ISSN: 2573-9514

Research Article

Journal of Addiction Research

The Essence of Consciousness Revisiting the Neural Structural Features in Human Conscious Flow

Yao Wu*

Tongji University, Canada.

***Corresponding Author**
Yao Wu, Tongji University, Canada.

Submitted:2023, Jun 02; Accepted:2023, June 21; Published: 2023, June 26

Citation: Wu, Y. (2023). The Essence of Consciousness Revisiting the Neural Structural Features in Human Conscious Flow. *J Addict Res, 7*(1), 32-38.

Abstract

No matter when or from which direction a neural signal is transmitted, the neural signal expression of a neuron within a neural region is unique. This unique neural signal expression is determined by the nature of the neuron, which is determined by the neurotransmitters it secretes. In the nervous system, the particlization process of neural signals can create structural relationships between neurons within a neural region. Within a neural region, the extreme combinations of the particlization process of neural signals from different neurons generate consciousness.

The specific and non-specific neural tracts together form a reflex cross-section composed of the neural structures within the thalamic reflex pathway. The neural structures that make up the thalamic reflex cross-section are easily controlled by the thalamus, affecting the neural activity of various neural structures within the entire cerebral cortex, and forming neural reflex responses throughout the cerebral cortex.

Keywords: Nature of Neurons, Neural Signals, Neural Information, Consciousness, Particlization Process of Neural Signals, Neural Reflex Cross-Section

1. Introduction

I.1. On the Issue of Tracing the Origin of Neural Signals

Fundamentally, the problem of tracing the origin of neural signals is a core issue, which is at the heart of the essential problems in the working principles of the human nervous system. A person's nervous system may have over 80 billion neurons, with the potential for more than tens of trillions of synapses at their interconnections. The possible permutations and combinations among these tens of trillions of synapses probably exceed the limits of all large numbers in the universe. Thus, in reality, it is impossible to trace the origin of a neural signal on a single neuron. One cannot arbitrarily control each synapse on their body to form neural responses; such a neural mechanism does not exist. There should not exist a set of mathematical formulas in this world that could edit all synapses in the human nervous system, enabling humans to achieve neural functions through the editing of each synapse.

On the other hand, if it is possible to trace the origin of a neural signal on a single neuron, this viewpoint is indeed contradictory to the facts of neuroanatomy. We know that almost all neurons have several dendrites, and there are even more synapses on these dendrites to receive neural signals. However, each neuron only has one cell body and one axon, and the changes in action potential frequency on the axon may not necessarily have a one-to-one logical relationship with the changes in neural signals received post-synoptically. The pre-synaptic structures on the axon of a neuron passively accept neural signals transmitted from the axon without any ability to actively respond. The transmission of neural signals along the axon is a passive process, and the neural signals transmitted from the axon to all presynaptic structures cannot be edited or changed.

If the neural signal transmitted by the presynaptic structure is passive, then the neurobiological significance of changes in synaptic vesicles released by the presynaptic structure into the synaptic cleft is also limited, including changes in the postsynaptic structure. I can't imagine a scenario where slight changes in the frequency of action potentials on a single axon could accurately modulate changes in the release of synaptic vesicles, and in real time affect the absorption post-synoptically. In this process, the transmission of neural signals cannot be rigidly unique; the changes in the synaptic cleft and postsynaptic membrane are plastic and gradual, and the speed of biological changes should not be able to keep up with the speed of signal changes. The enhancement of the electrical signal in the presynaptic structure leads to plastic changes in the postsynaptic membrane structure, which merely alters the transmission of electrical potential between the pre- and post-synaptic structures over a certain time scale. While these changes can induce alterations in the excitability of the next level of neurons, they cannot change the biological characteristics of these neurons. It is the neurons themselves, not the synapses attached to them, that express neural signals in a neural region. It is a fundamental issue for a neuron to perform its own biological function in the nervous system, otherwise the myriad types of neurons would be meaningless to the human body. The brain's control over synapses is passive, and there is no neural structure in the nervous system that can specifically constrain the behavior of each synapse.

The neural mechanism for constraining synapses is passive, and the brain exerts control over synapses by regulating neuronal excitability. A single synapse may undergo changes in connection strength, but it is unlikely to completely influence the excitability of the next level of neurons. Each neuron is like a large tree with numerous dendrites, each of which hosts an even larger number of synapses. The connections between these synapses and the synapses of the previous level of neurons are incredibly complex. It contradicts reality to imagine that a single synapse can result in the production of a complete action potential in the next level neuron. The excitatory action potential of a neuron is the result of a group of synapses being stimulated, and these synapses triggering the post-synaptic potential may come from different neurons. The combination of these post-synaptic potentials determines the excitability of this neuron, and they cannot change the biological characteristics of this neuron. In the nervous system, synaptic plasticity is the result, not the cause, of neurogenesis. All the synapses of a neuron cannot form structural relationships or connections with each other. Similarly, different neuronal synapses cannot form structures and connections with each other. All synapses are isolated from each other and cannot form any form of editing function for neural signals. This is an indirect neural mechanism, and it is impossible to generate additional neural response capabilities.

Not all synapses on a neuron's dendrites generate neural signals of the same electrical strength at a specific time, which is entirely different from how presynaptic structures on an axon receive neural signals. If this viewpoint is confirmed, the neural signals received by the synapses on a neuron's dendrites at different times are indeed different and can vary. At a given moment, the combined postsynaptic potentials of a neuron form the neural signal, rather than all of the neuron's postsynaptic structures simultaneously forming a uniform potential to create a neural signal. However, a neuron has only one cell body and one axon. Neuroscientists would need to identify diverse responses from different neuronal bodies and axons to handle the differing combinations of postsynaptic potentials coming from the same neuron's dendrites at different times. I believe this would be an impossible task, let alone allowing the axon to fully express the variations in these combinations of postsynaptic potentials at different times, while simultaneously transmitting these changes in neural signals to the next level of neurons.

On a single neuron, a group of postsynaptic potentials forms the neural signal, while the presynaptic structure receives neural signals in a simultaneous and balanced manner. The way neural signals are transmitted in these two different parts of a neuron is not the same. In the pre-somatic part of a neuron, the neural signal is formed by a combination of postsynaptic potentials. On the axon, if the expression of the neural signal is determined by the frequency of action potentials, then how much capacity does a neuron have to match the completely different neural signals expressed in these two parts one-to-ones? Thus, a neuron has many dendrites and even more synapses transmitting neural signals to the cell body and axon, while a neuron only has one cell body and a single axon. This implies that the method of neural signal transmission before and after the cell body in a neuron is asymmetrical. In a neuron, the propagation of neural signals is unidirectional, ultimately conveyed from the axon to the next level of neural tissue. Therefore, the method of neural signal transmission in a neuron is ultimately defined by the axon. If the neural signals received by a neuron can be traced back and distinguished, but the neural signals transmitted through the axon are consistent and indistinguishable, then there is a flaw in the logical structure. A neural signal is just a neural signal; the generation of neural signals before the cell body stimulates the biological characteristics of the neuron, while after the axon hillock, it merely transmits the neural signal.

For any given neuron, there is only one axon, meaning that each neuron can only have one neural response. The function of the axon is purely to passively transmit electrical signals to all presynaptic structures. Therefore, from a neurobiological perspective, the response mechanism of neural signals on the axon is singular; it cannot undertake additional tasks of editing and expressing neural signals. In my previous paper, I joked that the axon is a 'trash bin' for the excitatory potentials of neural signals. In fact, this is indeed the case. Speculating about special neural functions on the axon is a meaningless endeavor. Changes in the frequency of neural impulses cannot change the nature of a neuron. This holds true whether we are talking about the neuron that generates the neural impulse or about influencing the neural activity of the next level of neurons. The biological characteristics of a neuron determine its expression of neural signals within a neural region, not changes in the frequency of neural impulses. In fact, people will one day understand that distinguishing different neural impulse signals on a neuron is meaningless. The enhancement of the frequency of neural impulses merely indicates the strengthening of this neuron's function within the neural region. The enhancement of a neuron's own biological function within a neural region due to the increase in the frequency of neural impulses allows the neuron to participate in the formation of neural information within the region. This is fundamentally different from a neuron editing neural signals through changes in the frequency of neural impulses. Neurons are not signal generators; they cannot produce aimless neural signals to confuse extraterrestrial life.

A neuron has only one soma (cell body) and one axon, but it may have several dendrites, with potentially even more synapses connected to the dendrites. With the neuronal soma as the boundary, the mode of neural signal transmission before and after the soma is different. However, the neural signals are ultimately transmitted by the axon. The mode of neural signal transmission in a neuron is ultimately defined by the axon. (Image source: Google)

On a single neuron, changes in neural signals cannot alter the biological nature of this neuron. Therefore:

Regardless of the time or the direction from which the neural signals are transmitted, the signal expression of a neuron within a neural area is unique. This unique neural signal expression is determined by the nature of the neuron, which is in turn determined by the neurotransmitters it secretes.

1.2. On the Cerebral Cortex

In the previous article, I mentioned three concepts: neural signals, neural information, and consciousness. In the previous paper, I did not differentiate between these three concepts. The editor raised this question, so now I will describe the differences between these three concepts:

1. The electrical signal running on a neuron is a neural signal. Except for some special neurons, the electrical signals transmitted between neurons through synapses have no neurobiological significance.
2. At a certain specific moment, when some neurons within a neural region are excited, a specific neural structure is formed between these excited neurons, which I define as neural information. Within the nervous system, this is a horizontal neural information connection pattern. This neural information pattern has a specific neurobiological significance.
3. At a specific moment, when some neurons within a neural region are excited, a specific neural structure is formed between these excited neurons. Consciousness arises when the strength of the neural signals from these excited neurons reaches its limit.

The cerebral cortex is very complex, with various neural connections difficult to discern. However, the way the cerebral cortex expresses neural information is structural, which can help us make a relatively simple description of the complex cerebral cortex.

Within a neural region, neurons of different properties cluster together. The synaptic connections between each neuron allow all neurons within a region to connect as a whole. This neural mechanism prepares all the neurons within a region to await the triggering of neural signals. Each neuron's signal expression within a neural region is unique, forming an anisotropic neural information expression ability within a neural region. As long as the way each neuron expresses signals within the neural region is fixed, then the neural information expression within this neural region is structural. At a certain moment, the expression of neural information within this neural region is established by the positional relationships between each neuron.

The human cerebral cortex is composed of over a hundred types of neurons, the connections between which are incredibly complex. As the "information layer" for humans to respond to the external environment, the entire cerebral cortex plays a decisive role. The human brain has the ability to generate necessary neural responses to very complex environmental changes. In responding to the external environment, the cerebral cortex first needs an understanding of the spatial structure of the external environment. The human brain's understanding of the external environment primarily comes from its various sensory organs. Secondly, when our hands, feet, and other organs react to the external environment, there should also be feedback on the external spatial position. This kind of human brain response to the external spatial position is gradually established, but at a certain moment, the entire brain's response to the external space is unique. The human brain has only one memory of the external spatial environment, meaning that all organs in the human body "share" a spatial structure in the cerebral cortex. Further, all organs within the human body share information about the external spatial environment.

This understanding of the external spatial environment can be obtained from the third- and fifth-layer neurons of the cerebral cortex respectively. The third layer neurons provide spatial information about the external environment of the upper three layers of the cerebral cortex, while the fifth layer structure provides spatial location information of the neural structure below the fourth layer. The third- and fifth-layer neurons of the cerebral cortex are mainly composed of pyramidal cells. The uniformity of the neuronal types that make up these two layers ensures the integrity of the neural information about the external environment in the cerebral cortex. The neural signals expressed by these two neural structure layers are isotropic. This means that the neural information expressed by the third- and fifth-layer structures of the cerebral cortex is unique, unrelated to the location, size, and angle at which the neural signal occurs in these two neural structure layers. The expression of neural information on these two neural structure layers only relates to the structure at the time the neural signal occurs. Signals of the same nature are expressed in a fixed and unique way in the cerebral cortex. The uniformity of the neuronal types that make up the third- and fifth-layer neural structures of the cerebral cortex ensures that any structurally identical neural signals can only have one neural information response. The third- and fifth-layer neural structures of the cerebral cortex provide positional information about the external spatial environment, and it is unique and unchanging.

However, the second- and fourth-layer neural structures of the cerebral cortex are anisotropic. They contain a variety of neuron types, and the neural information that these two structural layers may express is very rich. For the third- and fifth-layer neural structures, as long as the structure of the neural signal is the same, neural signals from different locations, sizes, and angles will have consistent neural information expression. However, for the second- and fourth-layer neural structures, neural signals of different sizes, positions, and angles might all have different neural information expressions. This distinct neural information expression can be based on the same neural signal structure of the third and fifth layers. The same neural signal structure expression of the third- and fifth-layer neurons can result in a rich neural information expression in the second- and fourth-layer neural structures of the cerebral cortex. This abundant capability of neural information expression means that the same neural signal structure of the third- and fifth-layer neural structures on the cerebral cortex can access all the content on the second- and fourth-layer neural structures. This is likely the source of human intelligence.

When people observe the external spatial environment, a corresponding neural signal structure is automatically formed in the third and fifth neural structures within the cerebral cortex, and can adjust direction, size, and position freely within these two structural layers. This accommodates the second and fourth neural structures in the cerebral cortex, forming the brain's response to the external environment. This type of neural response can also be reversed by transforming the neural signals within the second and fourth structural layers into the third and fifth layers. This process aims to further inductively organize the relevant neural signals in the second and fourth neural structures, allowing a neural signal structure that once existed within the second and fourth neural structural layers to be universalized within the third and fifth neural structures of the entire cerebral cortex. Enhancing the universalization ability of a specific neural structure in the cerebral cortex can allow a neural structure to have a broader ability to expand its logical structure.

The third and fifth neural structures in the cerebral cortex are composed of the same type of neuron. The neural information expressed there can be seen as composed of neural signals running in a homogeneous neural biofield. These two neural structure layers are two distinct scalar fields, corresponding to the second and fourth neural structure layers respectively. These two scalar fields can each be seen as a two-dimensional plane that does not change under the premise of the same neural signal structure. In the second and fourth neural structure layers of the cerebral cortex, the neural information composed of the neural signals generated there operates in an anisotropic neural biofield. Therefore, the second and fourth structures of the cerebral cortex can be viewed as a vector field, where the changes in neurobiological information are related to the changes in neural signals. Here, the changes in neural signals are related to position, size, and angle. The variables of neural signals in this vector field may be more numerous than in traditional vector fields, suggesting that it can be described as a structure of a "super vector field" comprised of a series of continuously changing two-dimensional planes. I differentiate various scalar fields and vector fields within the cerebral cortex for the purposes of discussion, but on a deeper level, I hope that such a discussion might someday lead to the discovery of a suitable mathematical structure within the cerebral cortex - that is my dream.

A neural signal simultaneously exhibits as a scalar and a vector in different structural layers of the cerebral cortex. This is because the six neural structural layers within the cerebral cortex are composed of alternating scalar and vector layers. They form interconnected neural information due to the linkage of neural signals, a phenomenon that is unique in the universe. The same neural signal can produce entirely different neural information results in different neural structural layers. A scalar field composed of unchanging two-dimensional planes and a vector field composed of changing two-dimensional planes, these two fields combine and superimpose to form a new layer of neural information response. On the basis of the same neural information expression in the third and fifth neural cell layers, this new level of neural information response can identify associated neural signal structures in the second and fourth neural structure layers. The fusion of neural signal structures from the scalar and vector layers could be ones that have already occurred, or they could be new, previously unseen ones. Of course, the expression of neural information from different neural structures in the third and fifth neural structure layers of the cerebral cortex may also lead to changes in neural information expression within the second and fourth neural structure layers. However, these changes are based on alterations in the two-dimensional structural patterns of neural information within the third and fifth neural structure layers. From the perspective of human thought, this represents a proposition beyond the scope of logical structure.

In this context, regardless of whether or not there are changes in the neural information structure of the third and fifth layers of the cerebral cortex, changes in neural information may occur in the second and fourth neural structure layers. When the cross-sectional structure of the neural information in the third and fifth neural structural layers does not change, an identical neural structure can express different neural information structures on the second and fourth neural structural layers of the cerebral cortex at different positions, sizes, and angles in the third and fifth layers. This reflects thinking patterns under the same logical framework.

The cerebral cortex is composed of various subdivisions, and each sensory channel receives neural signals in different ways. The information about the external environment gathered from the eyes, nose, ears, and mouth must comply with different physical rules of the external environment. Therefore, the neural signals transmitted to the cerebral cortex from each sensory channel are vastly different. Hence, there is a problem of neural signal compatibility in the structures below the fourth layer of the cerebral cortex. The structures of the neural signals from each sensory channel and those reflected downward must be compatible in order to form a complete neural information response pattern in the cerebral cortex.

There are complex neural connections between different areas of the cerebral cortex and between various regions of the entire nervous system. Several neural pathways might lead to a single neural region, and the neural signals transmitted between these pathways must first be compatible in order to display the same neural structure within the same neural region. Therefore, we can say that as long as the neural structures of the signals transmitted by these neural pathways are compatible, they can collectively express neural signals to form neural information within the same neural area.

In my first article, I discussed why a neural pathway is perpendicular to the target neural area. This question is vital because, as mentioned above, if a neural pathway is not perpendicular to the target neural area, then the neural information expressed in the second and fourth neural structures of the cerebral cortex will be inconsistent. The external spatial position information would not align, preventing a uniform neural response. In this case, the information about the external environment in the cerebral cortex would be scattered and disordered. A neural pathway needs to be perpendicular to its target neural area. Only in this way can all neural pathways transmitting signals to this area maintain a parallel spatial relationship, ensuring that the angles of the transmitted neural signals are consistent, leading to a uniform neural response. This conclusion can be further extrapolated, suggesting that the neural pathways reflecting neural information from this neural area outward also have a perpendicular spatial relationship.

1.3. The Particle Process of Neural Signals

At any given moment, a neural signal transmitted from a postsynaptic potential to an axon can be represented as a bio quantity acting in a scalar field. We can't find the angular relationship when the postsynaptic potential is transmitted to the axon, nor can we find a "biofield" or "neural field" to constrain the electrical activity within the scale of a neuron, so we cannot express this electric signal as a bio quantity acting in a vector field. In fact, between the two mathematical concepts of scalar field and vector field, we can only choose one. So, from a mathematical point of view, the structure of a neural circuit here is imperfect.

At a specific moment, the excitability of a neuron can be expressed as the probability of potential strength occurring in each postsynaptic structure, forming a definite value at the axon hillock. For this neuron, there is no structural connection between all post-synaptic and synaptic structures, so it is essentially a geometric point. Therefore, the transmission of neural signals from a neuron's postsynaptic structure to the axon hillock is essentially the transfer of potential energy. We cannot differentiate the specific location of these potential energies' distribution area on the plane of the neuron's postsynaptic structure. Furthermore, in all structures before a neuron's synapse, the transmission of electrical signals is also the transfer of potential energy. In a neuron, the transfer of electrical signals should be viewed as the transfer of potential energy. This transfer of potential energy is supported and constrained by the neuron's structure and forms directionality on a complete neuron.

On the scale of a neuron, the operation of neural signals from the postsynaptic plane to the axon follows some quantum rules of neural signals, and the neural signals produced after synapse eventually converge to the axon hillock to form a quantum phenomenon. This phenomenon is a process, which reflects the uncertainty of the source of neural signals within the range of a neuron's scale. Therefore, for a neuron, the source of any neural impulse signal is untraceable. And the action potential of each cell is fixed, showing the indivisibility of a single neural impulse waveform. As mentioned earlier, an action potential can be composed of several postsynaptic potentials. The fact that an action potential cannot be further divided implies that the combination of several postsynaptic potentials that make up this action potential is also indivisible, that is, the source of this group of postsynaptic potentials cannot be divided and distinguished. The transfer of neural signals on a neuron simultaneously exhibits these two characteristics, indicating that a complete quantum feature is formed in the process of neural signal transfer in a neuron. The inability to trace the source and the inability to divide are connected, they are cause and effect of each other.

At a specific moment, the excitability of a neuron can be expressed as the probability of each postsynaptic structure showing a potential intensity, and a definite value is formed at the axon hillock. Therefore, in the process of nerve signal transmission from the postsynaptic structure of a neuron towards the cell body of the neuron, the nerve signal transitions from a wave to a particle. Then, when the nerve signal continues to be transmitted from the cell body to the presynaptic structure, it is a process of transition from particle to wave again. Here, the transmission of nerve signals from the postsynaptic structure towards the cell body and the transmission of nerve signals from the cell body to the presynaptic structure follow the transformation in physics from wave to particle and then from particle to wave, forming this complete transformation of a double structure. God does not play dice, because the mutual transformation of wave and particle on a neuron is a process, it's just that we didn't understand this process before.

At the synapse of a neuron, the wave property of the neural signal can be manifested, while at the neuron's soma, it can be considered as the particle property of the neural signal. In the nervous system, the particlization process of neural signals can generate structural relationships between neurons within a neural region. Within a neural region, the limit combination of the particlization process of neural signals from different neurons can give rise to consciousness.

From a physics perspective, the superposition state of microscopic particles is the norm. However, fundamental particles are inherently unstable structures. Microscopic particles transition from one superposition state to a particle state, then revert back to another superposition state. The transition between two superposition states of microscopic particles is a particle state. The structural changes of basic particles at the microscopic level operate on the same principle as the propagation of neural signals within a neuron. When a neural signal is transmitted within a neuron, the signal exhibits wave-like properties at the postsynaptic structure of the nerve cell, transforms into a particle structure at the soma, and reverts back to wave-like properties at the presynaptic structure of the same neuron. This mirrors the wave-particle duality in physics: Microscopic particles are fundamentally wave-like and exist in a superposition of states. However, a microscopic particle exhibits particle properties in the process of transitioning from one wave-like state to another.

At the scale of a neuron, the transmission of neural signals follows the quantum rules of the physical world.

In the cerebral cortex, consciousness is formed by the integration between neuronal soma, and the formation of consciousness has nothing to do with synapses. In the nervous system, neural integration occurs within a neural region, and the signal transmitted along the synapse only triggers the neural signals of the next-level neural region. In the nervous system, neural information integration is a horizontal relationship, determined by the structural relationship formed between different neurons within a neural region through neural excitation. The transmission of neural signals is a vertical relationship, which is the signal transmission between regions in the nervous system. The vertical relationship is determined by the neural projection structure.

In the human brain, there is no independent neural loop to integrate neural signals. The anatomical structure of a neuron tells us that the connections between neurons cannot be precise and cannot create clear boundaries, so an independent neural loop does not exist. The coordination of a person's hand and foot is due to the brain controlling a neural state, not controlling several neural loops; the hand and foot are under a neural state, not several or more neural loops. Therefore, in the nervous system, the neural loop is a longitudinal neural structure, which is an electric signal transmitted by neurons through synapses. It does not form neural sensations and produce consciousness.

1.4. Division of Labor between Specific and Non-specific Neural Bundles

The complexity of the human brain is truly astonishing, and encompassing all of it within the scope of conscious control is an extremely challenging task. Currently, there are relatively few scientists who approach questions in neuroscience from the perspective of the entire brain. Traditional neuroscience research often investigates the nervous system from a localized viewpoint, thus the research materials I can cite only represent a fraction of it.

A particular example is the division of labor between specific and non-specific neural bundles. Our knowledge about non-specific neural bundles is very limited to this day, and no one has ever mentioned the coordination issue between specific and non-specific neural bundles. However, from the perspective of neural information integration, I believe this is a fundamental issue that cannot be avoided.

First of all, the neural signals transmitted by any neural pathway are structured, and only when the neural signals within a neural pathway interact can they form the result of neural information. In a neural region within the cerebral cortex, a clear neural structure can only be formed between some neurons with a relatively high level of excitability. This neural mechanism must also be jointly formed by the coordination between specific and non-specific neural bundles.

Secondly, if a neural pathway is transmitting neural information, then the neural information is structured on a cross-section of a neural pathway. At a specific moment, all the neural reflex signals that have undergone regional neural integration in a neural region can be regarded as operating within the same neural projection pathway. These neural signals can be seen as different parts on the same cross-section, forming a complete neural information cross-section.

Thirdly, both specific and non-specific neural bundles originate from the thalamus to the cerebral cortex, and both are parts of the thalamic reflex bundle. The neural signals transmitted within the thalamic reflex bundle can form a complete cross-sectional structure. Therefore, there should be the ability for full cross-sectional complementation between specific and non-specific neural bundles at any time.

Fourth, looking at the six-layer anatomical structure of the cerebral cortex, all upward-projecting neural signals result in neural excitation, and all downward-reflecting neural signals result in neural inhibition. This is because upward neural signals first stimulate the projection layer, triggering the neural signal to continue to be transmitted upwards. Conversely, when neural signals reflect downwards, the neural projection signal first encounters the granule layer, ultimately resulting in a neural inhibitory effect. Therefore, upward and downward neural signals have completely opposite neural excitation modes. Upward transmitting neural signals target a region, so it is a passive neural process, and the resulting neural function is vague and imprecise. Downward reflecting neural signals contain neural projection structures, and they define the scope and structure based on the basis of upwardly transmitted neural signals, thus it is a precise neural structure. These characteristics conform to the functional features between specific and non-specific bundles.

For the thalamus, the specific and non-specific neural bundles together form the neural structure of the thalamic reflex bundle, with these two bundles being in the same thalamic reflex pathway. The specific and non-specific neural bundles together form a reflex cross-section composed of neural structures within the thalamic reflex pathway. The neural structures forming this reflex cross-section are easily influenced by the control of the thalamus, affecting the neural activities of various neural structures within the entire cerebral cortex, and forming neural reflex responses throughout the cerebral cortex. Therefore, the specific and non-specific neural bundles of the thalamus can form a definite neural structure within the thalamic reflex pathway under the control of the thalamus, and form clear and definite neural responses on the cerebral cortex.

Even though our understanding of how specific and non-specific bundles work together to form a complete neural function is still very limited, it is clear that the human brain requires such a neural mechanism to achieve its complex and diverse neural functions. The coordination between specific and non-specific neural bundles may be a key mechanism for the cerebral cortex to process complex information, perform advanced tasks, and adapt to the constantly changing external environment. Therefore, further research on how these two types of neural bundles work together has significant scientific value for revealing the working principles of the brain and understanding its neural functions.

1.5. A Potential Topic

In a human brain, we receive information inputs from various sensory organs, each operating under different scientific rules. However, the nervous system of a person is one, and it needs to accommodate these neural signals transmitted according to different scientific rules within various sensors. This issue should ultimately be resolved by the compatibility of the neural structure. Most of the ascending neural signals pass through the thalamus and are sent to the fourth layer structure of the cerebral cortex. After the compatibility issue of neural structures is resolved in the thalamus, these ascending neural signals are sent to the fourth layer of the cerebral cortex. The majority of neural reflex signals also go through the fourth layer of the cerebral cortex, where the compatibility issue between ascending neural signals and neural reflex signals is resolved.

In any specific neural region, the issue of neural structure compatibility largely involves the balance between excitatory and inhibitory neurons. This balance, or ratio, is a key factor determining the neural response pattern of a neural region, which must be consistent. That is to say, the ratio between excitatory and inhibitory signals in a neural region may be a relatively stable value, which largely determines the neural activity characteristics of the area. In a neural region, the excitatory level of neural signal responses from different neural pathways must be consistent. This compatibility of neural characteristics within a neural region ultimately forms a complete and unique spatial structure in the brain about the external environment. However, this is my personal view, and there is not yet sufficient experimental data to support and prove it. Further research and experimental work need to be conducted to validate this view and reveal the detailed mechanisms behind it.

2. Conclusion

The same neural signal structures in the third and fifth layers of neurons can form a rich expression of neural information on the second and fourth layers of the cortical structure in the brain. This rich capability for neural information expression means that the same neural signal structures in the third and fifth neural structure layers of the cerebral cortex can access all the content on the second and fourth neural structure layers. This should be the source of human intelligence, isn't it?

Acknowledgments

I would like to express my sincere gratitude to Sandra Cai and Ava Wu, who have provided me with invaluable support and resources during the course of this report. They were instrumental in facilitating my point of view on neural structure in the flow of human consciousness. I would also like to thank my colleagues Xue Lan Jiang and Guo Qing Gu, who have provided me with valuable feedbacks and support throughout the writing process. Their insights and suggestions have been invaluable to the development of this manuscript. Finally, I would like to express my appreciation to my family and friends for their unwavering support and encouragement. Their patience and understanding have been a constant source of inspiration throughout the writing of this manuscript.

I am deeply grateful for the support and encouragement that I have received from all those who have contributed to this research and helped me to bring this manuscript to completion.

Financial Disclosures

I, Yao Wu, the author of this manuscript declares no financial or other conflicts of interest. There are no financial relationships with any organization that might have an interest in the submitted work. I have no other relationships or activities that could influence the submitted work. I have not received any financial support for the research, authorship, and/or publication of this article.

Authors' contributions

The author (Wu Yao) conceived and designed the study, collected and analyzed the data, and wrote the manuscript.

References

Google.com

Wikipedia