

## COMPARATIVE STUDY OF *KARMA* AND THE SCIENCE OF GENETICS

### CORELATION BETWEEN *KARMA* AND *GENES*

In Psychology, the difference, between the living organism (*jīva*) and life is very specific. The study of *karma* theory makes the difference quite clear. Heredity is related to life, in the same way *karma* is related to the *jīva*, in which all the *karmas* and reactions of so many pre-births are accumulated in the form of *karma śarīra*.<sup>1</sup> So the individual ability and extra ordinary talent not only base on present life it can be traced out beyond it in the accumulated *karmas* bonded with *jīva* i.e. *karma śarīra*.<sup>2</sup>

Biology believes that the important component of body is *gene*. It is the characteristic formula, it is very subtle. Every *gene* contains sixty lakhs of orders in it. Its subtleness is a merely hypothesis. Where does our consciousness reside? Whether it is present in chromosomes and *genes*? That is why so much difference is there from man to man. Every one's self-exertion is not same. Every one's consciousness is not the same. As per doctrine of *karma* the cause of this dissimilarity is due to "*karma*".<sup>3</sup>

Once *Gandhara Gautama* asked Lord Mahāvīrā<sup>4</sup> : *kammoṇaṃ bhante jīve no akkammāo vibhakti bhawaṃ pariṇamaṃ*. There appears dissimilarity in whole world, some possess less knowledge and the other possess more. What is reason of this?

**Mahāvīra replied, "*karma* is the cause of this dissimilarity".**

**If a biologist of today is asked this question, he will reply that the root cause of all dissimilarity is "*gene*".** The characteristics of *genes* and chromosomes determine the human personality. His temperament and behaviour becomes the same as the *genes* are. This *gene* is responsible for all dissimilarities.<sup>5</sup> As per biology every *gene* contains sixty lakhs orders in it. As per Doctrine of *karma* on every *karma* particle written infinite instructions.<sup>6</sup>

Now science has been able to reach only upto the *genes*. *Gene* is the component of physical body, but *karma* is the component of subtle body.

Inside this physical body lies astral body—the electric body which is subtle and *karma śarīra* which is subtler than that, it is the subtlest. It's every part has infinite inscriptions. All records of our self-exertion, of goodness, of bad works, of limitations and of specialties are inscribed in the *karma* body. Man begins to behave according to vibrations received from *karma śarīra*. The theory of *karma* is very subtle. It is the theory beyond the subtle intellect. Today's science of the genetics has helped us in understanding this theory of *karma*.

*Genes* are the transporters of heredity characteristics.<sup>7</sup> The difference, perceptible in every man, is due to the *genes*. For every special characteristic, a special type of *gene* exists. **These laws of heredity are the messenger laws of *karmavāda*.**<sup>8</sup>

The travel from the physical body upto the subtle body, is very important in itself. This body is physical, and it is made of subtle biological cells. There are about 100 trillion cells in human body. If these cells are understood according to the Jaina Philosophy, that at the point of a needle, infinite *nigoda jīvas* be accommodated there.<sup>9</sup> *Nigoda* is one of the species of vegetation. It is a subtle secret thing. But the present science also postulates many subtle concepts. There exist trillions of cells in our body, and they contain the chromosomes, and every chromosome is made of 1-2 thousand *genes*. There are 46 chromosomes in one cell in our body which are made of *genes*. *Genes* are very subtle.

If a comparative study is made, the heredity, *genes* and all the chemicals changes—all three are the Doctrine of *karma*. *Gene* is the component of our physical body, and the *karma* is the component of our subtler body (*karma śarīra*). Both are intertwined with the body. ***Ācārya Mahaprajñā* says, that *genes* not only transport the traits of parents, but they also represent our bonded *karmas*.**<sup>10</sup>

## Parapsychology

The parapsychology comes closer to find the answer as to what is behind *genes*? They claim that we have unconscious mind and a subconscious mind. As per Jainism unconscious mind is *karma śarīra* and the sub-conscious mind is *taijasa śarīra* (*leśyā* and *bhāva* from *taijasa śarīra*). They talk about things that are controlled by other than the senses. They talk about ESP (Extra Sensory Perception). They talk about telepathy (sending thoughts/feelings from one person to another), Clairvoyance, (awakeness of objects, things without use of senses), pre-recognition (knowledge of future events) and psychokinesis (mind over matter). We say there are *avadhi jñāna* (knowledge limited by area, time and feelings), *manahparyava jñāna* (knowledge of other's thoughts) and *kevala jñāna* (perfect knowledge). **These three knowledges are not dependant on our senses and mind. *Karma śarīra* and its effect on our soul are behind every thing. Similarly *karma śarīra* is behind *genes* also.**<sup>11</sup>

Thirty five years ago when the science of genetics was still in its infancy in the west, my "God *gene*" (read spiritual hunger) became active and I found myself in India Sitting at the feet of a great *Mahātmā*. His view of spiritual practice as a preparation for enlightenment was based on the idea of burning out or exhausting the traces of *karma* (read soul *genes*) that has accumulated in the casual body (read DNA). I don't know where the first references to the God *gene* appear in Vedic literature but the idea is certainly many thousand years old. **The DNA that the west has been investigating and is meant to contain the "God *gene*" among others, it is known as the *karma śarīra* or the casual body in Vedantic literature.** It is called casual because, like the DNA, it is the cause of the psyche and the motivating force behind action. The *genes* themselves are referred to as *vāsanās* or *saṃskāras*. **The way the casual body manages the *vāsanās* is similar to the way the DNA is thought to manage the *genes*.** The *Vāsanās* explain how psychic material passes through time, survives then death of the physical and comes to generate new life. The *Vāsanās* are responsible for psychological as well as physical traits. In fact, the search for the ultimate building blocks of life is a search for its cause the *Vāsanās* are the *genes* for *genes*; they are the link between non-material unmanifest consciousness

(called spirit or God in the west) the source of life, and its subtlest manifestation, the DNA which contains the *genes*. Although it has discovered the DNA and its genetic material. Western science will discover the *vāsānās*, except by inference because its epistemology is ultimately based on sense data; **the Vāsānās are much subtler than the senses.**<sup>12</sup>

India's reputation as the world's super power is well deserved. Long before the 'west' as we know it embarked on the enquiry into the nature of the material world that is now modern science the Vedic seers had developed a method called "yoga" that allowed them to transcend the mind and therefore observed extremely subtle phenomena, that the senses cannot record. As a result of this they were able to **understand the DNA and the genes**. In spite of perhaps because of its success in understanding the material world, western science is burdened with an undeserved proud regarding its achievements. It would not take kindly to the idea that another civilization on it regards as primitive owing to its lack of water seal toilets and other material amenities. Could have understood something as subtle and important as genetics, not to mention the science of God, long before it even existed.<sup>13</sup>

The limitation of the experimental scientific approach to God are evident in geneticist Dr. Hamer's statement, "I think we follow the basic law of nature, which is that we are a bunch of chemical reactions running around in a bag. Perhaps, but the real question is : What or who is the chemist? Because chemicals are insentient they do not react on their own.....although they appear to do so. **A conscious agent is required to make life.** The very scientists who are 'investigating the DNA among other things are conscious beings and no instrument can validate their existence.....because it is self evident that human beings are conscious, it does not make a mirror to know that we have eyes even though the eyes cannot see themselves. And it is quite clear from simple observations that the creation too is conscious."<sup>14</sup>

The article considered other relevant research on the relationship between the functions of the brain and spiritual state (combination of soul and *karma śarīra*)—"The deeper that people descend into meditation or prayer the more active the frontal lobe and the limbic system become. The frontal lobe is the seat of concentration and attention : the limbic system is

where powerful feelings, including rapture are processed. **This is being done by specific genes.** More revealing is the fact that at the same time these regions flash to life, another important region the parietal lobe at the back of the brain—goes dim. It is this lobe that orients the individual in time and space. Take it offline and the boundaries of the self fall away, creating the feeling of being at one with the universe. Combine that with what is going on in the other two lobes. and you can put together a profound religious experience. The most interesting idea in this statement is the idea of taking a portion of brain offline. **This is done by specific genes.** All that is needed is to substitute the word mind or brain and this is fundamentally the same idea as that of a great of second century BC Indian yogi *Pātañjali* "**Yoga is the removal of the thoughts in the mind**". He says it is taking the brain off line. When you clear the mind *Pātañjali* says "the seer shines in all its glory. In other words you have a profound religious experience. You can also have a profound religious experience without taking any thing offline or removing the thoughts in the mind. If consciousness is every where, informing everything every second how unreasonable is it to assume that revelation (*Ākāśavāṇī*) is a daily and universal phenomenon.<sup>15</sup>

### **The human genome and the Doctrine of *karma***

Scientists decoding the human genome may persuade us to re-examine our belief in fate, predestination, free will and the law of *karma*. Some *genes*, we are told, determine our mood swing. Some predispose us to diseases, some determine how faithful we are to our companions, while others the intensity of our spirituality. If *genes* predetermine our behaviour, if karmic destiny is encoded in our *genes*, do we have a choice?

What about free will? Are we to drift, as sailer on a stream without every being able to change the course of our life? Dean Hamer who is working on the 'spirituality gene' says by exercising our free will, we could change the nature or quality of our *genes*. Through our effort dormant *genes* could get activated. For example, creativity *gene* can lie dormant till a person is passed her middle age. At a later stage, one might have found time and suitable circumstances to activate her dormant creativity *genes*.

Similarly the spirituality *gene* (VMAT2 or God *gene*) gets activated when a person feels inner need for God and devotes herself whole heartedly to spiritual pursuits. When young *Vivekānaṅda* requested *Ramakṛṣṇa* to pursued goddess Kali to give him wealth, the sage advised him to ask the goddess directly. Facing the goddess, prominent philosopher *Vivekānaṅda* asked for wisdom and enlightenment instead. What could have promoted a young man to desire enlightenment and not wealth? In the light of genomic findings, **we may see that he was promoted to do so by the spirituality gene.**<sup>16</sup>

### ***Karma* play role through genes**

The scripture talks about the place of storage of karmic info too, and that place is incidentally not this physical body. The *jīva* comes to a mother's womb with its own bag and baggage, this alone explains existence of abnormally different indignations of child and parents. So no physical manipulation can really alter the inclinations (*karma*) of any *jīva*. Yes the health of people can certainly be altered, and so far so good. Moreover these *genes* themselves are a later manifestation in the beautiful process of creation, **and they are basically meant to facilitate bringing about the ideal conditions of the *karmas* of a *jīva* to express and exhaust.** Physical features and same such gross things are provided by the parents to the child, but the *jīva* comes in the womb with its own *karmas*. That alone is the reason why a *śūdra* couple too can possibly have a child with the inclination of a *brāhmaṇa* or even *kṣtriya*. If what was provided by parents alone draw the line within which this *jīva* lives and operates then such things could never have happened.<sup>17</sup>

Is there a possibility that the psycho-somatic effect of committing a sin or crime can cause an epigenetic change in a person and whatever the consequence of that change will get transmitted to his or her offspring? So far no scientific evidence can be provided for that possibility. Perhaps "*karma*" will prevail over dogma.<sup>18</sup> Such misperception of genetics sounds—strange as this might seem at first—like the common use of the *sāṃskṛta* term "*karma*" often defined as the "law of cause and effect". Both *karma* and genetics are frequently used to refer to fate, something

predestined, But *karma* provides the situation, not the response to the situation", according śambhālā dictionary of Buddhism and Zen. Further under "*karma*" in another book by the same publisher, **"Future conditions depend on what we do in the present, substitute "genetics" for "*karma*".<sup>19</sup>**

### **Genes are because of you and not vice-versa**

The fundamental difference between the materialism and spirituality is that while the former believes that "matter" is the important thing and it controls our lives and its joys, the later brings about a paradigm shift in our priorities and perceptions by passing the back of importance to an all pervasive, non-material. Conscious principle—the subjective essence of all. When the scriptures talk about this entire cosmos coming out of a spiritual essence. Which is your trueself, they in fact are saying that you are the creators of these very *genes*. *Genes* may be chemically made up of DNA molecules etc.—but are in this context are clubbed under one genetic term the "matter". They are comparable to seeds. They are the first perceptible manifestations in this beautiful process of the grossification of the great yet highly subtle creative self revealing, blissful existence which is continuously infolding itself—in a highly intelligence and orderly way. **This is so called "spirit" or more approximately—the consciousness, is not a product of any chemistry, but it is that because of which the basic elements can be what they are.** This consciousness is called a *Brāhmaṇa* by *Upniṣadas*, it from this alone everything has come, and into this alone goes back. That alone is the truth, rest is an illusion, a mere continuum of time and space.<sup>20</sup>

The concessus extract of Jaina Philosophy, in the form of formulas, has been given in "*Tattvārtha Sūtra*", These formulas are if analyzed in light of cell, nucleus structure, *genes* and genetic codes provide us a new vision, and it clearly appears that *karma*, in one or the other way is certainly attached to these controller units—the *genes*, Every cell has a nucleus, the nucleus possesses the chromosomes which are made of DNA. These are chromosomes who decide the various characteristics of all living organisms. DNA is formed with the glucose, alkaline and phosphate chemicals. Due to joining of four alkalines in different ways, different characteristics are

created. These alkalines are attached in three sequence line and are called the genetic codes. These genetic codes having possessed a systematic sequence create the *genes*, which are attached to the chromosomes in linear order, **These *genes* and the genetic codes are called deciding factors of the fate of every living being.**

The structure and function of body of every living being is according to their chromosomes. In conducting life, at every stage, protein of one or other type is necessarily required and its formation is only done by some specialized *gene*.<sup>21</sup> These *genes* are ever changing and this change is called "Mutation", according to mutation, the changes happen in the characteristics of every living organism. In this way, all the activities of creature its destinies, its forms, according to the "Jaina Doctrine of *karma*", are decided by karmic particles (*karma*) and according to Biology, are decided by *genes*. **According to this research work *karmas* are the cause and the genes are their effect (fruits). *Karmas* direct, instruct, motivate genetic codes and genes to function and mutate accordingly.**

Every creature gets the different type of body according to its bonded *karmas*. It is only due to the consequences of *karmas*, one is born blind eyes, sans intellect, some remains dwarf (short of structure) and other is quite tall, some is born with fair and the other with dark complexion, and these are all done by the *genes*. Only due to the *genes*, the structure of the body of creature takes place and some certain *genes* also decide the gender of a living being like man, woman and enunch. **The fate of every living organism is decided by *genes* only. *Karmas* are the cause and the genes are their effect (fruits). *Karmas* direct, instruct, motivate genetic codes and genes to function and mutate accordingly.** The fundamental compounds of genetic code—glucose, phosphate and alkalines finally having in alliance with nitrogen, carbon, hydrogen, oxygen etc. elements make the genetic codes. These elements pervade in our environment. **This research work brings the possibilities that the invisible *Pudgalas* (karmic particles) i.e. the *karmas* create the *genes*.**<sup>22</sup>

## **EFFECT OF KARMA OVER GENES**

Effect of karma over *genes* is being studied as under :

### **Physics and *karma***

When the living organism performs the various activities, it having attracted the karmic particles enwraps them all around it. According to one theory of physics, all inert matters, due to their present heat, radiate the electromagnetic rays. When any creature (*jīva*) is attracted towards anything living (animate) or inert (inanimate) then living being (*jīva*) according to intensity of his/her passions and yoga he/she adjusts clock frequency equal to frequency of that thing, such condition is called the stage of attraction. In this state of intense attraction, the creature (*jīva*) and the matter (*pudgala*) exchange the highest form of power. When the waves having two different frequencies pass through any matter, its effect is marked in holograph form in that matter. Similarly, due to its attachment and aversion the holograph is imprinted on the soul of creature (*jīva*) in positive or negative charge.<sup>23</sup>

Even the modern scientists have begun to believe the presence of invisible fine matter particles around human body. Those particles are karmic particles i.e. *karma vargaṇā* which ultimately become *karma* when attracted by *jīva* due to its activities.<sup>24</sup> The way in which radio active elements keep on radiating the rays for millions or billions of years very slowly. Similarly the *karma* particles radiate special types of rays. It should be understood here that the changes in living being (*jīva*) occur due to these radiating rays mainly.

### ***Karma* and *gene***

All the characteristics of every living organism are carried by its all the chromosomes in the form of *genes*. These chromosomes are packed in the cells, and body is formed by many cells put together. So in every cell similar type of *genes* exist, but at the same time it is necessary that some *genes* should remain inert and some active during a certain time. This process is very complex.<sup>25</sup> It is believed that in developed complex creatures (*jīvas*) during a certain time only upto 2-15% *genes* remain active.<sup>26</sup> How the various creatures (*jīvas*) function under whose control? **This research work**

**supposes that the creature's active or inactive state, the *karma* particles (*karma*) are the only causes for it.**

Keeping *genes* active or inactive is done by hormones, vitamins, minerals, chemicals and immune system.<sup>27</sup> It is believed that the *genes* are controlled by environment around it, cell nutrition wrapped around *genes*, and the temperature of the light.<sup>28</sup> Thus *genes* are the deciding factors for the various characteristics of a living organism (*jīva*) and *genes* are controlled by some known or unknown causes and these causes are certainly the *karmas* of an individual.

### **Changes in *jīva* state and the change of fate**

Many times it so happens that partial or total transformation is noticed in living organism (*jīva*) due to mutation of *genes*, and this process is called the principle of mutation. Mutation is that process in which the chemical structure of living organism transform in such a way that it changes living organism in the hereditary form.<sup>29</sup> Here, this mutation, artificially occurs due to various radiations, X-rays, gama-rays, ultra violet rays and various chemicals.<sup>30</sup> In this mutation the number of alkalines also changes.<sup>31</sup> If we view in accordance to the presented thesis, we observe that various *karmas* transforms the fate of the creature (*jīvas*).

### **Change of modes, re-birth and genetic codes**

In the nucleus of cells and the existing chromosomes and the *genes* there on (which are formed by meeting of genetic codes) control the various activities of the organism (*jīva*) and on these *genes* and genetic codes, the *karma* waves exercise its definite control and regulate the life. **There is an interesting fact here, that all big or small subtle creatures or plants contain the some genetic codes.**<sup>32</sup> Thus right from *amībā* to man, the life deciding fundamental genetic codes are the same. So the theory of rebirth gets force from this principle of same genetic codes.

Perhaps the *karma* particles controlling the genetic codes regulate them for next birth/modes and give them such a serial system, that the soul migrate in search of further body, having left its own body. According to the *karma* reward, genetic codes and fate, soul reaches such a body and place

and further develop it. This can be interpreted that *karma śarīra* of that nature is formed which can easily fit in such created genetic codes which with the soul begins a new life in the new body. Again, having met with the genetic codes of a living being—a cow, a lion, an insect, a bird, or any form of creature can be created. So on the basis of the study of Biology, it appears that every control on the life of every creature, is conducted by the *genes* and the genetic codes, the fundamental units which exist in the nucleus of the cells. According to the Jaina *karma* theory for various destinities and for various bodies, the deciding factor is the *karma*. **It is according to the *karma* the *karma śarīra* is built. Perhaps this *karma* body possibly control the activities of the *genes*.**

**It is this *karma*-body, which perhaps controls the *genes* and gives favourable or unfavourable results and decides the forth coming body. If this hypothesis is enlarged and ratified in a laboratory, it will come to the conclusion that man's thoughts and actions attract such atoms around him which further give us happy or tragic results. Telepathy and *Rekī* therapies have given such results. Through these therapies one man's thoughts are conveyed to the other man and affect the other man to a great extent.** Research done in this direction will be able to prove this biological hypothesis, a complete theory and people incline towards good conduct and healthy thoughts. This theory will help us to lead happy, contented and a balanced life and a new happy contented society will come into existence.<sup>33</sup>

In Indian Philosophies there is a maxim "*Jaisā karma vaisā fala*", "so you sow, so you reap" is popular in *Mahābhārata*.<sup>34</sup> It has been said "the way in which a calf searches out its mother from among the thousands of cows, follows her, likewise the *karmas* done earlier, follow the doer and continue to follow even in the next birth and body like a shadow".<sup>35</sup> Lord Budha says "so you sow, so you reap".<sup>36</sup> Lord Mahāvīra says, "*Jo jaisā bīja botā hai, vo vaisā hī fala pātā hai*" the same maxim "so you sow, so you reap".<sup>37</sup> Everyman receives the reward only according to his sinful and good *karmas*. Lord Mahāvīra says that the *karmas* done by a man, always follow the doer. The good *karmas* give the good rewards and the bad *karmas*, the bad rewards.

"Strange consequences of *karma* theory" is validated in Indian Philosophy, *Minda*<sup>38</sup> the speech and the body, if do the good *karmas* or the bad ones. So, the rewards are also given likewise. It has been said in *Viṣṇupurāṇa*.<sup>39</sup> "O Rajana, this ātmā is neither a deva nor a man, nor animal, nor a tree, but this difference is only due to *karma*-body and birth". In the Buddhista Philosophy *Ācārya Nāgasena* in *Milinda* question has told<sup>40</sup>— "Rajana the diversities among the *jīvas* (creatures) is only due to their own *karmas*. Every living being undergoes the reward of its own *karmas*. All the creatures found in various status, states and bodies, get according to *karmas* and take birth in different bodies only due to their *karmas*." Lord Mahāvīrā says, Gautama! the *karma* seeds of creatures of this world, being different, create difference in their states. It is not due to the inert state. It is only due to the *karma* seeds sown by the worldly living beings, various states and many bodies are seen. "The theory of strangeness of *karma*" in psychology and the "law of variation"<sup>41</sup> have been compared. The heredity traits are found in germ plasm—stem cell (sex cell). These germ cells are made of many fibers and those are called chromosomes.

One germ plasm contains many chromosomes. These chromosomes have *genes*. In fact only the *genes* are the messengers of virtues-vices, they are the cause of virtues and vices. According to genetics every embryo contains 23 chromosomes of father and 23 chromosomes of a mother.<sup>42</sup> The biologists guess that due to meeting of these all chromosomes-16, 77, 216 kinds of various similarities are expected<sup>43</sup> Uptill now the science of genetics has reached only upto *genes*. *Gene* is one of the component units of this gross *śarīra* on the other hand, *karma* is one of the component of our subtle body. Inside this gross body (*sthūla śarīra*) resides the astral body (*taijasa śarīra*). The more subtle body is the *karma* body. It is the most subtle body.<sup>44</sup> At every limb of this most subtle body, is written the account of our self-exertion of our virtues and vices, of our limitations, of our reactions. The human starts behaving according to the vibrations coming from *karma śarīra*. *Ācārya Mahāprajñā* writes, "**the *genes* not only bears the genetic traits of its parents, but these also represent the *karmas* performed by individual.**"<sup>45</sup>

One of the scholars tells us that the controlling elements of our body have been found out and it seems to be a great achievement. Today, through the genetic mapping, all the *genes* have been found out which control the various states of our traits. We have also discovered all the sequences of *genes* set up, and everyday new researches in this field are revealing new knowledge about the *genes*. A group of researches led by Paul Thomasan of the University of California of Los-angles has given dear evidence that intelligence is largely determined by before birth.<sup>46</sup> Still the whole puzzle-regarding all the traits of human beings, has not been fully solved. But the Jaina *karma* theory—describes elaborately about the *karma* particles—and these *karma* particles determine not only the characteristic of body of *jīva* but also its happiness, sorrow, perception, age and *gotra* are also decided.<sup>47</sup>

Thus the *genes* and genetic codes to which the scientists are considering supreme of all are the only particles functioning under the *karma vargaṇas*. It requires a great research, because, where science has stopped only on body characteristics on the other hand Doctrine of *karma* has gone far ahead of it. The genetic science states only that they have found out those atoms which determine our characteristics, but the Doctrine of *karma* goes upto the *karmaṇa* body and describes many more characteristics. The Doctrine of *karma* also describes that how *asṛava karma* sticks to soul? and how *asṛava* can be detached from soul? It also says that the unwholesome *karmas* can be removed by austerities and state of joy can be achieved.<sup>48</sup>

It is sure that mental as well as intellectual merits of *genes* are necessarily affected by a man's prebirth internal state i.e. nature and also by the after-birth, outer environment such as air, temperature, light, moisture nutrition etc. i.e. nurture.<sup>49</sup> If two identical twins are kept separately in outer environmental conditions, their body structure, their personality and mental characteristics will greatly differ from each other. Where as both have the same genome structure and similar development of the embryo. These two identical twins, inspite of having similar internal and outer environment, their original form will differ. These factors clearly indicate towards *karma*—the controlling factors and existence of soul. After a thorough

research of Jaina Theory of *karma*, the described consequences may be achieved.<sup>50</sup>

### **The scientific communistic thought of Jainism**

According to the modern anatomy, all creatures have the same genetic codes—fundamental building blocks of life.<sup>51</sup> It is only due to the mutation of the genetic codes, different types of species of creatures—right from *amibā* to man take birth. Thus the doctrine of Jaina *karma* believes that all the jivas are possessed with similar soul, similar capacities but their different *karmas* provide them different bodies.<sup>52</sup>

First of all it should be made clear that every incident does not occur only due to *karma*. ***Karmas are not all in all.*** If we believe that whatever happens is subject to *karmas* only, it will be such on explanation, that the thiest (believer in God) says, that every thing happens only due to command of God or all that happens is subject to fate (fate accomplish or predestined), we cannot introduce any change. If *karma* is believed to be all in all, there will be then, no room for self exertion to eliminate them nor there will be any possibility for achieving salvation (*mokṣa*), because—as the *karmas* are done, so do they rise and reward the doer, and he or she will act according to them and bear further bondage of *karmas*. If it is so, then the thought of self-exertion and salvation will prove wrong. **Thus it is proved that *karmas* are not all in all.**

*Karma* is not an autocratic dominion. The *karma* has also goad on it. Changes can be made in *karmas*. Lord Mahāvīra says, "*karma* performed will be undergone", is a general principle, but there is an exception in it. In *karmas Udīrṇa*, (to attract pre mature *karma*), *Udvartana* (lengthening of *karma* period), *Apvartana* (shortening of *karma* period) and *saṁkramaṇa* (changing nature of *karma*) all these stages are possible, and change can be introduced in the *karmas*. Thus, we can say that due to self-exertion eradication of *karmas* can be done even before their maturity. Their duration and intensity can be minimized or maximized and one nature of *karma* can be changed with other sub group of same nature. The *karmas* which has come in rising, their reward can be subsided for a time, they can be made

incapable for a certain period in their reward. This process is called "*upaśama*".

According to Ācārya Mahāprajña "**The theory of *saṅkramaṇa*", is the theory of mutation of *gene***. One important thing worth paying attention is that the rise of *karma* take place according to substance, area, time, mode and state of living being. This rise depend upon medium and rewards accordingly. If the pain-causing *karma* rise at the same time with two different persons, and one person out of these two listens to the religious sermons and the devotional songs, the other one kept himself in a closed room doing nothing. The pain causing *karma* will cause more pain to second person in comparison to the first person who spends his time in listening to the religious sermons and devotional songs. There is a psychological reason of it also.<sup>53</sup>

Thus we reach to the conclusion considering all the above facts that in building personality, *karma* is not all in all, but heredity, environment, geographical situation and ecological conditions all effect nature and behaviour of man. *Nāma karmas* are not all in all. In facial and body formation of man, effect of the place and time can easily be perceptible on human physique. If two children are born to a mother—the one in some cold country and the other one in some hot country, the child born in a cold country can comparatively be more fair than the other child. If some person begins to live in some cold country, his complexion will change. According to Ācārya Mahāprajña the change of *genes* and the chemical changes bring change in human personality.

*Āyusya karma* is also a *karma*. But the outer mediums like poison etc. can minimize life span of a creature. Similarly, if some change is made in chromosomes and *genes*, a person's physique can be changed. Thus alone *nāma karma* does not decide human physique but environmental conditions can bring change in human physique. **If we produce carbon copy of doner parent (i.e. clone) by changing nucleus of cell by a special scientific method, there come no discrepancy according to the Theory of *karma* because *Saṅkramaṇa* is possible in *karmas*.**

Thus we come to conclusion that according to *karma* Theory, giving birth of the same physique by the cloning process is possible. So, the process

of cloning is not a challenge to the *karma* Theory, but after understanding the *karma* Theory very systematically this process can easily be interpreted.<sup>54</sup>

### **Principle of *San̄kramaṇa***

In *Sthānāṅga Sūtra's* story Lord Mahāvīra has given the message to awaken one's self exertion :

There are four types of *karmas* :

- (1) Some *karmas* are auspicious and their reward is also auspicious.
- (2) Some *karmas* are auspicious, but their reward is inauspicious.
- (3) Some *karmas* are inauspicious, but their reward is auspicious.
- (4) Some *karmas* are inauspicious and their reward is also inauspicious.<sup>55</sup>

In other worlds even bonded *karma* is auspicious but its reward is sinful. Bonded *karma* is inauspicious but gives the auspicious reward. It is a strange thing. This is all the Theory of *San̄kramaṇa*, the Theory of transformation. Bonded *karma* that is auspicious, will give auspicious reward and bonded inauspicious *karma* gives the inauspicious reward, but the second and third are important, because the principle of *San̄kramaṇa* (transformation) is applicable here.

Principle of *San̄kramaṇa* (transformation) is the principle of self-exertion. It is only through the self-exertion that the sinful *karma* can be transformed into auspicious *karma* and vice-versa. It is entirely the self exertion and creativity of man which make such a thing happen. By doing good self-exertion a man can change his fate or destiny.<sup>56</sup> All the collected auspicious *karmas* can be transformed through sinful self exertion, and all collected sins can be transformed into auspicious *karmas* through good self exertion.<sup>57</sup>

**(a) Transplantation of body limbs**—A news was published in the times of India newspaper, "scientists donated new life to lakhs of people". This year (1990) two American scientists who have been awarded the Nobel prize in the medical science, they have donated a new life to lakhs of people

with the help of their scientific processes. The award giving *keroliñsakā* Institute wrote in the honour, that the work of these scientists is very important for whom the other method of treatment are ineffective, and they can fully be cured through the method of transplantation of limbs. They have invented the system of transplanting limbs, bones, bone marrow and cells. Both the scientists cured the patients through transplantation of limbs methods.

Prominent Geneticist Dr. Mure controlled the tissues denial problem. In 1954, he made a successful limb transplantation. He took a kidney from one child of two identical twins and transplanted it to the other child where it continued to function for twenty four years. Seventy years old Scientist Dr. Tonson invented transplantation bone—marrow process in which in luckinia white cells become blood red cells. He succeeded in transplanting the bone marrow cells of one person to the other person.<sup>58</sup>

### **SPIRITUALITY (COMBINATION OF SPIRIT AND *KARMA ŚARĪRA*) AND *GENES***

**The advantage that we have today is that our understanding of *genes* is growing so quickly. Understanding *genes* does not mean resigning ourselves to some programmed fate. This is a tool for liberation, a scientific window into the soul. Yes, we are born with a certain genetic make up. No, that does not mean we have no control over our lives. No scientist, nor observant parents, really believe we are born as completely blank states to be filled in by our upbringing. The key is the interplay between the hardware we are born with and the software we add. It is not nature or nurture. It is nature and nurture. In fact it is part of our nature to respond to nurture.<sup>59</sup>**

**The essence of spirituality, which can include a belief in God or higher power or a divine order to the universe, is looking inward, searching for meaning and purpose, and seeking to understand what truly matters. People turn away from materialism in search of inner peace, through identification with God or with the cosmos. Is spirituality simply an adaptive response, a self deception to deal with old age, infirmity and death? Or it is wisdom, a gradual realization of**

**the real truth about the universe? A scientist might wonder whether spirituality was not written into our genetic codes. Perhaps as the body begins to expire, the brain wires a new set of neuronal connections in the cerebral cortex that allows us to accept the end with grace, dignity and even hope. On the other hand, this may be a lot of mumbo jumbo, a far too clinical explanation for what we know as the soul with subtle body (*karma śarīra*).**

Prominent Geneticist Cloninger found one other thing that seems to increase with aging : spirituality. Not only that, but spiritual people are relatively more likely to express warmth, altruism, positive emotions and openness to feelings. They are relatively more intimate and friendly, they are generous, and concerned with the welfare of others. They also tend to be more optimistic about life and more likely to experience positive emotions such as love and happiness. Above all, spiritual people are open to their own inner feelings and emotions. They experience happiness and joy—as well as pain and suffering—with heightened intensity.<sup>60</sup>

### **The God *gene* theory**

**Why is spirituality such a powerful and universal force? Why do so many people believe in things they cannot see, smell taste, hear or touch? Why do people from all walks of life, around the globe, regardless of their religious backgrounds or the particular God they worship, value spirituality as much as, or more than pleasure, power or wealth? It is argued that the answer is hardwired into our *genes*. Spirituality is one of our basic human inheritances. It is in fact an instinct.**

The reason a sparrow sings the song of a sparrow, and not of a robin or a lark, is that it has the *genes* and brain of sparrow, not that it was raised by sparrow. Moreover, there is a dedicated brain circuit for song. In the God *gene*, It is proposed that spirituality has a biological mechanism akin to bird song, albeit a far more complex and nuanced one : that we have a genetic predisposition for spiritual belief that is expressed in response to, and shaped by, personal experience and the culture environment. These *genes*, act by

influencing the brain's capability for various types and forms of consciousness, which become the basis for spiritual experiences.

The first task for any scientist attempting to link genetics to spirituality is to show that spirituality can be defined and quantified. This is essential for any scientific analysis, regardless of the topic. Scientists measure things. If we cannot measure it, we cannot test a hypothesis about it, and if we cannot test a hypothesis, about it, it cannot be proved. Our major new finding revealed in "The God *gene*" is our discovery of a scientific individual *gene* associated with the self transcendence scale of spirituality. This "God *gene*" codes for a monoamine transporter—a protein that controls the amount of crucial brain signaling chemicals. Interestingly, those same brain chemicals can be triggered by certain drugs that can bring about mystical—like experiences.

The specific *gene* identified by no means the entire story behind spirituality. It plays only a small, if key role; many other *genes* and environmental factors also are involved. Nevertheless, the *gene* is important because it points out the mechanism by which spirituality is manifested in the brain. One of the important roles that God *genes* play in natural selection is to provide human beings with an innate sense of optimism. At the psychological level, optimism is the will to keep on living and procreating, despite the fact that death is ultimately inevitable. At the physical level, studies show that optimism seems to promote better health and quicker recovery from disease, advantages that would help us to live long enough to have and raise children and pass on our genetic heritage.<sup>61</sup>

### **Self transcendence and *genes***

Of course static alone cannot tell us what that common root is. **It could be the result of a *gene*.** But it could equally well be the result of environment or culture. Self transcendence is, so far, the simplest way we have to measure spirituality. One reason for confirming the validity of the self-transcendence scale was that we wanted to measure individual differences in spirituality and **co-relate them with *genes*.** It was also important, however to know if there were any group differences in the scale, because these would complicate and possibly compromise the genetic

analysis. Our data base of 1388 subjects allowed us to examine the relationship between self transcendence and three potentially important demographic variances—race, age and gender.

A statical analysis showed that the higher scores of women could not be accounted for any of the other personality factors we measured. It might be something to do with the fact that women are more willing to express their feelings than men or perhaps there is something about our society that brings out the spirituality in women. Or it might have something to do with their *genes*, a possibility we would later have a chance to test experimentally. Although statistics cannot tell us what spirituality is or is not, or where it comes from, it can help to measure spirituality in individual and conform its uniqueness. In a study of the connection between *genes* and spirituality, that is a good place to start.<sup>62</sup>

Unlike most young children, Jane and Rose loved going to church, not just on Sunday but during the week as well. They both decided as teenagers to devote their lives to the church and took their vows together. Today, sister Jane Frances and sister rose Marie are nuns at the same convent in Akron, Ohio. In addition to their mutual interest in God and spirituality, **Jane and Rose have one other important similarity : their DNA.** They are identical twins—the product of the same fertilized egg. Twins, especially identical ones like Jane and Rose, are fascinating. There is something mysterious and alluring about people who look and sound identical. But identical twins are more than curiosities. Because they share identical DNA, for scientists they offer a way to dissect the role of *genes* and environment in complex human characteristics like spirituality.

The main use of twins in behaviour genetics research is to determine heritability, which is defined as the percentage of variation in a behaviour that is due to genetic differences. Heritability can be most directly measured by comparing identical twins who were separated at birth and raised apart. **Because such twins have the same *genes*** but are raised in different environments, the extent to which they are similar to each other is a direct approximation of heritability. The degree of similarity can be calculated as a correlation.

The result of their study were consistent, for every scale examined, *genes* seemed to play an important part. The calculated heritabilities were all between 41 and 52 percent, meaning that *genes* were responsible for roughly half of the variation in religiousness from one twin to next. In other words, the study seemed to suggest that at least part of the reason **people believe that religion can help to answer life's questions in their DNA.**<sup>63</sup> In other words, nearly half of the reason that the twins felt religion helped them, spent time privately praying and had a sense of God's presence was inherited. Since these twins were raised by different parents, in different neighbourhoods, and sometimes even in different religions, their similarities seemed to be the result of their DNA rather than their environment. Something in their *genes* helped to push them towards religion.

How did the researchers conduct their studies? First they evaluated the data, using a modeling technique that took into account three main sources of variation in self transcendence : genetic influences, shared environmental influences. The first two factors make twins alike, the third makes them different. The analysis indicated that *genes* are responsible for 48% of the variation in self transcendence in twins both male and female. The remaining 52% of variance was due to environmental factors for females. Age also had an effect, in males it accounted for 4 percent of variance (Environmental factors accounted for the other 48%).

The researcher also examined the data by a statistical technique called "multivariate modeling". **Once again, they found that *genes* played an important role in self-transcendence.**

Using this analysis, the estimated heritabilities were 37% for men and 41 for women, which are similar to the numbers obtained in first analysis. The take home lesson from the Martin and Evas study was clear : ***genes* are a major factor in self transcendence.** In other words, spirituality is in good measure an inherited trait. This was a surprising result. The implication is that spirituality, at least as measured by self transcendence, does not result from outside influences. Contrary to what many people might believe, children don't learn to be spiritual from their parents, teachers, priests, imams, ministers or rabbis, nor from their culture or society. All of these influences are equally shared by identical and fraternal twins who are raised

together, and yet the two types of twins are strikingly dissimilar in the extent to which they correlate for self transcendence. In other words, William James was right : **spirituality comes from within. The kernel must be there from the start. It must be part of their *genes*.**<sup>64</sup>

Maslow, Cloninger and many others before them and since have argued that spirituality and religiousness are fundamentally different. The twins studies, by looking quantitatively at both qualities in a single population, strongly support and distinction. More important, they tell us something about why they differ. Religiousness, as measured by church attendance is learned in the classical sense—from parents, teachers, religious leaders and seers. People go to the Church or mosque or temple because that is what they were told to do? **Spirituality, as measured by self transcendence is more innate. It comes from within, not from without. Of course spirituality has to be developed, just like any other talent. But the evidence suggests the predisposition is there from beginning.**

What makes some siblings, like Tenkai and his brother, so spirituality dissimilar despite their common upbringing? and what makes others, like Gloria and Louise, so similar despite their very different life trajectories? **Could it be something in their *genes*?** There was only way to find out.<sup>65</sup>

The first *gene* on the list of candidates was D4DR, which codes for a receptor that senses the presence of dopamine one of the monoamines in the brain. It was a prime suspect for several reasons. In the Comings's study, dopamine was the neurochemical most strongly associated with self transcendence of all those examined. Comings speculated that this was because the D4DR *gene* contains an extremely variable repeated DNA sequence that changes the number of amino acids in the protein, which in turn alters the way it works in the brain. Some people have only three copies of this odd sequence : others have as many as eleven copies. D4DR's high association with self transcendence might also be because it is expressed both in the **limbic system of the brain—the seat of emotions**—and the prefrontal region of cortex—the think part of the brain. Moreover this *gene* had previously been linked to novelty seeking, a personality trait that is slightly correlated with self transcendence.

There was a clear association between the VMAT2 (on chromosome 10) polymorphism and self transcendence. Individual with A and C in their DNA—on either one chromosome or both scored significantly higher than those with an A. The effect was greatest on the overall self-transcendence scale and was also significant for the self-forgetfulness sub scale. With transpersonal identification and mysticism, the effect was in the same direction but just short of statistical significance. Somehow, this single base change was effecting every facet of self-transcendence, from loving nature to loving God, from feeling at one with the universe to being willing to sacrifice for its improvement. **To delve further into the biology of spirituality, we need to understand more about how monoamines work normally in the brain to produce the greatest hat trick of biology : consciousness.**<sup>66</sup>

### **Consciousness and *Genes***

Our brains are bombarded with information every second of every minute of the day, day in and day out. There is the data we receive from the outside world through our senses : sights, sounds, smells, tastes and touches. And then there is the news that one part of the brain receives from other parts of the brain : memories, feelings, thoughts and dreams. This is consciousness our awareness of our surroundings and our selves. It is at once both the common place and the most mysterious of all life processes.

Our aspect of consciousness has puzzled Philosophers, theologians, metaphysicists, psychologists and biologists for centuries and probably will continue to do so for many more. Sometimes called the mind-body problem, it boils down to this : **Can consciousness (soul or spirit) be explained scientifically? Rane decarts "I think therefore I am"—who believed that the mind and the body our distinct substances that communicate through the pineal gland, which he believed was the seat of the soul. By a scientifically explanation i.e. one that can be expressed in terms of the basic principles of chemistry and physics. Proponents of this view often are called "materialists" because they believed that all mental processes can ultimately be accounted for by a few basic physical laws. Most scientists are materialists.**

Other thinkers simply proclaim that the origins consciousness are too difficult to be solved with our present knowledge. So far so good for Scientist Edelman's theory : consciousness links the physical senses to the emotions through widely distributed brain networks. But that still leaves the critical question of how those emotions are generated, what is that actually makes us feel happy, sad, excited or anxious? This is where the monoamines and the VMAT2 *gene* comes to the fore. The monoamines are the biochemical mediators of emotions and values. They are what make us feel. But monoamines are not freely available to the brain, like a gift, they first need to be wrapped up and unwrapped. That is where the VMAT2 *gene* plays a critical role.

Wrapping up the monoamines is hard work. This is where the vesicular monoamine transporter encoded by VMAT2 enters the picture. The VMAT2 transporter is a long, snakelike molecule that weaves in and out of the vesicular membrane. The head and tail of VMAT2 are both securely tucked inside the vesicle. The body crosses the membrane twelve times to form six coils running from inside to outside and back again. At each juncture with the membrane there is a trans-membrane helix, a tight spiral of amino acids that fits perfectly into its slippery, greasy oil, once the monoamines are packed into vesicles, they sit there, completely shielded by the vesicular membrane, waiting for something to happen.

Like Ari, Tomas is under the influence of monoaminergic drug, in this case cocaine, cocaine releases dopamine, **the brains reward chemicals**. Although dopamine and serotonin are chemically similar, there are big differences in what they do? Dopamine makes people feel good rather than just not bad, sociable rather than not just hostile. **If serotonin is the brains stick, dopamine is its carrot.** How could such a temporary change in brain chemistry have such long lasting consequences? It is because the psilocybin made young question the one thing that he, like all of us, depends on most in life : his consciousness. Without consciousness there would be no life as we know it. We would not know who we are or where we are going? Yet we take our consciousness for granted. It is automatic and effortless, like breathing. Only when it suddenly stops working and goes haywire do we realize what an incredible gift it is?

The integration between primary and higher consciousness allows us to remember the present. And this is where VMAT2 enters the picture. VMAT2 controls the flow of monoamines within the brain.<sup>67</sup> As the Buddhist meditate, they consciously attempt to clear their minds of thoughts and emotions. To do so, they send **signals through the thalamus to the cortex, the seat of will.** As more and more of the brain's energy is directed towards this area, output to other regions is decreased through the process that neurobiologists call *deaf fermentation*. It would be like simultaneously turning on all the air conditioners in a house; the flow of power to the other appliances would be decreased.

Based on this experiment and other lines of evidence, Persinger believes that the biological basis of all spiritual and mystical experience is due to spontaneous firing of the temporo-parietal region—highly focal microseizures without any obvious motor effects. He calls such episodes transient and theorizes that they occur in everybody to some extent. Exactly how often and how strongly is determined by a mix of *genes*, environment and experience. The main effect of such transients is to increase communication between the right and left temporoparietal areas, leading to a brief confusion between the sense of self and the sense of others. The outcome, he says, is a sense of presence that people interpret as a God, spirit or other mystical being. This is why feelings of spirituality are a matter of emotions rather than intellect. No book or sermon can teach one person to use a different monoamine transporter or another to ignore the signals emanating from his limbic system. **It is our genetic make up that helps to determine how spiritual we are? We don't know God, we feel him.**

Where did "God *gene*" come from? At first that might seem like a question of faith or Philosophy rather than science. But the actual answer is quite obvious. They came from our parents. Who inherited them from their ancestors. Those ancestors received them from their predecessors, and so on down the evolutionary line to the very beginnings of life on earth, over the ages, of course, the *genes* evolved. At every step, the *genes* that helped their owners survive and reproduce were most likely to be passed on to the next generation. *Genes* that do not successfully accomplish this do not survive in succeeding generations. If the organism in which such *genes* resided did not

have offsprings, the *genes* soon would be lost from the population, discarded in the dustbin of failed evolutionary experiments. Only the *genes* that promoted our post survival and reproduction are still with us today.<sup>68</sup>

The scientific method of course is based on observation, experimentation and replication—methods that exclude most religious phenomena from consideration. There is no way for objectively test, for example, whether the consciousness continues after death or whether God listens to our prayers. **There is no MRI or CAT scan for the human soul.** It is therefore not surprising that many scientist regard religion with suspicion. First it is essential to realize that there is nothing intrinsically theistic or atheistic about postulating a specific genetic and biochemical mechanism for spirituality. If God does exist, he would need a way for us to recognize his presence. In deed many religious believers have interpreted the brain scan experiments of Persinger. Ramchandran and Newberg as supporting the existence of deity; why else, they ask, would we have a "God module" prewired in the brain. **Science can tell us whether there are God genes but not whether there is a God.** Spiritual experiences, like all experiences, must at some level be interpreted by biologically constructed brains.

The experiment implies that it is possible to strengthen one's sense of spirituality by practicing it—an idea that has been stressed by every great spiritual leader from Buddha to Gāndhī from Muhammada to Martīna Luthara king Jr. from Jesus to Bishop Ruisa. We have no say over the exact group of *genes* that we inherit; whether we have A, C or an A at the critical position in VMAT2 (*God gene*), the *genes* of a Tenkai or of a Hanibal Lecter is purely a matter of chance. What we do with our spiritual *genes*, whoever is very much upto us. **Spirituality is based in consciousness**, religion in cognition. Spirituality is universal, where as cultures have their own forms of religion. It is argued that the most important contrast is that **spirituality is genetic** while religion is based on culture, traditions, beliefs and ideas. It is in other words, mimetic. This is one reason why spirituality and religion have such differing impacts on individual life and society.

The idea that spirituality is inherited is not new. A Tungus Shaman Cited in Joseph Campbell's the masks of God says, "A person cannot

become a sharmans if there have been no sharmans in his sib". As we have seen from twin studies, self-transcendence, a quantifiable measure of spirituality, is partially inherited. At least one of the **God gene VMAT2**, appears to code for a protein that controls the ebb and flow of monoamines, brain chemicals that play a key role in emotions and consciousness.

The fact that spirituality has a genetic component implies that evolved for a purpose. No matter how selfish a *gene* is, it still needs a human being as a carrier to perpetuate itself. There is now reasonable evidence that spirituality is in fact beneficial to our physical as well as mental health. Faith may not only make people feel better. It may actually make them better people. Are we condemned to endlessly repeat the said mistakes of the past? It is believed that understanding the difference between spirituality and religion gives us another tool in offering hope for the future. **For while our spirituality may be engraved to a degree in our DNA.** We can charge, re interpret and reconsider the mems written or the scrolls of our religious history.<sup>69</sup>

## **LIFE AND GENES**

**Where there is soul and *karma śarīra* life will take birth. Every living organism is built of number of cells. Where there is cell, means life is there. Cell is made of up of *genes*. That means, where there are *genes* life is there. Soul generates life with the help of *karma śarīra*. *Karma śarīra* plays its role in gross body of a living organism with the help of *genes* only. Thus we can say life is a composite building up of soul, *karma* and *genes*. Without the soul *karma* and *genes* cannot survive more in gross body of living being but not vice-versa. Hence it is proved that life cannot be survived without the common efforts of *karma* and *genes*. So we should compare life with *genes* i.e. to compare *karma* with *genes*.**

## **Thinking (Inheriting intelligence) and *genes***

**The brain begins with *genes*. *Genes* from both parents combine to design and create the lump of gray flesh in the head, plus the rest of body, which operates and it operated by the brain. The slightest**

**disruption in the physical development of brain can have a devastating effect on future intelligence. A single glitch in the DNA code can limit mental development or cause severe retardation. On the other hand "good" genes make genius possible. There is no single factor more important in an adult's IQ score than genes. However parents also pass along the environment in which the genes are expressed. What we think about, the language we think in, and how we apply our intelligence are all products of the environment; how we will think depends very much on that original set of blue prints from the genes. Just like a person who hops into a car decides where to go and how to get there, the car sets limit on how fast and how successfully.**

Short term memory is similar to the random access memory (RAM) on a computer; it controls the information needed to run at any given moment. Long term memory is like the hard drive, a repository for all the information needed to operate. Just a computer needs both the RAM and a hard drive, so both short term and long term memory are essential for intelligence. For example, adding the numbers 349 and 217 requires long term memory to remember the rules of addition, **and short term memory to execute the specific problem.** Memory itself is so control to the thinking process that memory is one of the best predictors of human intelligence as measured by IQ tests.

**There are two basic types of memory : short term and long term. Short term memory also known as working memory, operates over seconds where as long term memory lasts for minutes to an entire life.** If you here a random telephone number 441-9620 you might remember it until the end of sentence, probably not until the end of the paragraph. Your own telephone number, however, is securely stored and easily remembered. The reason is that the random telephone number went into short term memory only, because there was no reason to save it, while your own number is stored in a personal long term vault.

How is information in short-term memory converted into long term memory? It must be a selective process. Otherwise long term memory would soon be swamped with useless information such as restaurant menus, road signs and old TV guides. It would be like the hard drive of a computer that

stores every revision of every document, or a radio that records every song. The machinery would soon be filled up with useless, disorganized information, somehow the brain must have a filter to sieve out what needs to be remembered from what can be discarded.

**The filter is a physical structure built by *genes*.** It was discovered by studying a simple invertebrate, the sea slug *Aplysia*. Sea slugs hardly have a brain, and they probably could not pass the bar exam, but they do have a nervous system and are able to 'remember' simple stimuli and respond accordingly, one of the best studied responses is the gill withdrawal reflex. When the gill of a sea slug is touched, the body withdraws into its shell; presumably the touch is a warning that a predator may be nearby. But if the gill is touched repeatedly, the withdrawal response slows down or disappears, as if the sea slug knows that it has nothing to fear. To the extent that intelligence is ability to adopt behaviour to the environment, the sea slug shows a primitive form of intelligence.

Scientist Eric Kandel wanted to know how the sea slug adopts its response. The first step was to recreate the reflex without the sea slug, using isolated nerve cells grown in a petri plate. By recording the electrical signals between nerve cells, Kandel found that after a single stimulus there is a strong electrical signal at the synapse between nerve cells, Kandel found that after a single stimulus there is a strong electrical signal at the synapse between nerve cells, but as the stimulus is repeated, the strength of synaptic connection decreases. The nerve cells are "remembering" their past, Kandel showed that the nerve cell 'remembers' by synthesizing a burst of proteins and that the key activator of this explosion of *gene* expression is a protein called CREB. Kandel proved that the nerve cells could be fooled into thinking they had been stimulated simply by adjusting the amount of active CREB protein.

Geneticist Tully established three things : that the flies, just like humans, have two forms of memory, short term and long term; that short term memory is required to learn the difference between odors, where as long term memory is required to remember the difference and behave accordingly : and that converting short term memory into long term memory **requires new *gene* expression**. But what *genes* were turning on? Taking a

clue from kandel's work on sea slugs. Tully decided to look at the CREB mechanism. The part of the brain responsible is the hippo campus which makes a mental map in minutes and stores it for weeks. Later, if it is an important map, the information is transferred to the cerebral cortex for long term storage. A damaged hippocampus, as can occur from injury or stoke, would prevent a person from finding his way out of a new room, even though he could remember the layout of a place he had lived long before.

Even though the loss of single *gene* can prevent a mouse from finding its way, **the thought process depends upon more than just genes.** A simple experiment showed that experience is important too. Some mice were raised either in a sparse, unfurnished cage with only a water bottle and food tray, while others grew up in a special "play ground" equipped with plastic tubes, a tunnel with multiple openings, and an exercise wheel. After 3 months the mice brought up in the more stimulating environ showed a 15% increase in number of cells in the hippocampus. The more the mice used their brains to remember the complex topography of the play ground, the better their brain becomes. Even for this simple type of intelligence, environment makes a difference.

What do different people, even when they are brought up the same way in the same environment, get different scores on IQ tests? Although there is no single answer to this question, the results of decades worth of study on tens of thousands of subjects have been remarkably consistent in showing **that the single most important factor is genes.** The "environment" includes many factors that influence intelligence, such as prenatal care, nutrition, child care, schooling etc. Together they are a powerful force, **but not one of those environmental factors alone has a great impact that genes.**<sup>70</sup>

### **Body weight and genes**

Nothing could be further from the truth. Eating is one of the most ancient and evolutionarily conserved of our behaviours. If we did not eat enough to replenish the calories we burn, we could not survive. So naturally we have inherited *genes* that make our bodies conserve calories instead of burn them. Unfortunately, even though our *genes* have not changed in the

last several hundred thousand years, our culture has dramatically. **Now most people recognize that body weight respond both to the biology and society, to *genes* and emotions. The most recent experiments show that *genes* are the single most important contributor to body weight, more than any other factor or combination of things.**

The bottom line is that the *genes* are very important, but still dependent on the environment. A person who might balloon to obscene fatness in one setting could stay relatively thin in another. **To understand how *genes* and behavior work together to control body weight, it is necessary to understand what the *genes* are doing?** The scientists chose ten Pimas suffering from both obesity and diabetes and screened the DNA for the B-30 adrenergic receptor *gene*. The researchers were astounded to find the five out of the ten had the same *gene* mutations.<sup>71</sup>

When you think about *genes* for your personality, you are asking who am I? The simple answer is "you are who your brain thinks you are". And who your brain thinks, you are the result of an intricate, one of a kind interaction of *genes* and life experiences. So what about free will? It is alive and well, and probably genetic. Free will means taking control of your life. This is only possible when you understand who you are. As humans, we are born with instinct to survive, to love to produce. As individual we are born unique, each of us a variation on the human theme. *Genes* play an essential role in the overall theme and the individual variations : *genes* make us human and they make us unique. People cannot be mass produced even if we tried. Every individual has too many choices and too many possibilities to ever predict the future. You are born with a pen and paper in hand, but you have to write your own story.<sup>72</sup>

### **Relationship and *genes***

On the other hand, ***genes* made Paul a man and Madeleine a woman**, thus making possible their sexual attraction. They met at the age of maximum reproductive potential, a time when biology throws young people at each other with enough force to tilt the earth. **Both had *genes* that made them attracted to the opposite sex**; perhaps a simple variation could have made Paul sexually attracted to Madelein's brother. *Genes* might have also

influenced how the relationship developed was Madeleine a genetically driven thrill seeker? Did she pursue the ship's captain because she craved a new high? Or was it harm avoidance that caused Paul to flee at the first sign of trouble instead of sticking with Madeleine when she was confused? **We are products of our *genes*, so it is natural that our relationship, too, will fall under the sway of DNA.**<sup>73</sup>

One afternoon at the HIV clinic, after I had finished an interview, the subject asked me why I was so interested in his family history. When **I explained that we are trying to see if sexual orientation was influenced by *genes***. He made an interesting suggestion : "You should look at the sex chromosomes. That is what makes men different from women." In fact I was interested in the sex chromosomes, not so much because of their role in making men and women different as because of their distinct pattern of inheritance. Specifically, fathers transmit their single Y chromosome to each of their sons and their single X chromosome to each of their daughters. This generates unique family trees and makes the sex chromosomes easy to track.<sup>74</sup>

It was prominent scientist Botstein who had, in 1980, proposed that it might be possible to map the entire human genome by using random bits of variable DNA called markers. The second principle that influences linkage is that *genes* found close to one another on a chromosomes usually are inherited together. Because of simple chemistry, two *genes* that are "close together" are, by definition found on the same DNA molecule. DNA is tough and wiry : only rarely do its long strands break in two. As a result, *genes* that are located on the same piece of DNA almost always travel together into the germ cells that make up the fertilized egg.

To understand how *genes* help shape who we are, rather than just what we suffer from, it helps to start with something simple and move to more complex areas of behavior. The first example is something most people take for granted. *Genes* make us all alike "when people hear a trait is influenced by a *gene*, they sometimes assume it only comes in two opposite varieties : smart or stupid, mean or kind, passive or aggressive, we know that

physical characteristic such as height, weight and skin color don't come in just two varieties so we must assume that the variations of personality are equally vast. Just look in the mirror. Facial features are largely determined by *genes* but there is nobody else in the world (unless you have an identical twin) who looks quite like you. Given the wonderful diversity with which *genes* sculpt the human face, they must be equally dexterous and imaginative when it comes to shaping the nooks and crannies of human brain. Such breath taking detail on the outside of the human form suggests an equal, or even more elaborate, construction on inside.<sup>75</sup>

### **KARMA AND GENETIC ENGINEERING**

According to "The Doctrine of Jaina *karma*" soul remains in gross body due to existence of *karma śarīra*. The person who wants to attain salvation for eternal pleasures does efforts to vanish *karma śarīra*. There are many ways to eradicate *karmas* attached to soul. *Udīrṇa*, *Udvartana*, *Apvartana* and *Samkramaṇa* are the ways to eradicate pre matured *karmas*. **According to Ācārya Mahāprajña "The theory of *saṁkramaṇa* is the theory of mutation of *genes*. *Gene* transplantation, *Gene* therapy. *Gene* finger printing, transplantation of limbs, cloning etc. are the various processes of *Gene* improvement by Genetic Engineering. So the study of *karma* and Genetic Engineering is the study of *Samkramaṇa* of *karma*.**

In a short but interesting article, "Religion, genetics and embryo" of Sophie Boukhari, Unesco courier journalist, an array of responses to the bioethical question posed by genetic technologies, by Catholics, Protestants, Buddhist, Muslims and Jews are referred. "Although religious practice may be declining" says French geneticist and member of parliament Jean Francois Mattei "the metaphysical issue is still at the core of the question raised about Genetic Engineering, either by tradition, culture or duty" should a person has recourse to prenatal screening and consider having on abortion if a serious genetic defect is discovered? Should search on embryos, *gene* therapy and cloning be allowed? All the "religions of book" (Christianity, Judaism and Islam) believe that the answers to these questions largely

depend on the status of embryo. The frontier between "good" and "bad" Genetic Engineering depends on whether or not the embryo is considered to be "animate". **"If the embryo has soul, then it is endowed with a human (with *karma śarīra*) as well as biological life and any attack on its integrity is seen as a crime"** says French Geneticist Hene Frydman. **That is to say that even geneticists and religious books both believe in *karmas* playing role through *genes* in this gross body.**<sup>76</sup>

**Concept of *karma* resembles the concept of *gene* in all its functions.** Rather the concept of *karma* goes one step ahead in the sense that apart from transporting the hereditary influences over the twenty four generations of both the parents, it also takes into account the effect of individual performances in the previous births. **Probably further studies in the field of Genetic Engineering may break upon a new era in the field of transmigration of soul striving for ultimate state of liberations.**

Jaina *karma* theory helps us to understand the complexities of personality traits of human beings. Jainian approach for modifying human behaviour through the practice of right faith, right knowledge and right conduct is all psychological in nature. Compared modern psychological approach through the application of principles of repression, inhibition, redirection and sublimation. Jainian approach is rather an attempt to overhaul the wholeness of an individual. It involves only psychological approach, a sort of non-drug therapy.

Jaina *karma* theory seems to be so sophisticated that it appears to have shown the seed of modern Genetic Engineering. Jaina principle of '*saṁkramaṇa*' (Ingression) propounds the theory that *karma paramāṇu* can be modified through some variations by following the principles of Jaina *karma* theory. **This clearly indicates towards possibility of changes in the *genes* in modern times.** Jaina *karma* theory had thus paved the way for such transformations in human beings, the ideas of which have led to the development of modern Genetic Engineering.<sup>77</sup>

**COMPARISON OF *KARMA* AND *GENES***

Comparative statement of *karma* and *gene* is narrated as below :

<b>S.No.</b>	<b><i>Karma</i></b>	<b><i>Genes</i></b>
1.	The Doctrine of <i>karma</i> says " <i>karma</i> of any two living beings of universe never resembles", so each individual in the world is different from other from the angle of the science of the <i>karma</i> .	The genetics says "DNA of any two living beings of universe never resembles", so each individual in the world is different from other from the angle of genetics.
2.	The offsprings of a particular set of parents differ from each other and from their parents in many respects to different degrees due to <i>karma</i> .	Although the resemblances between parents and offsprings are close due to heredity even than they are usually not exact.
3.	It is easy to understand why the offsprings of intelligent parents are sometimes less intelligent (manda) than either parent because of past <i>karma</i> .	Biology explains this point in this way that since the co-ordinate action of many pairs of <i>genes</i> are involved in intelligence. The fortunitous combination of those which produced the intelligent parents be broken by genetic segregation. Conversely the chance combination of favourable <i>gene</i> may produce a brilliant child from average parents, but genius are never produced by feeble minded parents.
4.	It is suggestive from the study of rise of <i>karma</i> etc. from the point of view of <i>dravya</i> (substance), <i>kṣetra</i> (locus), <i>kāla</i> (time), <i>bhava</i> (life of birth) and <i>bhāva</i> (condition).	Both physical and mental traits are the results of the interplay of both genetic (from the aspect of <i>dravya</i> ) and environmental factors (i.e. form the aspect of <i>kṣetra</i> , <i>kāla</i> , <i>bhava</i> and <i>bhāva</i> )

5.	<i>Genes</i> are not only hereditary but are also significantly influenced by the <i>karma</i> of the individual member.	True that all members of a particular species and sub-species would possess the same genetic codes but the <i>genes</i> , themselves would vary from member to member.
6.	<i>Karma</i> constitute the personality of a living being.	<i>Genes</i> constitute the personality of a living being.
7.	<i>Karmas</i> are extremely subtler matter particle which are part of subtler body.	<i>Genes</i> are subtle atomic particles which are parts of gross body.
8.	<i>Karmas</i> are atomic homogeneous endowed with color, smell, taste and touch.	<i>Genes</i> are atomic homogeneous endowed with color, smell, taste and touch.
9.	It is a natural law, a universal truth that extremely subtle control the subtle. Thus <i>karma</i> control <i>genes</i> .	<i>Genes</i> control personality.
10.	The <i>karmas</i> are the deciding factors for the various characteristics of a living organism ( <i>Jīva</i> ).	The <i>genes</i> are the deciding factors for the various characteristics of a living organism ( <i>Jīva</i> ).
11.	Every creature ( <i>Jīva</i> ) of universe attract the same <i>karma vargaṇā</i> (karmic particles) due to its activities and ultimately become <i>karma</i> .	there is an interesting fact here, that all big or small creatures or plants contain the same genetic codes.
12.	<b>The Jaina doctrine of <i>karma</i> believes that all the <i>jīvas</i> are possessed with similar souls, similar capacities but their different <i>karmas</i> provide them different bodies.</b>	<b>According to modern anatomy, all creatures have the same genetic codes, fundamental building block of life. It is only due to the mutation of the genetic codes, different types of species of creatures—amibā to man take birth.</b>

13.	<i>Karma</i> is not all in all, but heredity, environment, situation, geographical and ecological conditions, effect nature and behaviour of man.	<i>Genes</i> are not all in all but <i>karma</i> , environment, situation, geography, ecological conditions (nurture) effect nature and behaviour of man.
14.	<b>The laws of heredity are the messenger laws of <i>karmavāda</i>.</b>	<b><i>Genes</i> are the transporters of heredity characteristics.</b>
15.	<i>Jñānavarṇiya karma</i>	Non-stop chemicals and proteins produced by DNA distort our knowledge.
16.	<i>Darśanāvarṇiya karma</i>	Non-stop chemicals and proteins produced by DNA distort our perception.
17.	<i>Antarāya karma</i>	Non-stop chemicals and proteins produced by DNA distort our energy level.
18.	<i>Vedaniyā karma</i>	<i>Genes</i> produce various diseases by mutation process.
19.	<i>Mohanīya karma</i>	Non stop chemicals and proteins produced by DNA distort our healthy emotions.
20.	<i>Āyusya karma</i>	<i>Genes</i> affect aging process.
21.	<i>Nāma karma</i>	Genetic program decides characteristic of the body of every living being.
22.	<i>Gotra karma</i>	<i>Genes</i> link family history.
23.	<b>Our <i>Tirthankaras</i> have said from very beginning that "we are what we are because of our <i>karma</i>".</b>	<b>Genetic science says "we are what we are because of our <i>genes</i>".</b>
24.	DNA is known as <i>karma śarīra</i> or the casual body in <i>vedāntic</i> literature.	The DNA that the west has been investigating recently and is meant to contain the "God <i>gene</i> " among others.

25.	The way the casual body or <i>karma</i> body manages <i>vāsanā</i> is similar to—	the way the DNA is thought to manage the <i>genes</i> .
26.	<i>Jīva</i> comes in the womb of his mother with his own <i>karmas</i> .	<i>Jiva</i> comes in the womb of his mother and builds up body with the <i>genes</i> of both parents.
27.	All the activities of creature—its destinies, its forms, etc. according to "the Jaina doctrine of <i>karma</i> " are decided by karmic particles ( <i>karma</i> ).	According to biology all the activities of creature—its destinies, its forms etc. are decided by <i>genes</i> .
28.	Every creature gets the different type of body according to its bonded <i>karmas</i> . It is only due to the consequences of <i>karmas</i> , one is born blind eyes, sans intellect, some remains dwarf (short of structure) and other is quite tall, some is born with fair and other with dark complexion.	As per genetics these are all done by <i>genes</i> . Only due to the <i>genes</i> the structure of the body of creature takes place and some certain <i>genes</i> decide the gender of a living being like man, woman and enunch. The fate of every living being is decided by <i>genes</i> .
29.	<b><i>Karmas</i> are the cause— <i>Karmas</i> direct, instruct and motivate—</b>	<b>and <i>genes</i> are their effect (fruits). genetic codes and genes to function and mutata accordingly.</b>
30.	<i>Karma</i> is the component of our subtle body.	<i>Gene</i> is one of the components unit of gross <i>śarīra</i> .
31.	<b>According to Ācārya Mahāprajña "The theory of <i>saṁkramaṇa</i>—</b>	<b>is the theory of mutation of <i>gene</i>.</b>
32.	<i>Āyṣya karma</i> is also a <i>karma</i> but the outer mediums like poison etc. can minimize life span of a creature.	Similarly if some change is made in chromosomes and <i>genes</i> a person's physique can be changed.

33.	<b>Once Gandhara Gautama asked Lord Mahāvīra what is reason of all dissimilarities in the word? Mahāvīra replied "<i>karma</i> is the cause of all dissimilarities".</b>	<b>If the biologist of today is asked this question, he will reply that only the root cause of all dissimilarities is the "<i>gene</i>".</b>
34.	As per doctrine of <i>karma</i> on every <i>karma</i> particle written infinite instructions.	As per biology every <i>gene</i> contains sixty lakhs orders in it.
35.	Ācārya Mahāprajña says " <i>Genes</i> also represent our bonded <i>karma</i> ".	Acārya Mahaprajña says, " <i>Genes</i> transport the traits of parents".
36.	According to Jaina Philosophy—"at the point of a needle infinite <i>jivās</i> can be accommodated there".	According to genetics—"human body contains 100 trillions cells. Each DNA of a chromosome contains 3 billion genetic codes."
37.	Why is spirituality (soul + <i>karma śarīra</i> ) such a powerful and universal force? Why do so many people believe in things they cannot see, smell, taste, hear or touch? Why do people from all walks of life, around the globe, regardless of their religious background or the particular God they worship, value spirituality as much as, or more than pleasure, power or wealth?	"The answer is hardwired into our <i>genes</i> ". Spirituality is one of our basic human inheritances. It is in fact an instinct.
38.	Today, sister Jone Frances and sister Rose Marie are nuns at the same convent in Akron, Ohio (U.S.A.). In addition to their mutual interest in God and spirituality.	This is because Jane and Rose has important similarity : their DNA. They are identical twins—the product of the same fertilized egg.

39.	Spirituality comes from within. The kernel must be there from the start.	It must be part of their <i>genes</i> .
40.	We don't know God, we feel him. Who helps to determine how spiritual we are?	It is our genetic make up that help to determine how spiritual we are?
41.	What is life?	Life is a composite built up of soul, <i>karma</i> and <i>genes</i> .
42.	it is partly karmic.	The pattern of human actions are set originally during embryonic development under the control of DNA which in itself is partly inherited—
43.	The rising <i>karma</i> directs—	the <i>genes</i> to operate according to body requirement. The <i>genes</i> are directed by rising <i>karmas</i> to operate according to nature, duration, intensity and quantity of <i>karmas</i> in rise.
44.	This can be compared with <i>jñānavarṇīya kṣayopāśama</i> .	Glutamate <i>gene</i> is both critical and specific for both the type of thinking involved in making a mental map.
45.	This can be compared with <i>darśana varṇīya karma</i> .	Low level of serotonin alters perception.
46.	This can be compared with <i>satāvedaṇīya karma</i> .	The <i>gene</i> that makes the DR dopamine receptor called D4DR, a <i>gene</i> of happiness.
47.	This can be compared with <i>asātā vedanīya karma</i> .	The leptin receptor <i>gene</i> send signals both within the brain to decrease hunger and to the body to increase metabolism.

48.	This is comparable with <i>krodha mohanīya karma</i> .	Serotonin receptor is called 5-HT1B. Low serotonin causes aggression.
49.	This is comparable with hatred <i>mohanīya karma</i> .	Probably the most important role of the Y chromosome in aggression is manufacturing testosterone, the hormones that makes half the population male.
50.	This is compared with hatred <i>mohanīya karma</i> .	The geneticists have discovered "crime gene".
51.	This can be compared with <i>puruṣa veda nokaṣaya mohānīya karma</i> .	The master <i>gene</i> is called TDF, which is named for the protein it codes for, the testis, determining factor. It is located not surprisingly, on the Y chromosome, the only chromosome that men have but women do not.
52.	This is comparable with <i>lobha mohanīya karma</i> .	Richard Dawkins is another pioneering evolutionary biologist, best known for popularizing the concept of the "selfish <i>gene</i> ".
53.	This is comparable with <i>veda mohanīya karma</i> .	More precisely, our mapping showed the "gay <i>gene</i> " is more likely somewhere between the markers GABRA3 and DXYS 154 which span a distance of about five million base pairs.
54.	This is comparable with <i>āyusya karma</i> .	The recent discovery of several key <i>genes</i> related to aging is done. Our genetic blue print comes with the fine print that

		reads : warranty valid only for limited time. The first life extending mutation was found in a <i>gene</i> dubbed "age-1".
55.	These all are comparable with <i>nāma karma</i> .	Messenger- <i>gene</i> , operate <i>gene</i> , ribosomal RNA <i>gene</i> , transfer RNA <i>gene</i> , regulatory <i>gene</i> , suppressor <i>gene</i> , kinetic <i>gene</i> , synaptic <i>gene</i> , inert <i>gene</i> , language <i>gene</i> , mental retardation <i>gene</i> , body weight effecting <i>gene</i> (leptin), myostatin <i>gene</i> (muscle growth), handedness <i>gene</i> , dextral <i>gene</i> (right handed), sinistral <i>gene</i> (left handed).
56.	This is comparable with <i>mohanīya karma</i> .	The dopamine D2 receptor <i>gene</i> , which had been co-related to alcoholism in some studies.

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- <sup>1</sup> "Karmavada", *Uvācārya śrī Mahāprajña (presently Ācāryasrī)*, p. 237.
- <sup>2</sup> *Jo tullasāhaṇaṅ fale viśesó ṇa so viṇā heuñ. Kajjataṇao Goyamā! Ghadotva heū ya so kamma—viśeṣāvasyaka Bhāṣya.*
- <sup>3</sup> *Karmavāda*, p. 136.
- <sup>4</sup> *Bhagawatī sūtra* 12/5.
- <sup>5</sup> *Karmavāda*, p. 137.
- <sup>6</sup> *Bhagwatī Sūtra.*
- <sup>7</sup> *Manovijñāna aura śikṣā*, 1960, p. 161.
- <sup>8</sup> *Karmavāda*, p. 164.
- <sup>9</sup> *Bhagwati Sūtra.*
- <sup>10</sup> *Karmavāda*, p. 165.
- <sup>11</sup> Website : [www.Jainism.com](http://www.Jainism.com)—doctrine of *karma*, p. 82.
- <sup>12</sup> The "God-gene" article from "Time magazine" November, 2004, p. 2.
- <sup>13</sup> *Time magazine*, Nov., 2004, p. 6.
- <sup>14</sup> *Ibid*, p. 8.
- <sup>15</sup> *Ibid*, p. 9.
- <sup>16</sup> *The times of India*—editorial article.
- <sup>17</sup> *Vedānta* article—"Mapping of human genome and the possible dangers of karmic manipulations"—by Swami Ātmānaṅda, *Vedanta mission*, p. 1.
- <sup>18</sup> Dr. Sethuramaṇa subramaniana, [subramaniansethu@hotmail.com](mailto:subramaniansethu@hotmail.com) published on 18-11-2003.
- <sup>19</sup> Website—[www.scattletimes.com](http://www.scattletimes.com), escaping your genetics.
- <sup>20</sup> *Vedānta article*—by Swāmī Ātmānaṅda.
- <sup>21</sup> *Ācārya Kanakanandī—Svatantratā ke Sūtra (Tattvārtha Sūtra with its annotation)—dharma darśana śodha prakāśana*, Badota, 1992.
- <sup>22</sup> *Ācārya Kanakanandī—Svatantratā ke Sūtra.*
- <sup>23</sup> *Jaina Jineśwaradāsa—Arhata Vacana* research magazine, p. 57-58.
- <sup>24</sup> *Gangawāla Mānika Cañdra Arhata Vacana* research magazine, p. 61.
- <sup>25</sup> *Molecular biology*—by P.K. Gupta, p. 50.
- <sup>26</sup> *Ibid*, p. 50.
- <sup>27</sup> *Biology XII* (1), p. 857.
- <sup>28</sup> *Ibid*, p. 260.
- <sup>29</sup> *Genetics*—by P.K. Gupta, p. 172.
- <sup>30</sup> *Ibid*, p. 162.

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- <sup>31</sup> Genetics by P.K. Gupt, p. 172.
- <sup>32</sup> Ibid, p. 69.
- <sup>33</sup> *Jaina karma theory of biological hypothesis*—by Ajit Jain "Jalaj"—Arhata Vacana Research magazine, July, 99, p. 17-22.
- <sup>34</sup> *Mahābhārata—Maharṣi Vedvyasa—Gīta* press Gorakhpur, V.S. 2021, śāntipurva 191.16.
- <sup>35</sup> *Mahābhārata Van Purva*, 230.18.
- <sup>36</sup> *Saṃyuta Nikāya, anu bhikṣu Jagadīśa Kaśyapa Mahābodhi Sabhā Sārnātha* 1954-1.11.10.
- <sup>37</sup> *Uttarājhāyaṇi*, part-I, annotated—*Vācanā pramukha Ācārya Tulasī Sampādaka Ācārya Mahāprajñā, Śrī Jaina Svetāmbara Terāpañthī Mahāsabhā*, Calcutta, 1967, p. 13-23..
- <sup>38</sup> *Manusmṛti Sampādaka Nārāyaṇa Ācārya Niryaṇasāgara* press, Mumbai, 1946, 12.3.
- <sup>39</sup> *Viṣṇupurāṇa, Gītā* press, Gorakhpur 2.13.97.
- <sup>40</sup> *Milinda panho vibhatticcheda panho*, p. 68. The Theory of *karma* in Indian religion. *Bhartiya Prāccaya tattava prakāśana Samiti Pindawārā* (Rajasthan).
- <sup>41</sup> *Education and psychology*—by Dr. Sarayū prasāda, Coube, p. 160, 1960.
- <sup>42</sup> Ibid, p. 161.
- <sup>43</sup> Ibid, p. 161.
- <sup>44</sup> *Karmavāda Ācārya Mahāprajñā*, p. 137.
- <sup>45</sup> *Jaina karma siddhānta and manovijñāna*—Ratanlal Jaina—*Arhata Vacana sodha patrikā*, July, 1997, p. 35-45.
- <sup>46</sup> *Invention intelligence*—Sept. Oct., 2002, N.R.D.C. 20-22, Kailāśa Colony extension, New Delhi.
- <sup>47</sup> *Āddho jñāna-darśanāvarṇa vedanīya mohanīya yurnāma gotrāntarāyaḥ—Tattvārtha Sūtra Tikā Ācārya Kanakanandī* (1992) *dharma darśana śodha prakāśana*, Badota (meerut), p. 476.
- <sup>48</sup> *Ādhunika Vijñāna ka Sapekṣa Karmavāda*—Ajit Kumar Jain "Jalaj"—*Arhata Vacana*, Jan.-March, 2005, p. 59-64.
- <sup>49</sup> *Śrīvāstava Nirupamā*—a blind rush of human cloning—*Vijñāna Pragati*, March 2004, C.S.I.R., Dr. K.R. Kṛṣṇā Marg, New Delhi, p. 13-12.
- <sup>50</sup> *Śrīvāstava Nirupamā*—as above.
- <sup>51</sup> *Cytology genetics and plants breeding*—molecular biology, p. 69.
- <sup>52</sup> Ajit Jain 'Jalaj', *Jīvana kā Vikāsa tathā Jaina Siddhānta Arhata Vacana*, p. 3.
- <sup>53</sup> *Karmavāda—Yuvācārya Mahāprajñā* (presently *Ācārya Mahāprajñā*), *Ādarsa sāhitya saṅgha*, Chūrū (Raj.) second edition, p. 102.
- <sup>54</sup> *Cloning and karma theory*—by Dr. Anil kumar Jain, *Arhata Vacana*, July, 99, p. 9-15.
- <sup>55</sup> *Thāṇaṅga*—Jaina Vishva Bharati, Ladnun, p. 4-603.

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- <sup>56</sup> *Karma and puruṣārtha—Yuvacārya Śrī Mahāprajña, Jinavāṇī Karma Theory viśeṣāñka*, p. 105.
- <sup>57</sup> *Bhāgya aur Puruṣārtha—Elacārya Upādhyāya Kanakanandī*, second edition—dharma darśana vijñāna, research publication, Badota (Meeruth).
- <sup>58</sup> *Times of India* 26-10-90, Hariyāṇā edition—Harīśa Agarwal.
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