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Achara Rasayana & Psychoneuroimmunology:

Rejuvenating Behavioral Therapies for the Body and Mind

Introduction

Extreme cleansing and exercise protocols have become popular with the hopes of restoring youth, longevity, and vitality, but according to Ayurveda, a 5,000 year old healing science, practicing rejuvenating therapies, or *rasayana chikitsa* in sanskrit, are essential to maintaining a healthy body and mind. In order to properly reap the benefits of rejuvenate therapies, the Ayurvedic texts explain the importance of detoxing and purification at different levels depending on the individual's constitution. However, the point of cleansing the system is to rejuvenate it, or build back healthy tissues and restore optimal digestion. The importance of rejuvenation therapies is marked by having its own branch of medicine. The eight branches of Ayurvedic medicine are: Internal Medicine, Ears, Nose, and Throat, Toxicology, Pediatrics, Surgery, Psychiatry, Aphrodisiacs, and Rejuvenation.¹ The three main vehicles for receiving *rasayana* therapies are *aushadha rasayana* (drugs and herbs), *ahara rasayana* (diet and nutrition), and *achara rasayana* (conduct and behavior).² All three are intrinsically important and should be taken together to receive the maximum therapeutic benefits, but without the proper state of mind it would be difficult to achieve and maintain health.

The following review will focus on *achara rasayana* therapies, which involve the psychological connection to physical health. The practice of implementing positive lifestyle routines is a cornerstone of preventative health care according to Ayurveda, and research is starting to grow in the western medical world around the importance of psychological management on physical health.³ A recent area of study around this is psychoneuroimmunology, which looks at the connection between the immune system and the nervous system in relation to mental health.⁴ The idea is that if the physical body is stressed from either external or internal stimuli, the nervous system will be triggered into an autonomic response that will signal a specific immune response to activate. In turn the person's emotional and mental well-being will be compromised from the physiological responses occurring in the body. This creates a potential negative feedback loop that may initiate an unhealthy cycle of reaction between the body and mind.

We will look at the specific recommendations Ayurveda lays out for *achara rasayana*, and the possible connections these practices have on health and well-being from a western perspective of psychoneuroimmunology. The immune system and nervous system are two of the most complex systems of the body and the follow review is a brief glimpse into their dynamic relationship. I have compiled this research with the hopes of providing a simple overview of the research that examines why our physical health is effected by our thoughts, words, and actions at a cellular level.

The Psychoneuroimmunological System

The study of Psychoneuroimmunology (PNI) emerged in western science due to the contributions of Robert Ader Ph.D, a researcher at the Department of Psychiatry at the University of Rochester Medical Center in Rochester, New York in the 1970s.⁵ Ader and his researchers, Cohen and Felten, investigated lab rats and discovered that outside environmental factors, which caused stress and anxiety, adversely effected the rats' immune systems. This is when the field of PNI first started taking off, but it was not until later, with further studies similar to this, that the area of PNI science actually gained credibility in the medical community.

In pre1950's it was postulated that the brain and immune system were disconnected and could not influence each other due to the blood brain barrier.⁶ This was found inaccurate when scientists began researching the pituitary gland more in depth . The pituitary gland was considered to be the "Master Endocrine Gland" for its influence on all other endocrine glands. This gland secretes hormones out through the blood and also sends these chemical messages out to the other endocrine glands (i.e. thyroid, adrenals, ovaries, testes), telling them to either produce or regulate hormone production. However, researchers eventually found that there was something else directing the pituitary gland to work, the hypothalamus. ⁷ The hypothalamus is located in the brain, just above the pituitary gland, and although it is the size of an almond it controls homeostasis in the body. Its role is to regulate the pituitary gland and send messages to the pituitary gland to either release or restrict hormones depending on the information received from the autonomic nervous system.⁸ This research proved that the brain, endocrine system, and nervous system were intertwined in a way considered impossible before and the real master of the endocrine system was in fact the hypothalamus.

According to Ader, Cohen, and Felten, the co-founders of PNI research, "two pathways link the brain and the immune system: the autonomic nervous system and the neuroendocrine outflow via the pituitary."⁹ The autonomic nervous system is the involuntary system of the

peripheral nervous system that governs the function of the visceral organs in order to maintain homeostasis. The two main subgroups of the autonomic system are the sympathetic system, which prepares the individual for fight-or-flight, and the parasympathetic system which initiates a recovery sequence following fight-or-flight known as the rest-and-digest mode. Ader revealed that sympathetic nerves innervate both the primary lymphatic organs (thymus, bone marrow) and secondary lymphatic organs (spleen, lymph nodes, and gut associated lymphoid tissues).¹⁰ Furthermore, the cells in the lymph organs bare receptors sites for many hormones and neurotransmitters secreted by the pituitary gland thus weaving a web of communication happening between the immune system and the neuroendocrine system.

The flow of nerves coming from the peripheral nervous system and connecting with the lymph organs shows that there is an intimate relationship between the brain, nervous system, endocrine and the immune systems. When the hypothalamus tells the pituitary gland to secrete hormones, not only do endocrine glands pick up the information but also some neural receptors sites gather the messages via neurotransmitters. Some of those same receptor sites were found on lymph cells showing their ability to integrate the information coming from the brain as well. It was not until recently that this brain-immune communication was seen as bi-directional loop instead of a top-down linear sequence from the brain to the immune system. With the discovery of cytokines in the brain came the understanding that the immune system could influence the brain in reverse.¹¹ For example we get “sick” because of a microorganism, such as the common cold, the symptoms of malaise, fatigue, lack of energy, and low appetite are part of this immune to brain loop. Since the body is fighting a pathogen it sends messages to the brain to slow down by causing lethargy and other symptoms that elicit a “sickness behavior,” and this response is understood to be triggered by cytokines produced by the immune system.¹²

Cytokines

To understand the basic concept of cytokines, a function of cells still being researched, it is helpful to take a look at the immune system in general. The immune system is a complex system, with new information still arising, but in general the system acts as a basic defense against foreign pathogens that enter the body. Activated immune cells detect what is exogenous and look to eradicate it from the system immediately to maintain homeostasis and health. Also, the process of eradicating microorganisms and pathogens can elicit certain innate responses in the body, like fever or inflammation. These responses are part of the body performing its job to eradicate the alien intruders.

There are two basic responses that the immune system utilizes: an innate response and an adaptive response. The innate response is the first line of defense and consists of a branch of immune cells called phagocytes. There are different kinds of phagocytes with different functions, and the most notable are the macrophages which permeate each and every tissue of the body besides the blood. The macrophages are highly intelligence immune cells that act not only to devour pathogens and unwanted cells but they can also mimic hormones. According to the book *Cytokines and Depression*, "It [Macrophages] has the ability to manufacture over 100 powerful chemicals ranging from cytokines and hormones to enzymes and prostaglandins. It can make many of the same powerful hormones secreted by the brain, pituitary and adrenal cortex."¹³

The overall function of the innate immune response is phagocytosis, antigen presentation, inflammation, and tissue repair.¹⁴ Phagocytosis translates to eating cells. The function of these immune cells is to eat invading microorganisms, dead, damaged and malignant cells, as well as foreign proteins and chemicals.¹⁵ They are scavengers with an instinctual biological response to foreign invaders, devouring them up without any discrimination. The antigen presentation is essentially phagocytes breaking down the unwanted invader and using pieces of that invader, usually a protein, and presenting it on its own cell surface. This antigen presentation is similar to a finger print of the invader and signals to other immune cells to take action. Inflammation is the bodies natural response when these innate immune cells are triggered into action. The phagocytes find an invader, or unwanted cells, and start producing cytokines which are molecules that signal out other cells to respond to the specific area resulting in the area being flooded with more immune cells, fluids, and blood. This appears as inflammation, but it is the body performing it's job to heal and protect itself. Tissue repair is initiated when the immune cells clean up the unwanted, dead, or malignant cells at a specific site, then they signal out, through cytokines and other chemical signals, to stimulate new tissue production.¹⁶

The second response of the immune system is the adaptive response. The immune cells involved with the adaptive response have the ability to store memory from past interactions with pathogens by cloning multiple cells that will destroy the pathogen again if contacted in the future. Lymphocytes are the main immune cells associated with the adaptive response, and they are the "major crime fighting white blood cells of the body."¹⁷ There are two major types of lymphocytes, B-cells and T-cells, and they are both formed in bone marrow, but T-cells come to mature in the Thymus gland whereas B-cells, for the most part, come to mature in the bone

marrow before they are released into circulation to do their job. Macrophages and other phagocytes that present antigens on their cell surfaces, signal to lymphocytes, and other immune cells, by secreting cytokines. Once in contact with the antigen presenting cell a T-Lymphocytes will eventually find a receptor and match-up to the antigen. The T- Lymphocyte will then secrete a different type of cytokine that allows it to start producing “clones.” These cloned T-Lymphocytes will remember the pathogen so next time it invades the body it will act more efficiently to eliminate it. The B-lymphocytes are called over by the T-lymphocytes as well to eat the cell up that has the pathogen in it.¹⁸ This is the intelligence of the adaptive immune response.

Cytokines are molecules secreted by activated immune cells, and they are also water soluble proteins that many types of cells, not just immune cells, use to relay information in the body. When an immune cell is stimulated, for example, a lymphocyte detects a pathogen and will secrete cytokines. Low levels of cytokines produce a localized response in the area of secretion, however when cells produce larger numbers of cytokines they can enter into systemic circulation. This is important because according to an article published in *Current Pharmaceutical Designs*, once introduced into circulation cytokines can cross the blood brain barrier.¹⁹ However, not all cytokines can cross the blood brain barrier. The three general categories of cytokines that can cross the blood brain barrier are: Interleukins, interferons, and tumor necrosis factor (TNF). Common symptoms associated with immune cytokine release are fever, chills, inflammation, pain, headache, malaise, aching joints, sleeplessness, social withdraw, nausea and anorexia.²⁰

Receptor sites were found for specific cytokines (not all types of cytokines) in the brain according to the above study by Dr. William A. Banks. This suggested that when immune cells signal the body for action via cytokines, the brain is involved in the process.²¹ Neuroscientist Robert Dantzer, links the cytokines affect on the brain during acute attacks of illness eliciting a “sickness behavior” on top of the physical symptoms of the illness.²² This may look like a lack of energy, aching joints, anorexia, and coldness. For an acute phase of illness, this is the body doing its job by signaling out to the neuroendocrine system to conserve its energy and use its reserves to fight whatever it present. For chronic inflammation disease, this is where the body is on constant alert, calling out to the immune cells to keep working and keep fighting, sometimes against itself. Dantzer explains cytokines are found flooding the system in patients with major depressive disorders as well as autoimmune diseases. The body’s neuroendocrine systems are in constant alert and repeatedly signaling out to the immune system to work in defense mode.²³

Cytokines are not only produced by immune cells when pathogens are detected in the system, but also when certain peripheral nerve responses in relation to stress, excitement, and fear. Ronald S. Smith, a research scientist on cytokines and their effects on the mind, states that, “cytokines command the brain, liver, immune system, endocrine system and various other tissues to act as one unit in the urgent defense of the body.”²⁴ This is an interesting look into the physiology of how our mind, behavior and emotions are effected when we become physically sick.

Vagus Nerve

In an article published in the journal *Brain, Behavior and Immunity*, gut infections and inflammation were linked to an increase in anxiety and mood disorders.²⁵ The article mentions that in addition to the “sickness behavior” found in Danzter’s research there was also anxiety present amongst individuals with gut infections and inflammation. The link that influences communication between the gut and brain was the vagus nerve.²⁶

The vagus nerve is a cranial nerve that comes directly out of the brain stem and innervates major visceral organs like the heart, lungs, bronchi, and gastrointestinal tract. It has fibers for parasympathetic nerve responses, our rest-and-digest mode. When activated from the top-down, brain to nerve, the vagus is highly regarded for its activation of rest-and-digest mode, calming the system. However, the nerve can also pick up information from the organs and tissues it innervates and send signals back to the brain alerting the brain that trouble is present. Vagus nerve ganglia in the gut were found to have receptor sites for pathogens, similar to macrophages, that allow them to sense when inflammation and infection is present.²⁷

Immunity and Ayurveda

The Ayurvedic paradigm views the world as a combination of five elements: earth, water, fire, air, and ether. These elements can be perceived in nature, everywhere: solids, liquids, radiant energy, gases, and space. The qualities that make up each element have certain affinities toward other elements creating relationships with each other. The concept of *doshas* are based on the dynamic relationship of the elements in the physical, mental and emotional bodies. The three *doshas* are *vata*, *pitta*, and *kapha*. *Vata* is the combination of the air and ether elements. *Pitta* is that relationship between fire and water elements. Lastly, *kapha* is the relationship between earth and water elements. The term *dosha* literally means “that which causes harm,” but they only do so when out of balance.²⁸ Balanced *doshas* do not cause

disease, it is when the *doshas* become aggravated and are not alleviated that illness arises. The most common ways *doshas* become aggravated are from the cycles of time, aging process, change of seasons, and varying climates.²⁹ These aggravators produce stress on the body resulting in either an excess or depletion of one or more of the *doshas*.

When a *dosha* becomes aggravated the initial signs are in the digestive system. Constipation and flatus denotes *vata* becoming disturbed, while burning indigestion and loose stools can signify pitta aggravation, and nausea with sluggish digestion points to *kapha*. When the first signs of imbalance are not treated the *doshas* begin making their way deeper into the tissues and organs of the body. Long term aggravated *doshas* relocate into these deeper places where they adversely effect immunity.

Immunity or the idea of having a strong defense system against pathogens and stress that attack the body is rooted in the idea of *ojas*, which is the essence produced from tissue production. Vasant Lad uses the example of butter being transformed into ghee, clarified butter.³⁰ As the end result of heating butter to make ghee, the end result of the cumulative digestive process is *ojas*, or a refined biological substance that gives the body strength, vitality and life. According to the *Charaka Samhita*, Ayurveda's core text, without *ojas* an individual would not be able to survive.³¹ Lad explains that when the endocrine, nervous, skeletal, muscular, hematopoietic, and digestive systems function optimally then *ojas* and healthy immunity is maintained.³²

Ojas has two types, inferior (*apara*) and superior (*para*). The superior *ojas* is seated in the heart where the inferior *ojas* is traveling around the body. It is interesting to note that in Ayurveda the seat of consciousness is centered at the heart not the head. Superior *ojas* is not only responsible for supporting the tissues and stability of the body but also for maintaining consciousness. Charaka states that three things are needed to maintain a healthy state of *ojas* giving strength and vitality to the body: the practice of non-violence, proper preservation of *shukra dhatu* (sexual fluids), and the attainment of wisdom.³³ Vaghbhatta, the compiler of the Ayurvedic text *Astanga Hridaya*, explains that *ojas* can be diminished due to an excessive anger, worry, hunger, fear, grief, and physical exertion.³⁴ All of these factors place stress on the body and trigger a neural immune response by the release of cytokines. Vaghbhatta then describes that the excessive of these factors manifest into specific symptoms: anxiety, worry, constant weakness, sensory organ disorder, loss of complexion, unstable mind, depression, dryness and emaciation.³⁵

Charaka states that the purpose of Ayurveda is to “protect the health of the healthy and to alleviate disorders of the diseased.”³⁶ Where western medicine has long been focused on alleviating the symptoms of diseases with the intention of eliminating the disease, Ayurveda has focused on tackling the root cause of disease with a heavy emphasis on preventive care. A healthy person according to the Ayurvedic text *Shushruta Samhita* is defined as a individual who is established in the higher Self, has balanced *doshas* (biological humors), balanced *agni* (digestive processes), properly formed *dhatu's* (tissues), proper elimination of *malas* (waste products), well functioning biological systems, and whose mind, soul and senses are full of bliss.³⁷ For proper health to happen Ayurveda emphasizes balancing the digestive system because it is the first place for imbalance to manifest. Health and immunity are rooted in the proper digestion of substances and sensory impressions by the physical and mental bodies.

Achara Rasayana

The sanskrit word *Achara* translates to behavior or practice, and *rasayana* translates to ‘that which promotes longevity by preventing aging and by making the body young again.’³⁸ Thus *Achara Rasayana* can be translated to mean restorative behavioral practices. *Rasayana* therapies serve the function of elongating one’s lifespan by implementing specific practices that restore the body’s balance as well as build and maintain *ojas*, the pure essence of digestion. In order to build *ojas* it is generally prescribed to start with a purification protocol determined by ones unique prakruti (constitution) and vikruti (current imbalance). With the tissues purified, it is then recommended to rekindle digestion by systematic food reintroduction (*samsarjana krama*) and then implement tonifying therapies through diet and herbs. However, restorative behavioral practices can be implemented without prior purification regimes. These practices simultaneously tonify the heart, the seat of consciousness, while purifying it. *Achara rasayana* not only cleanse the subtle body, but they also refine the physical body by giving favorable impressions to the sense organs. This is something beautifully unique to Ayurveda, the idea that our thoughts, words, and actions have a paramount impact on the restoration of health and wellbeing. The full benefit of herbal therapies and dietary changes depend on the implementing of restorative behavioral practices. If one’s lifestyle does not accompany diet and herbal *rasayana* therapies health is unattainable.³⁹

*Achara Rasayana*⁴⁰

1. Truthfulness

2. Letting go of Anger
3. Not over indulgent with alcohol or sexual activity
4. Non-violence
5. Calm
6. Sweet Spoken
7. *Jappa* - Mantra meditation
8. Cleanliness - Habitually cutting hair, nails, and bathing daily
9. Perseverant - unwavering in the face of difficulty
10. Charitable - Giving to those less fortunate and in need
11. Regular worship and offerings to teachers, elders, gods, cows, and priests
12. Devoted to love and compassion
13. Balanced in wakefulness and sleep
14. *Sattvic* diet with regular intake of milk and ghee
15. Taking in consideration time, place, and circumstance when assessing all situations
16. Acting well-behaved
17. Simple minded and free from ego
18. Engaging the senses in spiritual activities
19. Keeping the company of “elders” or saints - those who have wisdom
20. Surrounding oneself with uplifting and positive company
21. Practicing optimism
22. Self-control
23. Devotion to studying holy scriptures

Whoever embodies these qualities attains the most benefits from herbal and dietary *rasayanas*.⁴¹ *Astanga Hridaya*, a summary of Charaka’s work, elaborates that one should keep away from over attachment and indifference.⁴² This includes fulfilling one’s duties, or *dharma*, without resentment and over attachment to recognition and power. It is considered most conducive to health to stay on the middle path not wavering to one extreme or the other.

The Journal of the American College of Cardiology came out with a study that linked anger and hostility to higher incidences of coronary heart disease.⁴³ The study found that healthy people who exhibited signs of anger and hostility in their behavior were found to have higher incidence of coronary heart disease. Furthermore, those diagnosed with coronary heart disease with a continued behavior of anger and hostility were found to have a persistent poor

prognosis. This study concludes that psychological management is a necessary addition for the treatment of this disease.⁴⁴

According to a study published by *The North American Journal of Medical Science*, having a regular practice of mantra meditation, yoga, and pranayama were linked to positively influencing immunity and joint disorders while also improving cognition, respiration, reducing cardiovascular risk, blood pressure, and diabetes.⁴⁵ Research found that a person who practices yoga with a yogic attitude of patience, persistence, overcoming obstacles within the self like laziness, anger, delusion, and desire for being different or better than others, had several positive changes in their physiology.⁴⁶

Another study published in *The Ancient Science of Life* journal looked at students studying for their Bachelor of Ayurvedic Medicine and Surgery. They tested the students against each other and found that those who strongly followed *achara rasayana* principles excelled in academics, peer relations, physical and mental health as compared to their peers who were not implementing these codes of conduct.⁴⁷

The goal of *achara rasayana* is not just to behave well for the sake of being a good person, but it is thought that by following these practices one will naturally lift their ability of discernment and self-awareness, raising their consciousness and thereby making better choices for their health. Charaka argues that, the root cause of all derangement is unrighteousness, and unrighteousness arises from misdeeds in past life but the source of both is intellectual error.⁴⁸ In sanskrit the the word *prajna-aparadha* translates to mean offenses committed to the intellect, or intellectual error. When we go against our better judgment by feeding our senses with disharmonious impressions and making improper choices regarding our health sickness has the potential to manifest.

Conclusions

There is a resonating call of personal responsibility for ones health in Ayurvedic medicine. Preventive care for avoidable conditions is urged through a balanced lifestyle and diet. Cultivating self-awareness through restorative behavioral practices is paramount to the Ayurvedic paradigm of preventive medicine. The *achara rasayana* guide laid out in *Charaka Samhita* encourages a moral path of integrity which directly relates to an individual's state of health. When our thoughts are positive, the actions we perform are conscientious, and the words we speak are uplifting we create a biome for our physical and mental bodies to function optimally. The nervous system becomes calm, avoiding excessive stress on our system, which

simultaneously pacifies our endocrine system from releasing stress hormones. This information is picked up deep in the cells of our immune system where we can store our energy for nourishing our deeper tissues and whole being.

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