, 31].

Finally, this is our third report of the medical evidences with results of infoton in daily life including omicron virus [32, 33].

Conclusion

Considering mental disease, we discuss schizophrenia, clinical depression, and Alzheimer's in which clear causes are not found. In the viewpoint, we focus on the receptor and neurotransmitter. We regard the amino acids are arginine, dopamine, serotonin, and Gaba as the neurotransmitter and the cause. Furthermore, we propose the treatment of the disease from chemical bonding strength of the substances. Our precious conclusion is to reduce the state of neurotransmitter and receptor with the pair of proton and electron in the hydrogen bond dissociated water. We will challenge another amino acid like phenylalanine, tryptophan, methionine, and asparagine which possess different structure.

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