

The Modulatory Effects of Hormones on *Sato, Rajo and Tamo Guna*

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Abstract: Hormones are a substance which, produced in any one part of an organism, is transferred to another part and there influences a specific physiological process. Hormones are chemical messengers which can trigger genetic flow of information. It conduct a wide variety of functions ranging from human action and behaviour, growth, vegetative and sexual development, cellular oxidation to thermal production and the metabolism of bio molecules. The interaction of hormone and receptor typically triggers a cascade of secondary effects within the cytoplasm of the cell. With the help of receptors, the cell got information from surroundings or from previous genes. An attempt has been made an efforts the working function of hormones to regulate the three qualities i.e. Satv, Rajo, Tamo as mentioned in Shrimad Bhagwad Gita. A possessive of these *gunas* control the journey of life before birth to liberation by developing the karma Sanskara which brings the 84 lakhs of Yonis. In this paper we put forward the scientific bases of three gunas with the help of hormonal action.

Keywords : Shrimad Bhagwad Gita, Endocrine System, Hormones

Introduction

Hormones are the chemical messengers that have specific regulatory effects on certain cells or organs. In 1904, William M. Bayliss and Ernest H. Starling of London University College use the term hormone, who showed that a chemical substance (*secretin*) from the intestine could stimulate the action of a pancreatic secretion. These substances were then called as 'chemical messengers'. In 1937, Went and Thimann defined a hormone as "a substance which, produced in any one part of an organism, is transferred to another part and there influences a specific physiological process." [1] Hormones from the endocrine glands are released directly into the bloodstream, which carries them to all parts of the body. They regulate growth, metabolism, reproduction, and behaviour. Some hormones affect many tissues, for example, growth hormone, thyroid hormone, and insulin. Others affect only specific tissues. The specific tissue acted on by each hormone is the target tissue. The cells that make up these tissues have receptors in the plasma membrane or within the cytoplasm to which the hormone attaches. Once a hormone binds to a receptor on or in a target cell, it affects cell activities, regulating the manufacture of proteins, changing the permeability of the membrane, or affecting metabolic reactions [2].

Types of Hormones

Like three *gunas* Hormones are also 3 types which govern entire system. The three types of hormones are steroid hormones, protein and peptide hormones and amino acid derivatives [3]. Due to their distinct chemical properties, the different types of hormones will have different mechanisms of action.

a) Steroid Hormones

Steroid hormones are lipophilic (fat-loving) – meaning they can freely diffuse across the plasma membrane of a cell. They bind to receptors in either the cytoplasm or nucleus of the target cell, to form an active receptor-hormone complex. This activated complex will move into the nucleus and bind directly to DNA, acting as a transcription factor for gene expression. Examples of steroid hormones include those produced by the gonads (i.e. estrogen, progesterone and testosterone). A **steroid hormone** is a steroid that acts as a hormone. Steroid hormones can be grouped into two classes: corticosteroids (typically made in the adrenal cortex, hence *cortico-*) and sex steroids (typically made in the gonads or placenta). Within those two classes are five types according to the receptors to which they bind: glucocorticoids, mineralocorticoids (corticosteroids), androgens, estrogens, and progestogens (sex steroids). Vitamin D derivatives are a sixth closely related hormone system with homologous receptors. They have some of the characteristics of true steroids as receptor ligands. Steroid hormones help control metabolism, inflammation, immune functions, salt and water balance, development of sexual characteristics, and the ability to withstand illness and injury. The term **steroid** describes both hormones produced by the body and artificially produced medications that duplicate the action for the naturally occurring steroids [4][5][6].

According to Shrimad Bhagwad Gita Chapter 14, slok 7 Shri Krishna told about the characteristics of *Rajo Gunai*. e desire and attachment where in science these are the characteristics of Steroid Hormones

b) Peptide Hormones

Peptide hormones are hydrophilic and lipophobic (fat-hating) – meaning they cannot freely cross the plasma membrane. They bind to receptors on the surface of the cell, which are typically coupled to internally anchored proteins (e.g. G proteins). The receptor complex activates a series of intracellular molecules called second messengers, which initiate cell activity. This process is called signal transduction, because the external signal (hormone) is transduced via internal intermediaries. Examples of second messengers include cyclic AMP (cAMP), calcium ions (Ca^{2+}), nitric oxide (NO) and protein kinases. The use of second messengers enables the amplification of the initial signal (as more molecules are activated)

Peptide hormones include insulin, glucagon, leptin, ADH and Oxytocin. Peptides occur naturally in every cell of every living thing. They have a number of functions, including the production of enzymes to help your body break down foreign substances, and create antibodies for your immune system. Without peptides, life would not be possible.[7]. The peptide hormone brings the good qualities of human body by providing strong immunity. Shri Krishna in Shrimad Bhagwad Gita gave the answer to Arjuna that Satv Guna are the source of happiness, pleasure and comfort. Where in science the peptide hormones make the body disease free and fought against foreign substances and make the body comfort and happy without this hormone life would not be possible. Without peptide hormones life is not possible whereas without Satv Guna life and Liberation is not possible.

c) Amine Hormones

Amine hormones are derived from the amino acid tyrosine and tryptophan. Two types of tyrosine derived hormones, they are :

1. Thyroid hormone is the most important as it regulates the development of organs and metabolism.
2. Catecholamines - Norepinephrine and epinephrine are catecholamines. They are stress hormones and are neurotransmitters.

Tryptophan amino acid is the precursor of hormones like serotonin and melatonin. Serotonin regulates the movement of the intestines and is also associated with mood and low levels of this hormones often result in depression [8].

Whereas *Tamo Guna* governs negligence, ignorance and laziness. *Tamoguna* person can't complete their work on time and always take a stress. This stress is governed by Amine hormones

Biofeedback and Hormones

Stress in the form of physical injury, disease, emotional anxiety, and even pleasure calls forth a specific response from the body that involves both the nervous system and the endocrine system. The nervous system response, the “fight-or-flight” response, is mediated by parts of the brain,

especially the hypothalamus, and by the sympathetic nervous system, which releases epinephrine. During stress, the hypothalamus also triggers the release of ACTH from the anterior pituitary. The hormones released from the adrenal cortex as a result of ACTH stimulation raise the levels of glucose and other nutrients in the blood and inhibit inflammation. Growth hormone, thyroid hormones, sex hormones, and insulin are also released. These hormones help the body meet stressful situations. Unchecked, however, they are harmful to the body and may lead to such stress-related disorders as high blood pressure, heart disease, ulcers, back pain, and headaches. Cortisones decrease the immune response, leaving the body more susceptible to infection. Although no one would enjoy a life totally free of stress in the form of stimulation and challenge, unmanaged stress, or “distress,” has negative effects on the body. For this reason, techniques such as biofeedback and meditation to control stress are useful. The simple measures of setting priorities, getting adequate periods of relaxation, and getting regular physical exercise are important in maintaining total health.

Human Life cycle and Hormones

Some of the changes associated with aging, such as loss of muscle and bone tissue, can be linked to changes in the endocrine system. The main clinical conditions associated with the endocrine system involve the pancreas and the thyroid. Many elderly people develop adult-onset diabetes mellitus as a result of decreased secretion of insulin, which is made worse by poor diet, inactivity, and increased body fat. Some elderly people also show the effects of decreased thyroid hormone secretion. Sex hormones decline during the middle-aged years in both males and females. These changes come from decreased activity of the gonads but also involve the more basic level of the pituitary gland and the secretion of gonadotropin hormones. Decrease in bone mass leading to osteoporosis is one result of these declines. With age, there is also a decrease in growth hormone levels and diminished activity of the adrenal cortex. Thus far, the only commonly applied treatment for endocrine failure associated with age has been sex hormone replacement therapy for women at menopause. This supplementation has shown some beneficial effects on mucous membranes, the cardiovascular system, bone mass, and mental function.

Karma Sanskaar

"Karma" literally means "deed" or "act", and more broadly names the universal principle of cause and effect, action and reaction, which Hindus believe governs all consciousness. Karma is not fate, for we act with what can be described as a conditioned free will creating our own destinies. Karma refers to the totality of our actions and their concomitant reactions in this and previous lives, all of which determine our future. The conquest of karma lies in intelligent action and dispassionate reaction. Not all karmas rebound

immediately. Some accumulate and return unexpectedly in this or other lifetimes. Human beings are said to produce karma in four ways

- through right attitude words
- through thoughts
- through actions that we perform ourselves
- through actions others perform under our instructions

Everything that we have ever thought, spoken, done or caused is karma, as is also that which we think, speak or do this very moment. According to the hindu scriptures karmas are divided into three kinds:

- *Sanchita* is the accumulated karma. It would be impossible to experience and endure all karmas in one lifetime. From this stock of *sanchita karma*, a handful is taken out to serve one lifetime and this handful of actions, which have begun to bear fruit and which will be exhausted only on their fruit being enjoyed and not otherwise, is known as *prarabdha karma*.
- *Prarabdha* : Fruit-bearing karma is the portion of accumulated karma that has "ripened" and appears as a particular problem in the present life.
- *Kriyamana* : It is everything that we produce in the current life. All *kriyamana karmas* flow in to *sanchita karma* and consequently shape our future. Only in human life we can change our future destiny. After death we lose Kriya Shakti (ability to act) and do

(*kriyamana*) karma until we are born again in another human body.

Some believe that only human beings who can distinguish right from wrong can do (*kriyamana*) karma Therefore, animals and young children are considered incapable of creating new karma (and thus cannot affect their future destinies) as they are incapable of discriminating between right and wrong.

Tulsidas, a Hindu saint, said: "Our destiny was shaped long before the body came into being." As long as the stock of *sanchita karma* lasts, a part of it continues to be taken out as *prarabdha karma* for being enjoyed in one lifetime, leading to the cycle of birth and death. A Jiva cannot attain moksha (liberation) from the cycle of birth and death, until the accumulated *sanchita karmas* are completely exhausted

Unkindness yields spoiled fruits, called *paap*, and good deeds bring forth sweet fruits, called *punya*. As one acts, so does one become: one becomes virtuous by virtuous action, and evil by evil action. By these *paap* and *Punya* karmas one can get birth and death cycle again and again. According to these *gunas* one can do their Karmas. That's why Shri Krishna said to Arjuna that without Karma no one can live and they got their result accordingly. One who done good work (*punya*) they got good result and one who always done sins (*paap*) they got bad results. The *Gunas* are influenced externally by *Prakriti* (nature) and internally by Genes (come from ancestors) [Fig 1].

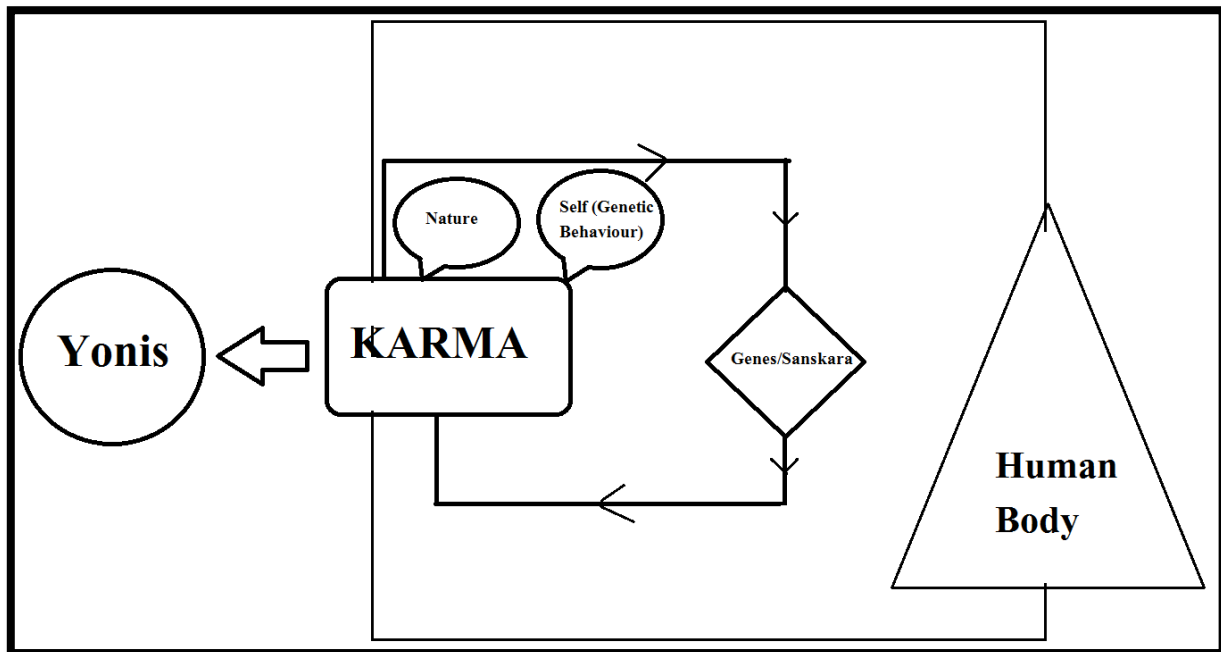


Fig 1: Shows the life cycle of karmas to Yonis.

Regulatory path and 84 lakhs of Yonis/Species

According to the Vedas, there are 8.4 million species of life and the conditioned soul is continuously passing through the different species according to his karma, under divine supervision. The Bhagavad Gita (2.22) says that just as one

gives up an old shirt to put on a new one, the soul gives up an old body to acquire a new kind of body (*vasāmsijirṇāniyathā vihāya*). Thus there are 8.4 million (84 lakh) types of bodies, out of which the soul assumes a

body at the time of death. If one spends his lifetime in sense gratification, then one may become a cat or dog. If one is attached to eating meat, he gets the body of a tiger wherein he gets full facility for eating flesh without the encumbrance of cleaning and cooking the meat. If one's stock of pious activities is high, then he gets elevated to the heavenly planets, where he gets the body of a *devatā* (demigods). However all the bodies within the ambit of the 8.4 million species, including that of the demigods, are subject to birth and death. All such bodies have a limited period of life, after which one has to give it up to assume a new body. This process of giving up one type of body and assuming a new one is called death. It is pertinent to note that it is the body that dies and not the spirit soul, who is occupying the body.

According to Padma Purana

जलज नव लक्षाणी, स्थावर लक्ष विम्शति, कृमयो रुद्र संख्यकः।

पक्षिणाम दश लक्षणं, त्रिंशत् लक्षानी पशवः, चतुर लक्षाणी

मानवः॥ - (78:5 पद्मपुराण)

that the 8.4 million species of life are divided into six groups, namely aquatics, trees, insects, birds, animals and humans. There are nine hundred thousand (9 lakh) types of aquatics, two million (20 lakh) types of trees, 1.1 million types of insects, a million types of birds, three million types of animal bodies and four hundred thousand types of human bodies. These aggregate to 8.4 million. All the bodies within the ambit of the 8.4 million species are sure to degenerate and ultimately die. Therefore one who is really intelligent understands the futility of all the activities that one carries out during his lifetime, the results of which will be finished at the time of death. Therefore he tries to understand the real purpose of human life and when he makes such an inquiry, the Supreme Lord, Who is seated within his heart, guides him on the transcendental path, where he understands that one has to get out of this cycle of 8.4 million species of life. Liberation (*mukti*) means putting a stop to the journey within the cycle of 8.4 million species. When one breaks this cycle, one is liberated from repeated birth and death, and is transferred to the spiritual sky, where he gets an eternal body. This body that he gets in the spiritual world is free from birth and death, because it is made of *sat* (eternity), *cit* (knowledge) and *ananda* (bliss). Once we reach the spiritual realm, there is no chance of our falling back into the miserable cycle of 8.4 million species of life.

Conclusion

The living body possesses remarkable communication system to coordinate its biological function. The endocrine system acts through a wide range of chemical messengers known as “Hormones”. The tissues or organs where hormones are produced are called as effectors and those where they exert their influence as targets. In science, our behaviour, tasks, growth, metabolism, maintenance and reproduction all (include *Satv, Rajo and Tamo Guna*) are governed by the

three types (based on the chemical nature) of hormones which are known as Peptide and Protein Hormones, Steroid Hormones and Amino acid or amine Hormones. But on the other side when we studied Shrimad Bhagwad Gita we saw that the functions of the hormones are well known to Shri Krishna in the form *Satv, Rajo and Tamo Guna*. It was explained the functions of these *gunas* in very detail in Chapter Fourteen. It has been described the function of each *gunas* and how one can get their next *Yoni* with the help of the mentioned *gunas*. *Sato, Rajo and Tamo Gunas* also seem to follow similar mechanism of a hormonal influence which modulate the human body function. Here Shri Krishna also narrated the Karma Sanaskar to Arjuna. It also further explains the possible mechanism of Karma Sanaskar through 84 lakhs of *yonis* according to the release of different process of hormonal action. The ancient literature shows that these *gunas* are governed by Purush (himself or genetic information) and Prakriti (Nature). For example, Angulimala Danku (Criminal) is a well known murderer/thief. The literature shows that he changes himself when he interacts with Gautama Buddha. Here genes are not responsible to change him but *Prakriti* does its job. Afterwards he left all the suspected crime and attains Moksha (liberation). Whereas in the case of *Purush* one can get information (genetic) from their ancestors. The three *gunas* and hormones are controlling centre of One's Karmas. According to Shrimad Bhagwad Gita one can get good karmas they can get upper *Yoni* and if anyone can do bad karmas they can get lowest *Yonis*.

We hope that hormonal change sheds light on the various theories of rebirth phenomenon and make a possible understanding of Karma Sanskara includes *Sato, Rajo and Tamo Gunas*.

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