Kirtan: Call and Response Chanting

How Does the Bliss Happen?

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Prairie Yoga
200 hour Foundational Yoga Teacher Training
Self-Study
5.17.2013

My experience of kirtan has been participating in the call and response chanting of Sanskrit mantras set to music. It usually starts out slowly and methodically. The person leading the kirtan begins by constructing the mantra in small sections. She begins calling out a few words, and the audience echoes it back. The series of deliberate harmonious repetitions continue and grow: call and response, call and response. The waves of this musical back and forth, again and again, slowly build, and the mantra evolves.

I liken my experience to standing on the sandy shore at the onset, and with each movement of the waves onto the shore, and then back into the ocean, I move gradually deeper into the ocean with them. I move gently further in with each wave and each repetition of the mantra. As the melody progresses, my thinking diminishes. I focus on the slow steady waves. Feeling expands. Soon, the once unfamiliar words flow easily off my tongue, and I let go of trying to remember what the mantra means. I understand the essence of what they all mean: love. My right brain wins the tug of war as my left brain finally lets go. Eventually, everything else falls away, and I completely embrace feeling. I am fully present, safely riding the ebb and flow of the waves deep in the ocean.

The tempo and the volume rise and continue to build. My sense of joy and community expands. Collectively, we are chanting, singing, feeling, and many are moving. We are there together experiencing this bliss. After building to a crescendo, the tempo descends, sometimes abruptly and sometimes progressively. We find ourselves in silence, back on the shore. There is silence within me and among the crowd. We are peace and bliss and unity. We are all one.

Science often provides evidence of the benefits practices earlier societies cultivated. Modern science seems to be slowly catching up with ancient wisdom in so many areas. Learning about the body-mind-brain connections is fascinating to me. I also enjoy learning the way things work in the body. Perhaps this comes from my background of learning mechanisms of action of medications in the body and the brain in biochemistry, pharmacology, and medicinal chemistry classes.

The last several decades of brain research have begun to unravel many mysteries, yet countless more remain to be explored in depth. It is the intention of this essay to begin a personal investigation of kirtan. I want to

learn more about it and wonder what has been written about this practice. I wonder what science has discovered about the manner in which this practice of singing and chanting mantras to music cultivates bliss within the body-mind. I know from experience bliss happens, but I also want to know how the bliss happens. My left brain wants to know why my right brain enjoys this practice so much. It seems the many elements that make kirtan what it is (Sanskrit, mantra, breath, vibration, sound, music, and community) play a role in creating the feeling of bliss.

Chanting and Sound Across Spiritual Traditions and Cultures

Many Christian traditions and the Catholic tradition specifically, use repetitive prayers and chants in their services. "Chanting is an important part of the Jewish cabalistic tradition. Native Americans centered many of their religious rituals on chanting. Buddhists and Sufis chant mantras, and Muslims use repetitive prayers," notes Dr. Khalsa, author of *Meditation as Medicine*.

Dr. Oakes, PhD, and author or *Sound Health Sound Wealth*, refers to Ancient cultures using sound and light for healing. She describes Egyptian temples of light, aboriginal healing with sounds, and gem elixirs from India. She cites the use of sound and light in modern medical practice. MRIs, ultrasound, and laser surgery are used to diagnose and promote healing.

Russill Paul, author of *The Yoga of Sound* states, "Every culture has its own form of sonic mysticism. Gospel music manifests the spiritual power of sound, as do symphony orchestras, Hebrew cantors, Sufi Qawwali singers, Siberian shamans, Benedictine monks, and the Tibetan Gyuto choir… Many ancient cultures viewed physical illness as a lack of harmony in the body; they used sound and music to restore this natural condition." Paul also points out that modern medicine also uses sound waves to dissolve gallstones and kidney stones without surgery.

Currently, in the West, there are many kirtan artists and performers blending their own musical backgrounds, training, and styles with devotional chanting. "And although purists might argue otherwise, kirtan's new generation of musicians believe that the genre-bending chants are still connecting our hearts to God," according to Sexton and Dubrovsky authors of a September 2011 Yoga Journal article about the rise in popularity of kirtan.

Kirtan Defined

Ana Hernandez, author of *The Sacred Art of Chant*, explains kirtan is from the Sanskrit *kirtanam* which means "praise eulogy" and is a form of devotional singing in India. "It is a form of mantra yoga with the energy of sound focused on selfless devotion."

Krishna Das, a modern-day kirtan wallah (singer/musician who performs kirtan), who spent many years in India learning the practice, defines kirtan as chanting the divine name from the Sanskrit meaning "to repeat." The singing is call and response in nature. Some suggest chanting or singing the name of a deity in order to be joined with the qualities of that deity we wish to exemplify. The article by Sexton and Dubrovsky provides a quote from Chris Wallis, a scholar of Indian religions describing medieval kirtan. "Some seekers chose to chant the names of a particular deity while others sang the names of different deities for different purposes. …It was said the effects of chanting were multiplied when many hearts were calling out the same mantras at once." "Chanting is a powerful spiritual practice," says Krishna Das. "…If you practice kirtan regularly, with sincerity and open-heartedness, every repetition of these mantras will have an effect and will bring real fruits to your heart, sooner or later."

Shakta Kaur Khalsa, author of *Kundalini Yoga,* defines kirtan as spiritual or sacred music. She says, "Another approach to meditation is to sing. Singing meditations open the heart as well as the lungs. Singing activates our eighth body, the pranic body, which brings fearless living. Singing songs of simple goodness and truth channel our emotions into a devotion of the highest, in ourselves and others."

Russill Paul states, "…through kirtan and other devotional practices, the bhakti teachers were echoing the fundamental premise of Patanjali's Yoga Sutra, that spiritual realization does not require and external mediator. God is inside you. They used kirtan as a way to get in touch with God's presence."

Kirtan developed many forms since its beginning, similar to the many types of yoga asana that have developed over the years. Some branches of kirtan highlighted introspection and others were celebratory often resulting in movement and dancing.

In his book, Paul presents an integrated intersecting system of the study and integration of the practices of Sound Yoga into the other components of yoga. He categorizes and presents four streams of sacred sound. They are Shabda

Yoga (mantra from the Vedic tradition), Shakti Yoga (sound and mantra from the Tantric tradition), Bhava Yoga (mantra, kirtan and japa from the Bhakti tradition), and Nada Yoga, (the classical term for Sound Yoga).

Bhakti Yoga: The Yoga of Devotion

As stated, kirtan is most often associated with the path of Bhakti Yoga. Dr. David Frawley author of *Yoga the Greater Tradition* explains that Bhakti yoga consists of concentrating one's mind, emotions and senses on the divine, both internally and externally. This may involve among other things, mantra and chanting in various forms. He further explains that it often rests on worshiping the Divine in particular forms called *devatas* in Sanskrit. He states it is a diverse approach to the infinite divine rather than a polytheistic approach. "Yoga gives us the freedom to worship the infinite in whatever form we like or as a formless entity. Everything comes from God, and all things reveal to us some aspect of universal reality. It is this inner freedom that is behind the many deities in the yoga tradition. The yoga of devotion teaches us how to merge into the reality of divine love. As such, it is the sweetest of the yoga approaches and is often more easily accessible…"

Georg Feuerstein, yoga scholar, is quoted from *The Shambala Guide to Yoga* as writing, "The path of bhakti yoga is constant remembrance of the Divine." It is, "the way of the heart," intended to channel and purify emotions through singing, dancing, meditation, and other activities that can help us merge with the beloved, according to Sexton and Dubrovsky.

Mantra

Mantra comes from the vedic *man* meaning "to think" and *tra* meaning "to free or protect." Originally, mantras were passed from teacher to student. As explained in the teacher training manual, "Mantra repetition is one of the oldest forms of meditation." As further explained, it requires concentration which leads to a meditative state as the mind becomes immersed in the vibrations.

Dr. Frawley defines mantra as, "special sacred sounds, songs, or even music." He describes several paths within yoga that utilize mantra. Bhakti yoga, the yoga of devotion, chants divine names. The yoga of knowledge has its affirmations of higher truth. Kriya and Kundalini yoga use special mantras along with pranayama and asana to awaken the chakras and Kundalini. "…Mantra is a kind of asana for the mind. We repeat the mantra as a means of developing prana and awareness, and forget all else. The mantra connects us to the deity, our higher self and the universal being, taking us through the

vibrations of cosmic sound beyond space and time…Mantras can change the patterns of our minds and prana, restructuring our life energies and expressions, and affording them higher levels of function," says Frawley. They require long-term repetition for their full empowerment.

He divides mantras into three types. First, "Bija, or seed mantras, are primal sounds that carry powerful forces than can heal the mind of unhealthy patterns down to the subconscious level." Next, are the names of the divine in its various aspects, forms and manifestations. These mantras occur in the Hindu and Buddhist traditions and show reverence to the divine. Finally, extended mantras "are mantric statements, prayers, affirmations and solicitations. They can be requests to the divine for grace, help, healing or other assistance in life, whether for mundane or spiritual purpose. Or they can project certain teachings or truths."

<u>Sanskrit and Primordial Sound</u>

Nicholai Bachman, author and Sanskrit scholar, explains, "Sanskrit is considered to be the mother of Indo-European languages." It is considered to be divine in origin and channeled through the sages. Sanskrit, he said, is designed for poetry and chanting and appeals to the left and the right brain. It is both logical and poetic.

The phonetics are also said to stimulate different energy frequencies and vibrate the pituitary gland which is located just above the palate and is the master gland of the endocrine system. Paul states, "The sounds of the individual Sanskrit letters and the basic sounds of human energy, such as grunts, groans, and other inarticulate sounds are codified in mantras that represent the flow and control of energy in and through the human organism."

Dr. Khalsa describes how "proper effective words and sounds" were derived from the practice of *naad* yoga, the yoga of sound.

> *"Many thousands of years ago the ancient yoga masters, whom many believe to be divinely inspired, selected special sounds that resonate and harmonize with the innate vibrations of the universe. These special sounds have specific physiological effects. They increase the brain's ability to operate at a higher level of intuition, perception, and cognition. They heighten the function of the neurological components that make spiritual perception possible."*

Dr. Deepak Chopra, MD and author of *Perfect Health*, describes nature's finest vibrations as primordial sound. He describes the name as coming from the "fainter-than-faint" sounds from which all nature is made. "In the complete stillness of the quantum mechanical universe, primordial sounds are born, form patterns, and in time blossom into matter, energy, an all the infinite variety of things made of matter and energy- stars, trees, rocks and human beings."

Invisible Vibrations to Quantum Physics

Luanne Oakes, PhD., describes the history of physics beginning in the 6th century B.C. with Greek philosophy and the word physics coming from a word, *physis*, meaning to see the essential nature of all things. Physicists of that time along with Chinese and Indian cultures had no distinction between inanimate and animate objects. Everything was in flow with the universe.

She further explains in contrast, the concept of duality began a distinction between spirit and matter. Matter was seen as dead passive building blocks. In the seventeenth century, Renee Descartes famously said, "I think, therefore, I exist." Mind and body became separate, and we did not think of ourselves as a part of one whole organism. Science and spirit became separate. This classic view of disconnectedness was perpetuated in thinking such as Newton's scientific theories of matter. Only what could be seen was real. This dualistic mechanistic thinking continued until the early 1900s.

Modern quantum physicists introduced the subatomic world. They described life as being interwoven. The seen and unseen are understood as inseparable. Dr. Chopra refers to this concept in our physical bodies as our "quantum mechanical human body." He describes it as, "the underlying basis for everything we are: thoughts, emotions, proteins, cells, and organs –any visible or invisible part of ourselves." He explains a quantum as the basic unit of matter or energy that is even smaller than an atom, 100,000 times smaller. At this minute level matter and energy are interchangeable, made of invisible vibrations, and waiting to take form. Chopra has blended and expanded upon the use of modern western medicine with ancient Ayurvedic wisdom.

Vibration and Sound

Sounds begin as vibrations that travel through the air. They cause our eardrums to vibrate. Vibrational signals of pitch and melody are transmitted to our brains through nerve impulses and the brain processes this as music. "The vibrations we create ourselves… have the most direct powerful effects,"

explains Dr. Khalsa. They strongly vibrate the brain as well as the pituitary and hypothalamus, which are located near the roof of mouth.

Physiologically, "the palate and the human ear function as a blueprint for the body's nervous system," according to Russill Paul. The palate has 82 reflex points which when activated by the tongue stimulate areas in the brain and parts of the body." Dr. Khalsa provides a count of 84 points that connect to the body's ethereal energy system and carry energy to the hypothalamus and pituitary gland which in turn, release chemicals and hormones throughout the body affecting healing, emotions and mood.

Dr. Khalsa also points out, "Vibrations can strongly stimulate the glands of the endocrine system especially those located in the head and the neck. Chanting certain mantras stimulates the vagus nerve. The vibratory effects of chanting also have other important physical actions." The benefits are paraphrased below.

- Improve immune function
- Increase brain hemispheric balance
- Send ethereal energy through the nadis
- Quiet inner dialogue
- Help maintain genetic integrity by potentiating proper DNA replication

Hernandez writes, "This sound [singing and chanting] touches our depths more than any of the other senses because it comes from the deepest part of us. It makes contact with us in a very physically intimate way, and in a sense, it is exercise for our molecules." She further explains our ears hear the sound and turn it into energy which feeds our brain. In addition, music resonates through our bones. Dr. Khalsa explains,

> *"Resonance is the scientific principle that encourages the merging of sounds. When one vibration strikes an object with a similar vibration, the two objects begin to resonate, or vibrate together harmoniously. Also each will vibrate more forcefully. In music, resonance creates many more beautiful tones. Various parts of the human body resonate with specific sound frequencies. Certain body cavities, such as the sinus cavities resonate with particular tones and frequencies. High pitches tend to resonate with smaller cavities and structures, and low pitches resonate with larger cavities and structures. Because of this, certain words and sounds have direct effects upon different areas of the body."*

Alfred Tomatis, an ear nose and throat physician, researcher, and surgeon, described one function of the ear is to charge the brain with energy by the way it produces sounds. His research found that high pitched sounds energize (charge) and low pitched sounds discharge the nervous system and decrease

our energy. He explained another function of the ear is to translate the sound vibrations that we receive through our skin and bones and all things that send sound into us. We receive the benefit of sound vibrating within our bodies, but we also receive benefits from sound on our bodies.

Dr. Luanne Oakes describes that every living thing is created from sound and light which are the building blocks of all matter. Sound and light travel on parallel wavelengths 40 octaves apart. Sound precedes light. Our bodies are composed of molecules vibrating at specific frequencies. Sound and light are the building blocks of all frequencies. Dr. Oakes also asserts that light and sound evoke feelings, emotions, and therapeutic healing responses.

"Sound is the emanation of any tone, frequency, or vibration. Quantum physicists tell us that in order for anything to exist it has to be in motion, vibrating. Conversely, if any object is in motion, it is producing a frequency – a specific tone… Life is vibration, tone and rhythm," summarizes Paul.

Sexton and Dubrovsky state, "Perhaps the positive effect comes from the vibration or from the content of the chants themselves." They interviewed Ishwari, the lead singer of SRI Kirtan, who indicates, "A lot of secular music is negative: It's about sadness, heartache, and loss." When the authors interviewed Donna DeLory, another chant artist (and incidentally Madonna's former backup singer for twenty years) said, "People don't realize pop music is full of mantra, but the mantras are things like 'I want to party all night.' Imagine if we were all walking around singing, 'I am divine love.'"

To sum it up, author Ana Hernandez said it well, "At its most basic level, sound is merely vibration. Nothing big, only the cause of everything."

<u>Bliss</u>

The brain is always seeking pleasure as a point of equilibrium. The source of the pleasure is not relevant. It can be chocolate or music or intimacy. Doug Lisle, PhD, and author of *The Pleasure Trap*, describes our primary pleasure neurochemicals as dopamine and endorphins. Dopamine excites the pleasure centers in the brain providing a feeling of euphoria, excitement, and satisfaction. Endorphins provide a sense of relaxation. They are the body's natural pain killers.

Drs. Luanne Oakes and Candace Pert, both PhDs, who independently studied pharmacology, have confirmed our feelings of bliss and oneness are produced on a biological molecular level.

"Ayurveda tells us that pure joy is a fundamental quality of life," explains Dr. Chopra. "In Sanskrit this quality is called *ananda*, which is usually translated as bliss." He goes on to explain, "Like intelligence, bliss is an end product. It resides in the quantum mechanical body in pure form and bubbles to the surface only under the right conditions. You cannot see or touch the thousands of processes in the brain and body that need to be coordinated in order to create bliss, but there is a definite feeling - pure joy – that can be felt that proves that bliss exists."

<u>Sound, Music, the Brain, and Emotions</u>

"Sound is powerfully linked to our feelings; it causes our cells and tissues to vibrate, activating a range of experience far beyond what they eyes are capable of perceiving. Music… is the organization of specific tones or frequencies, located at specific distances- or musical intervals- from each other. Music is the perception and understanding of the underlying order and relationships among all these vibrations expressed in melody, rhythm, and harmony," explains Paul.

Daniel Levitin, musician and former music producer turned cognitive neuroscientist, studies the brain and its relationship to music. He has shown we have emotional reactions to music. Listening to music you like produces endorphins, the body's own feel-good neuropeptide. This transforms the experience into pleasure.

In an article titled *Why Your Brain Craves Music*, Dr. Joseph Mercola, MD, summarizes findings of recent studies involving intellectual and emotional areas of the brain involved when experiencing music. "Much more is happening in your body than simple auditory processing. Music triggers activity in the nucleus accumbens, a part of your brain that releases the feel-good chemical dopamine and is involved in forming expectations. At the same time, the amygdala, which is involved in processing emotion, and the prefrontal cortex, which makes possible abstract decision-making, are also activated, according to new research published in the journal *Science*."

Most people have experienced hearing the soundtrack of a television program or a movie and having a clue of either a happy ending, or perhaps sadness, or even imminent danger. The sounds can lead to a visceral feeling, cause a startle response or even prompt looking away. Another example is hearing a song that takes you back and cues your memory to a specific time or specific event in your life's history.

Scientist Charles Limb scanned the brain of a jazz musician participating in improvisation. The medial prefrontal cortex went way up in activity. The brain also stopped censoring itself and the creative brain became active. He found the caudate becomes active when composing music and focusing on rhythm. The caudate is the part of the brain that plans and organizes body movement in response to emotion.

The corpus collosum is the fibrous tissue that connects the right and left hemispheres of the brain. Dr. Levitin found that in better musicians, it is very active. Amateur and non-musicians tend to use the right hemisphere to process pitch and melody and the left hemisphere for language. Accomplished musicians spread the process between the two hemispheres. Dr. Khalsa also provides information regarding the integrated nature of the brain involved in chanting:

> *"Another important effect of the chanting of mantras is the unification of the hemispheres of the brain. The right side is active when you sing, rhyme, make vowel sounds, create metaphors and speak with emotion. The left hemisphere is relatively more involve with non-emotional statements, proper word usage, grammar, logic, and consonant sounds. The two hemispheres are connected primarily by a band of nerves called the corpus callosum, and secondarily by the limbic system and the hypothalamus. These structures connect emotion to logic, vowels to consonants, and grammar to metaphor. The best way to activate and connect the two hemispheres is through repetitive use of particular phrases. When repetitive phrasing is combined with breath and patterned movement the two sides of the brain are stimulated to function in optimal concert. This harmonious function of the brain creates the best healing environment through the triad of mind, body and spirit. The endocrine system is balanced, the nervous system is energized and circulation is stimulated.* "

<u>Some Clinical Studies of the Effects of Music</u>

"…A meta-analysis by Levitin and colleagues found some striking benefits of music after reviewing 400 studies. Among the data was one study that revealed listening to music resulted in less anxiety and lower cortisol levels among patients about to undergo surgery than taking anti-anxiety drugs. Other evidence showed music has an impact on antibodies linked to immunity and may lead to higher levels of bacteria-fighting immune cells. Still more research revealed that playing music in the neonatal intensive care unit (NICU) improved the health of premature babies with respiratory distress or sepsis. When parents sang to their babies, or sounds mimicking those in the womb were played, numerous benefits occurred, including changes in heart rates, sucking behavior and parents' stress levels," summarized Dr. Mercola.

The Breath

According to Dr. Khalsa, "Breath creates movement, pulsation, vibration, and life. With breath we bring some of the outer world into us, and we release some of ourselves into the world. "The word *spirit* comes from the Latin *spiritus*, "breath". He says, "Breathing can change the type and quantity of peptides produced by the brain stem." He explains all the peptides are present in the respiratory system and can be a reason that deep breathing can calm the mind and help reduce anger and fear as these peptides circulate. "In addition, the mantras also produce certain breath patterns which also influence brain and endocrine function."

Ana Hernandez notes that chanting moves energy through our breath. We make sound which moves energy. She provides an example of small movement as a voice, and an example of large movement is an avalanche.

Russill Paul retells, "An ancient story from the Sufi tradition points to the connections between life, breath, body, and music.

> *When the Creator fashioned the human body, the human soul reused to enter because it didn't want to take on the body's limitations. The Creator then began to play music. In order to feel the fullness of this music through the senses and receptivity of the human form, the soul was coaxed into the body. The soul continues to receive its life from the Creator by breathing in this music.*

Indeed, the Divine is continually replenishing our life through the music of our breath."

Music and Feeling Connected

The previously referenced article by Dr. Mercola also touched upon the concept of feeling unity. It explained, "…music also has an, almost uncanny, ability to connect us to one another. Separate research… showed one reason for why this might be. When listening to four pieces of classical music they had never heard before, study participants' brains reacted in much the same way. Areas of the brain involved in movement planning, memory and attention all had similar activation patterns when the participants listened to the same music, which suggests we may each experience music in similar ways.
The study's lead author [V. Menon] noted:

> "*We spend a lot of time listening to music -- often in groups, and often in conjunction with synchronized movement and dance … Here, we've shown for the first time that*

despite our individual differences in musical experiences and preferences, classical music elicits a highly consistent pattern of activity across individuals in several brain structures including those involved in movement planning, memory and attention."

Co-author Daniel Levitin, PhD, expanded:

> *"It's not our natural tendency to thrust ourselves into a crowd of 20,000 people, but for a Muse concert or a Radiohead concert we'll do it … There's this unifying force that comes from the music, and we don't get that from other things.*"

"Singing together releases the hormone oxytocin which engenders feeling of trust and bonding," Levitin states. He says that music was also used by our ancestors to comfort one another and form social bonds.

Through another musical process called entrainment our brains use the power of rhythm to shape our feeling and our actions as well. Entrainment is the ability of one vibration to affect another. Music is thought to be the best way to synchronize a large group of people. "From heartbeat to drumbeat, music has literally swept people into action for hundreds of thousands of years," says neuroscientist Peter Janata in the documentary *The Musical Brain*.

The documentary proposed several ideas. The evolutionary purpose of music is that it helped us to create social bonds with large groups of people. Our communal response to music unites us in social rituals. Familiar musical themes reinforce our human bonds of sorrow and celebration. The power of musical entrainment can also synchronize human aggression or fill us with the courage we need to stop it.

<u>Molecules of Emotion: Neuropeptides and Biochemistry</u>

Candice Pert, PhD, neuropharmacologist, and author of *The Molecules of Emotion*, describes endorphins as the body's own pain suppressors and ecstasy inducers. They are known as the body's own morphine-like substances. She has been credited with playing a pivotal role in discovering the body's endorphin system and discovering the opiate receptor in 1972. Ligands are endogenous chemical messengers that have a specific composition, shape and structure to fit into specific receptor sites throughout the body. Pert expanded upon the traditional analogy of the ligand as the key to the receptor's keyhole. The response to a chemical cue from a ligand by a receptor includes vibrating, changing shape and then attaching to a cell's membrane. Vibration is part of the biological functioning in our bodies at the cellular level. From there, the receptor transmits messages into a cell's interior and initiates chains of

biochemical events which eventually translate into behavior and activity. The ligand-receptor system is thought of as a second nervous system that is more ancient than the brain. Endorphins were made inside cells before brains existed, explains Dr. Pert.

Her work further notes that science's understanding of the way the brain and the central nervous system function has moved away from the theory of electrical-type communication of wiring to a more of a chemical exchange theory. As an example, the endocrine, immune and digestive systems are all connected to one another. The three chemical types, or categories, of ligands (neurotransmitters, steroids, and peptides) and their receptors are found in all of these areas and regulate multiple systems. Neuropeptides carry, process, exchange and store the information across the systems. Simply put, everything is connected to everything else.

Dr. Pert continued studying the opiate receptor's action in the brain and the limbic system. The limbic area of the brain regulates emotion and memory. It connects the higher and lower functions of the brain. The opiate receptors followed the same pathways as the neurons connected to the limbic system. This laid the groundwork for her discovery to the mind –body connection and to the discovery of the molecular way we experience emotions. Through encounters with yogis later in her career she was able to see how this system also correlates to the chakra system.

Dr. Khalsa explains, "The chakras emanate from the center of the spinal cord and are the ethereal component s of our physical nerve plexuses, organs, and glands. They exchange energy bi-directionally from physical to ethereal and ethereal to physical." He further describes the *nadis* which are nonphysical energy conduits connecting the chakras to the rest of the body. They are the ethereal counterpart to the physical body's peripheral nerves. "Three nadis are of particular importance, because they are connected to the brain's limbic system, which controls memory and emotion. It also coordinates the functions of the hypothalamus, and helps control the endocrine system's master gland, the pituitary. These three nadis, the *ida*, *pingala*, and *shushmana*, have a tremendously important effect on the body's biochemistry."

Paul asserts that, "The yoga of sound works essentially with transformation, restoration, and reconstitution of the energies of the soul through channels known as nadis which are subtle channels of the chakra system related to the soul's infrastructure. Whereas Hatha Yoga teaches us how to effectively

manage and purify the dense aspects of our being (blood, cells and tissues), the Yoga of Sound maintains the subtler aspects of our being (thoughts, emotions and states of consciousness) and helps keep them free of psychic and spiritual toxicity."

Dr. Pert explains that opiate receptors are concentrated in the periaqueductal gray area (PAG) of the brain. This area of the brain is where the pain threshold is set and perception of pain is modulated. Dr. Dharma Singh Khalsa in *Meditation as Medicine* also describes the PAG area as an area that controls anger and fear. In her article entitled *Karma is Chemistry: Finding Bliss through Community and Chant*, Dearbhla Kelly states, "Stimulating the PAG stimulates the release of serotonin and enkephalins (another type of endogenous opioid, feel-good chemical and pain reliever like endorphins)."

Through her work, Dr. Pert also came to understand that emotions neither originate solely in the head nor solely in the body, but rather originate and move bi-directionally. There are areas in the body where there are high concentrations or nodal points of where receptors are found and information congregates. She believes "what we feel as an emotion or feeling is also a mechanism for activating a neuronal circuit throughout the brain and the body…Mind doesn't dominate body, it becomes body. Body and mind are one." So feelings and emotions require generation of various neuropeptides and neurotransmitters.

<u>Anandamide</u>

This neuropeptide was named for the Sanskrit word for bliss, *ananda*. The discovery of the "bliss receptor" or the binding site for the active ingredient in marijuana (THC- short for tetrahydrocannibol) came first. Scientists reasoned there must be an endogenous substance that fit into this site. Anandamide was the substance, the key to fit the receptor's lock. Our body's production of this ligand and its subsequent attachment to a receptor in the brain affects our sense of happiness. Ananadamide also plays a role in making and breaking short term neural connections, according to Fred Senese.

Elizabeth Landau interviewed Dr. Levitin for an article, and he stated, "The next frontier in the neuroscience of music is to look more carefully at which chemicals in the brain are involved in music listening and performing, and in which parts of the brain are they active. Any given neurochemical can have different function depending on its area of the brain," he said. The article explains, "For instance, dopamine helps increase attention in the frontal lobes,

but in the limbic system it is associated with pleasure. By using music as a window into the function of a healthy brain, researchers may gain insights into a slew of neurological and psychiatric problems. Knowing better how the brain is organized, how it functions, what chemical messengers are working and how they're working -- that will allow us to formulate treatments for people with brain injury, or to combat diseases or disorders or even psychiatric problems," Levitin said." This brings to mind the increasing use of physical yoga and asana in therapeutic capacities. Perhaps this research will lead to increased use of chanting and kirtan and the yoga of sound in similar situations in the future.

Samadhi (Unified Awareness)

Russill Paul states, "The use of mantra keeps us attuned to the high vibration of Samadhi and moves our activities toward that goal… Mantras establish union to form dynamic energy relationship between our soul and the rest of the universe, resulting in a bidirectional flow of intelligence that enriches our consciousness and creates the ecstasy that is Samadhi."

In a workshop presented by David Newman, another modern day kirtan artist, said, "Kirtan opens the heart and gives the mind a place to rest." As I reflect on the meaning of Yoga sutra *Yogas Citta Vritti Nirodhah* translated as stilling the fluctuations of the mind, I find for myself that along with asana, kirtan and chanting are the best methods in working toward stilling the fluctuations of my own mind and heading in the direction of finding the bliss of Samadhi.

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