

Trilateral research on the neural system and biogenic amines: Disclosure of the major causes and mechanisms of human characteristic neurocerebromuscular (psychosomatic) disorders

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Abstract—Trilateral research, i.e. a synthetic study of morphology, physiology and molecular biology in conjunction with biomechanics has been carried out to study the development of the neural system. The role of the neural system in evolution has been investigated and the establishment of the pyramidal tract and sympathetic nervous system has been considered. Also, the controlling, regulating and developing mechanisms of the neuromuscular system are deduced from the definition of the life system by comparing a monocellular organism (protozoa) to multicellular organisms (mammals). The author also considers the essential system of specially differentiated organ cells and carries out research on mitochondria in protozoa and mammals by the inductive method. He then investigated the mechanism of auto-nervous evolution under biomechanical energy and investigated a relationship between biogenic amines and mitochondria from the standpoint of the life system. Highly specialized functions in highly differentiated cells in mammal organs are carried out, it is suggested, by their characteristically shaped mitochondria in organ cells, which synthesize, in the case of neurons, biogenic amines and neurotransmitters. The characteristics of mammals are studied via the immune system, human-specific structural defects of the body, and mistaken energy incorporation in life which, it is claimed, create mechanisms for the onset of human characteristic neurocerebromuscular disorders.

Keywords: Mitochondria; protozoa; mammals; neurocerebromuscular system; evolution; development; immune system; human characteristic structural defect; intracellular infection; opportunistic infection.

EVOLUTION OF THE NEURAL SYSTEM

What is the neural system? This question is most important to solve the riddle of the brain. The investigation of the initial development of the neural system discloses

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the answers. The nervous system was differentiated together with muscle cells. The cerebrum of archetype animals is composed of a visceral brain, which controls not only visceral muscles but also somato muscles by means of the extra-pyramidal tract.

In conventional medical science, brain research is carried out separate from the somatic or visceral system. Even though brain research is being pursued independently, no remarkable results have been obtained. The neural system, namely the cerebrum and spinal system, do not exist dependently, but develop concomitant with muscle cells. Without muscle, creatures have no neural system. We have to distinguish and compare active animals with a neural and muscle system to plants without them. We also have to consider how the neural cells evolved in the initial stage of the development of the vertebrates.

In the Coelenterata stage, e.g. hydra, epitheliomuscular cells and glandular cells develop inside the gastrocoel. The former is the origin of neural cells in conjunction with muscle cells. These cells function to absorb digested nutrients in the gastrocoel during peristaltic movement. Ascidia developed from Coelenterata via Bryozoa and via Pterobranchia. In the Ascidian stage, which is thought to be the origin of the vertebrates, the archetype neural system concomitant with visceral and somato muscles developed. From ectodermal cells, somato neurons concomitant with somato-muscles develop. In the same way, visceral neurons of endodermal cells develop concomitant with visceral muscles. At this stage, the nervous system was made up of the branchial digestive and excretive gut system. During this stage, the ectodermal neural crest on the surface moves toward the chordate while on the other side of the chordate, the neural crest forms up from the gut. This can be deduced from the study of the development of mammalian embryos by observing neurula.

We have to ask again: What is the neural system from the standpoint of evolution? It is the connecting system between the sensory organs and the locomotive muscle system. Sensory organs are constructed by epithelial cells of endoderm and ectoderm as is the nervous system. The characteristic of animals is movement via muscle. The origin of somatic as well as visceral movements in the early stage of vertebral evolution is thought to be induced by ocean waves, a form of biomechanical energy. After the establishment of the hydra, i.e. coelenterate, energy evoked by ocean waves generates electrical potential in epithelial cells by this biomechanical energy, which is then conducted to fluctuating gut epithelio-muscular cells (Petrov *et al.*, 1989). By these potentials, epithelio-muscular cells develop from primordial cells by metaplasia. After development and differentiation, the surface epithelial cells elongate to form neurons then muscular cells, differentiated from gut epithelio-muscular cells. Thus, from primordial visceral epithelial cells, visceral nerves and muscles develop; from dermal epithelial cells, somato nerves and muscles develop.

The parasympathetic nervous system is extremely old. Even the initial developmental stage of the vertebrates, such as the monosomite ascidian, had this. The parasympathetic nervous system developed together with the gut system. Therefore, the parasympathetic nervous system belongs to the visceral smooth muscle group.

These systems function by means of cholinergic stimuli. Therefore, the preganglion nervous system of the sympathetic nerves is not correct, as it actually belongs to the parasympathetic nervous system because of its cholinergic fibers.

ESTABLISHMENT OF THE PYRAMIDAL TRACT AND SYMPATHETIC NERVOUS SYSTEM OF THE VERTEBRATES

Establishment of the basic construction of archetype vertebrates during the primitive evolution of the vertebrates is thought to occur by means of gene duplication of the hemichordate ascidia. At this stage, metameric organisms developed through a process of genome duplication from the ascidian (urochordate monosomite organisms). The author has already verified and reported that development from monosomite animals to multisomite vertebrae occurred by gene duplication (Nishihara, 2003a, 2004).

Through several cycles of gene duplication of ascidian genomes, a cyclosalpa-type organism, which is a continuous ascidian-like chain with the serial single gut of archetype independent vertebrae, evolved. From this primordial vertebral evolution, archetype vertebrates like *Amphioxus* and *Cyclostomata* developed, and they still live as relics. This mechanism of development depends upon Lamarck's Use and Disuse theory based on biomechanical energy (Lamarck, 1809; Nishihara, 1998, 2003a, 2004). Maintenance of this system required a hard-tissue notochord, namely, the series of somites that evolved into the vertebrae.

After organisms began moving in sea water, evolution occurred and the first frontal ascidia became the head and face. In this way, the *Acantoidii* (origin of the shark) evolved. This is the first revolution of the vertebrates. Even archetype vertebrate chondrichthyes (sharks) exhibit an archetype cerebrum, a diencephalon as well as mesencephalon, metencephalon (pons) with the cerebellum, and myelencephalon. The epithelial system of shark cerebral neurons is constructed with the visceral nervous system and the archetype somatic muscle system of the extrapyramidal tract.

In the second revolution of the vertebrates, the author has suggested that the increased gravitational action of the earth after landing affects the blood pressure elevation of chondrichthyes through their intensive movement to escape suffocation by moving back to water (Nishihara, 2003a). With elevated blood pressure, streaming potential increases (Petrov *et al.*, 1989), and this triggers the gene expression of chondrocytes to develop osseous tissue, together with bone marrow hemopoiesis as well as erythrocyte-enucleation, the cardiovascular system, lympho-vessel formation, the pyramidal tract of the cerebral motor nervous system, the sympathetic nervous system along with the capillary system, and the development of major histocompatibility antigens (MHC) in conjunction with the homothermal system. Evidence for these processes has been provided by experimental evolutionary research (Nishihara, 1998).

However, the question is: What are the mechanisms of the induction and development of the pyramidal tract system with somato-muscles as well as the sympathetic nervous system with vascular muscles in terms of evolution? These are the correlation systems between neurons and muscles. Therefore, the correlation system between various organs in organisms must be investigated.

BY WHAT MEANS IS THE NEURO-MUSCULAR SYSTEM DEVELOPED, REGULATED, AND CONTROLLED?

In this paper, the mechanisms of induction and the development of the neuromuscular system, and the regulation mechanisms in neural cells are investigated. The author shows not only evolving and developing mechanisms but also controlling and regulating mechanisms of specially differentiated systems, such as the neural system, by deduction from the definition of the life system. The definition of the life system states that life is composed of a water-soluble organic colloid surrounded by a phospholipid membrane, which remodels cells and a part and whole of life conjugated with energy metabolism, after which it can overcome aging. Remodeling of a whole creature is inheritance through reproduction.

To know this, comparative research on morphology and the function between protozoa and multi-cellular organisms of mammals from the standpoint of the definition of life and energy metabolism is essential. Comparing protozoa and multicellular organisms of vertebrates at the cellular level, there are no major differences. Therefore, it is necessary to ask: What is the difference in the life system between protozoa and multi-cellular organisms? To discover this, the basic construction of the mono-cellular organism of eukaryotae of protozoa and multi-cellular vertebrates are compared as one systemic creature. Protozoa obtain nutrition, including oxygen, by phagocytes directly from their surrounding medium, and they carry out regeneration or remodeling of a part or whole of the organism, conjugated with energy metabolism, by means of mitochondria. Through this metabolism they can overcome the deterioration of aging. The metabolism of protozoa depends entirely on nutrition and/or oxygen upon the surrounding medium. On the other hand, mammalian body cells obtain nutrition and oxygen from the blood and lymph system by the cardiovascular system and the organism obtains them from the gut digestive system and the respiratory system by eating and breathing. The only difference at the cellular level is the existence of the cardiovascular system in mammals. The gravitational action of the earth directly influences the cardiovascular system as blood pressure rises to compensate for increased gravity in mammals. There is no such influence of gravity on protozoa or cultured cells of mammals which have no circulatory system as found in a multicellular organism. All cells of organs and tissues of mammals also regenerate in a part of a cell, as well as a whole cell and a whole organism (hereditary by reproduction) in conjunction with the energy metabolism of mitochondria. The cellular metabolism of mammals also relies on the metabolism of mitochondria,

and this metabolism entirely depends upon blood circulation, atmospheric pressure, nutrition and oxygen in the blood. If some mitochondria in some cells require more energy for metabolism in some organ, the cells, e.g. neurons in the brain in mammals, they compel enhanced circulation of the heart and respiration of the lung by secretion of their hormone or cytokine. Therefore, mitochondria of the medullar cells of the adrenal glands excrete adrenalin, the respiratory movement of the lungs as well as the heart is enhanced, and glycogen is released from the liver. Consequently, the oxidative phosphorylation of mitochondria in neurons is activated and body temperature rises and energy pyrophosphate ATP are synthesized. After that, energy metabolizes ATP and catabolites as well as CO₂ are generated. Therefore, mitochondria of specially differentiated cells control cellular metabolism of all cells in living organisms.

WHAT IS THE ESSENTIAL SYSTEM FOR SPECIALLY DIFFERENTIATED CELLS TO EXHIBIT THEIR FUNCTIONS?

In mammals, there are various kinds of highly differentiated organs with specialized functions: for example, neurons of the cerebrum, osteoblast, various cells in kidney, and suprarenal glands, cells of hormonal glands, muscle cells, hemopoietic cells, various cells in liver and pancreas, and cardio-vascular cells.

What is the correlation system of the various organs in mammals, which are regulated as a holistic system?

Protozoa, as well as mammalian cells, remodel a part of a cell using energy, 95% of which their mitochondria generate. The other 5% of energy is generated by anaerobic glycolysis. Thus, the correlation system of various organs in mammals is constructed by the mitochondrial function of organ cells, which produce hormones and cytokines. The functions of neurons are one of the correlation systems of neural cells and muscles. An adult human has 60 trillion cells and one trillion cells are regenerated daily. For this regeneration to take place, mitochondria as well as HLA are the key functioning components.

To investigate the essential system of specially differentiated organ cells, research on the function of mitochondria in protozoa and mammals is necessary. As mentioned above, as the basic cellular construction, protozoa and mammals utilize the same organelle of mitochondria for 95% of energy generation. In other words, almost all functions of cells in organisms are carried out by the gene expression of mitochondria in the cells of organisms by means of the ATP generated in it.

The genome of mitochondria as well as that of the nucleus is quite similar in all cells regardless of specialized differentiated or non-differentiated cells in certain organisms. Highly differentiated cells carry out their specialized function by their characteristically shaped mitochondria. This fact can be induced from research evidence. What are characteristics of mitochondria? The following itemized points answer this.

- (1) Mitochondria are parasitic aerobic bacteria of an archetype form which had evolved as a parasite into eukaryote some 18 billion years ago. Therefore, in the human body, in certain conditions, not only pathogenic but also nonpathogenic enterobacteria and microles can easily live intracellularly.
- (2) All specialized differentiated cells in mammals, like neurons, paraneurons, respiratory ciliated cells, hormonal gland cells, salivary gland cells, hepatic cells, the glomerulus of kidney, specialized-shaped brown adipose tissue of hibernating animals, osteoblasts, and fibroblasts, have their mitochondria.
- (3) The life system states that it remodels a part of or whole cells conjugated with energy metabolism, after which they can overcome aging. As 95% of cellular respiration is controlled by mitochondria, 95% of energy metabolism is carried out by mitochondria in mammals. The other 5% of anaerobic respiration, namely glycolysis, provides pyruvate from glycogen for TCA cycle function in mitochondria. Consequently, the life system depends 100% on energy metabolism by mitochondria.
- (4) Concerning neurons in the cerebrum: from the following, it is deduced that cerebral functions, e.g. moving, speaking, thinking, and waking, are all sustained by mitochondria.
 - In the brain, about 20% of the total oxygen absorbed is consumed by the mitochondria of neurons, paraneurons, and glia of the cerebrum, yet the brain is only 2% of total body weight.
 - It is well known that neural mitochondria generate not only catecholamines, biogenic amines or monoamines that are also cerebral hormones, cerebro-entero hormones, neurotransmitters, growth factors, and other cytokines.
 - All specialized cells of highly differentiated organs, e.g. kidney, suprarenal glands, muscles, osteoblasts, neurons, hemopoietic cells, and cartilaginous cells have specialized functions. These essential functions depend upon the characteristic mitochondria of these specially differentiated cells.
 - As mitochondria are archetypical parasitic bacteria in eukaryotic cells, their protein synthetic system is the same as that of bacteria. Therefore, antibiotics that are effective on bacteria also influence the function of mitochondria. Side-effects of antibiotics, e.g. dizziness, fainting, defects of hearing, urticaria, disturbance of hemopoietic organs, and anaphylactic shock are all disturbances of the mitochondria of the specialized neurons or mesenchymal cells in the respective organs.

From the above functions, the specialized functions of differentiated organ cells are deduced to be carried out by mitochondria in organ cells. As well, from these items, the organ correlation system and the organ regulation mechanism, as a whole system, are driven by mitochondria.

WHAT IS THE MECHANISM OF AUTO-NERVOUS EVOLUTION UNDER BIOMECHANICAL ENERGY?

In the second revolution, two kinds of evolutionary processes occurred. One is development of metaplasia, observed in gills and skin cells. The other is the development of the autonomic system with vascular muscles in the capillary system. Evidence for the former has already been published elsewhere (Nishihara, 1998, 1999, 2001, 2003a, b, 2004a, b; Nishihara *et al.*, 2000). The latter are as follows: in landing, the mitochondria in somato-visceral organ cells, e.g. the intestine, heart, and brain, required oxygen. This demands that mitochondria in cells of all kinds of organs and viscera as well as of connective tissues synthesize some kind of cytokine of nerve growth factor to generate capillaries and the lymphovessel system with vasoconstrictor muscles. Consequently, capillaries with the sympathetic nervous system proliferate and develop into brain, visceral organs, as well as somato muscles. Before this stage, there were no nutritional capillaries even in the heart or brain. The heart evolved from branchial hematopoietic nests. Therefore, the heart itself generated hemato cells in its initial archeostage.

All vascular systems have smooth muscle cells in their walls. At this initial stage, the sympathetic nervous system developed from the ganglion of the parasympathetic nervous system.

What then, were the major factors in the development of capillaries concomitant with sympathetic nerves? They developed from the extensive increase of movement as well as thermal changes of the air in the environment requiring oxygen and nutrients. This induced a several hundred-fold increase of energy metabolism at the cellular level in mammals. Mitochondria in muscle cells require large amounts of pyruvate- and oxygen-yielding growth factors to induce the formation of capillaries from the ganglion of parasympathetic nerves with autonomous neuro-musculo vascular cells. Thus, the surface skin of the somatic sensory and motor system has a connection with somato organs, e.g. brain, and visceral organs, such as the heart and the intestines, via the autonomic nervous system. The sympathetic nervous system functions only by adrenalin. During the development of the sympathetic nervous system, neurons in the cerebral cortex proliferate in mammalian type reptiles and control somato motor muscles by means of the pyramidal tract. At this stage, the bone marrow hemopoietic system, together with the functioning of MHC, as well as the homothermal system are established (Nishihara, 1998, 2004a).

After the establishment of the mammalian system, a remarkable development of the neuron system of somatic muscles of the pyramidal tract occurred in the center of the cerebrum. This development of the neuron-muscular pyramidal tract system had been driven by secretion of neuro-vascular growth factor from mitochondria in somato-muscular cells. As a result, the extra-pyramidal tract system as well as the visceral brain system in the cerebrum (namely the cerebral system of the archetypical chondrichthyes) was pushed into the peripheral site in the brain namely the limbic region. Consequently, in mammals, the visceral nervous system and extrapyramidal system become the limbic system of the peripheral cerebrum. Thus,

besides metaplasia of somato-visceral organs, mitochondria of somato-visceral muscular cells drive evolutionary change. The two mechanisms of evolution by biomechanical energy are as follows: one is metaplasia, namely the gene expression of cells triggered by energies just like a catalyst; the other is the synthesis and secretion of growth factors as well as cytokine of mitochondria in somato-visceral muscular cells.

CHARACTERISTICS OF THE IMMUNE SYSTEM IN MAMMALS, HUMAN-SPECIFIC STRUCTURAL DEFECTS, AND MISTAKEN ENERGY INCORPORATION IN HUMAN LIFE

The author has previously suggested that the emergence of the tissue immune system in higher animals coincides with the development of bone marrow hemopoiesis as well as the acquisition of a homothermal system as a result of the reaction to gravity (Nishihara, 1998, 2001, 2003b, 2004a). As well as yielding immunoglobulins, HLA function on leukocyte membrane emergence works in conjunction with the development of the homothermal system and the differentiation of lymphocytes. It is well known that archetype vertebrates like the shark have MHC and genes of immunoglobulin. However, the author has shown that chondrichthyes are immunotolerant. Therefore, xenotransplantation between sharks and amphibians, birds and mammals can be successfully carried out (Nishihara, 1998, 1999, 2001, 2003b, 2004a).

What does immunotolerance mean with respect to bacteria and viruses? For surgical operations on sharks, such as xenotransplantation, aseptic treatment is not necessary. In cold-blooded animals like chondrichthyes as well as amphibians, bacteria and viruses coexist in their body, intracellularly. The major function of MHC of leukocytes (HLA) is not merely to detect self or non-self by cell membranes, but to detect abnormal cell membranes of tumors, deteriorated/aged cells, and infected cells intracellularly by bacteria and viruses. The function of leukocytes to detect abnormal membranes as well as to generate immunoglobulin depends strictly upon the gene expression of the cells, and these leukocyte functions depend upon the homothermal system in mammals.

The strict dependence of the mammalian immune system on the homothermal system has been shown by Hayashi through his investigation of brain resuscitation by means of cerebral hypothermia (Hayashi and Takasa, 1998). Brain surgery was carried out after lowering the body temperature to 3°C from the normal human temperature 37°C. During the operation at this lowered body temperature, numerous bacteria from the gut through M (microfold) cells of GALT (Gut Associated Lymphoid Tissue) are absorbed into leukocytes in the bloodstream. However, leukocytes do not digest bacteria but leave them to co-exist intracellularly. If the body temperature rises intensively without washing out the gut the patient dies because leukocytes and numerous bacteria in the bloodstream react intensively as sepsis at the normal 37°C homothermal system temperature.

By cooling the gut, enterobacteria and viruses are absorbed from M cells in GALT in leukocytes which are circulating via the lymphovessel into blood vessels and the leukocytes disseminate throughout the body. Consequently, various organs and structures are contaminated by bacteria intracellularly.

By the development of artificial gompholic roots and artificial bone marrow chambers, it has been shown that the causal factor of evolution is the energy generated by animals to overcome gravity (Nishihara *et al.*, 2000). From this observation, the author has proposed the Gravity Evolutionary theory (Nishihara, 1999, 2001, 2003b).

The author has carried out research on the characteristic mitochondrial function of mammalian cells, from the viewpoint of the gravity evolution theory as well as comparative anatomy and physiology, and the following results have been obtained: (1) Mitochondrial functions of mammalian cells are strongly influenced by the energy out of the body. (2) Mitochondrial functions of differentiated cells are disturbed by opportunistic infections of nonpathogenic microbes intracellularly; consequently organ functions deteriorate.

From the viewpoint of energy and the evolutionary theory, mitochondria in human cells deteriorate due to the following major five dysfunctions: (i) breathing through the mouth; (ii) cooling the body by air-conditioners and cold drinks and foods; (iii) workaholism without adequate bone rest; (iv) infant feeding of solid foods with protein; and (v) lack of natural solar light in rooms. The details are as follows:

- (i) After acquiring speech, about five million years ago, humans could breathe through the mouth, not only through the nose. Only humans can do so. By mouth breathing, intracellular infection of neurons as well as all somato-visceral organs occur though intracellular infections of leukocytes in Waldeyer's lymphadenoid ring.
- (ii) By cooling the gut, bacteria and protein with antigenicity are quite easily absorbed through M cells into leukocytes, which change into granulocytes and disseminate bacteria into various cells of the organism, e.g. the brain, the heart, the pancreas, the joints, and the gut.
- (iii) Humans became bipeds several million years ago. After that, humans had to suffer twice the gravitational force of the earth compared to common Eutheria. Humans must sleep to rest their bones for at least 8 hours. Without 8 hours of rest, bone marrow ceases to generate leukocytes hemopoiesis and lymphocytes lose energy.
- (iv) Mitochondria in human cells can function optimally at 37–38°C, i.e. thermal energy and hemo-protein excites with sunlight under homoiotherm and without sunlight energy, mitochondrial functions deteriorate. Lack of solar light energy in rooms disturbs cellular respiration. Sunlight energy is important for hemoglobin, myoglobin, and cytochrome of hemo-protein. Solar light energy excites the hemo-protein; consequently, mitochondria recover, proliferate, and enhance oxidative phosphorylation.

- (v) Too early feeding of food to infants changes the flora of the gut from bifidus to *E. coli* leading to diarrhea. In infants before two-and-a-half years of age, leukocytes in the gut can absorb *E. coli* and leukocytes disseminate microbes into whole body cells. Consequently intracellular contamination, e.g. in the brain, subcutan, and thorax of infants occurs.
- (vi) Too early feeding of protein with antigenicity is very toxic to infants until they are one-and-a-half years old. The gut of infants can absorb any kind of protein with antigenicity. Absorbed protein in infants can be utilized only by mitochondria in neural cells, because of the parasitic independency of mitochondria utilizing the high molecular weight components of protein. After antibodies develop conjugated with neural infections, allergic idiopathy and food anaphylaxis, autism and epilepsy occur.

With low body temperatures, as well as a lack of bone rest and lack of sunlight, the mitochondria of hemopoietic cells loose their vitality, and breathing through mouth as well as cooling the gut with cold liquids allows leukocytes in GALT follicles to become infected with parasitic enterobacillus, which are disseminated into various organ as well as tissue cells. Consequently, the metabolism of mitochondria in organs is disturbed and their function deteriorates. These conditions constitute immune system diseases. As a result, the highly differentiated function of organs deteriorates.

MECHANISMS IN THE ONSET OF HUMAN CHARACTERISTIC NEUROCEREBROMUSCULAR DISORDERS

Breathing through the mouth is the worst structural defect found in mammals. As a result of acquiring the ability to speak, only humans can breathe through the mouth (Nishihara, 1998, 2004a, b). Common mammals have the continuous construction of trachea and choana of the epiglottic type, through which air can be respired even during swallowing. Only humans cannot. From this mouth breathing habit, i.e. a mistaken usage of the mouth, various maladies occur in accordance with Lamarck's Use and Disuse theory. Mouth breathing during sleep allows five kinds of lympho-adenoid tissues in the nasopharyngeal region of Waldeyer's ring to deteriorate, thus permitting aerobic bacteria, mycoplasma and viruses to be absorbed into lymphoid-follicles through microfold (M) cells. In addition to the mouth breathing habit, six other human weak points and structural defects bring about intracellular infections in neurons in various parts of the central nervous system, i.e. brain and spine.

In the case of nose breathing, leukocytes digest these parasites in Waldeyer's lympho-adenoid follicles and induce the secretion of immunoglobulin A (IgA). Newly synthesized IgA is excreted through tears, nasal mucous and saliva. In the case of mouth-breathing patients, tears, nasal secretions, and saliva dry up, allowing membranous rhinitis and tonsillitis with infected leukocytes to occur by aerobic as well as anaerobic microbes, intracellularly. These leukocytes with microbes can

enter from nasopharyngeal adenoids through the hypophysis into not only neurons of the limbic system but neurons of the cortex in the cerebrum as well as the cerebellum, intracellularly.

In neurons, large numbers of mitochondria function secreting biogenic amines, neuro-transmitters, and other neuroenteric hormones as well as various kinds of cytokines as growth factors. If these neurons are contaminated intracellularly by aerobic bacteria via leukocytes from the Waldeyer's lympho-adenoid glands, mitochondria in neurons lack oxygen and nutrition. If they are contaminated, anaerobic bacteria via GALT in the gut, glycolysis in neurons or gliacells become disturbed causing a lack of pyruvate. Consequently, the mitochondria in neurons deteriorate causing neural cells to lose their functions (Nishihara, 2004a).

If intracellular infections occur in the visceral brain, depression (psychosis) takes place. If neural infection occurs in the cerebral cortex conjugated with the limbic extrapyramidal somatic tract system, schizophrenia occurs. Autism and epilepsy are also caused not only by infections of brain but also by antigen-antibody reaction of mitochondrial structural proteins in neuron via the mouth breathing habit in parallel with too early feeding. If neuron contamination in the cerebral cortex concomitant with peripheral nervous as well as muscle cell infections intracellularly, multiple sclerosis, amyotrophic lateral sclerosis, and fibromyalgia occur. If intracellular contamination occurs in the cerebellum, neurons as well as muscle cells, spinal-cerebellum degeneration occurs. Cenestopathy, neurosis, manic-depressive psychosis, and hypochondria are all caused by the intracellular contamination of neural cells, i.e. opportunistic infections by non pathogenic entero parasites.

SUMMARY

To elucidate the development of the neural system in evolution the author has carried out synthetic research in morphology, physiology and molecular biology in conjugation with biomechanics.

By deduction from the definition of the life system, the mechanisms of evolution of the neuro-muscular system as well as immunology have been investigated.

As an inductive method, the author studied the essential system of specially differentiated cells and carried out research on mitochondria, from which a suggestion is made as to the mechanism of neuro-muscle evolution under biomechanical energy. The characteristics of the mammals, human-specific structural defects and mistaken energy incorporation in human life are probed.

As a result, the following conclusions have been reached: (1) Mitochondrial functions of mammalian cells strictly depend upon the energy out of the body, and (2) mitochondrial functions of differentiated cells in various organ cells as well as cerebral cells are disturbed by opportunistic infections of nonpathogenic microbes intracellularly, as a result of which organ functions deteriorate. Consequently, human-characteristic neurocerebro-muscular disorders are suggested to arise from

intracellular contamination of parasitic entero-bacteria via mouth-breathing, cooling the gut and/or too early feeding of infants.

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