Chromosomes

Farook Aman

We are taught from an early age to show gratitude to God for the blessings that He provided us as humans. The meaning of God’s blessings engulfs optimistically the various aspects of our life experiences, such as health, wealth, children... etc to name a few. No matter how thankful we may be to our creator for what He bestowed upon us, we would never be able to fully understand the entire mechanism of God’s divine wisdom, for it is too profound and too complex?

As human beings, we are born naked, without knowledge (3Alm), with little, if any, strength and with no speech-save the cry as a baby to strengthen the lungs performance. Basically, when we are born, we are at the mercy, the compassion and the love of our Lord (subhanahu wa tala) [swt] as well as the infinite care and loving parents, who will raise us in the very best manner they could provide.

But what about acquiring knowledge...well, what about it?

The Holy Book of the Quran tells us that “Because of God, man comes to learn that which he previously did not know.”

Many people are knowledgeable in various fields but no one person alone knows it all. God Almighty does, (as He alone can). Nevertheless, there are some individuals, who might educate us, influence or enhance our knowledge base as they offer their respective knowhow and experience in order to share it with others and therefore, with the will of God, benefit humankind. When we seriously think about it, it is the knowledge that effectively spreads love and compassion among humans and shows us a way of life that directs us to refer to the word of God in a more meaningful way. And when we begin to see and experience that notion of feelings, then we begin to comprehend how deep our Creator's love for us truly is. That knowledge can be in the form of services provided by one human being to another; doctors who assist us in maintaining better health, engineers who build our homes, teachers who give us a strong base for learning etc....the list goes on and on.

But the very dossier I had wished to focus on is the scientific association of what God has taught us to learn, understand and appreciate about human genome and Chromosomes. A bright, young colleague of mine who has recently submitted his PhD thesis in biochemistry was explaining to me the intricacies of how chromosomes work in our bodies. During the short half hour ride in order to drop him at his home after work, I was intrigued and inspired to write about it. I trust that I will be able to deliver to the reader the required message, insha Allah.
Without indulging in the scientific exhaustive aspects, he explained as simply as possible, how each body cell represents 46 individual chromosomes (i.e. 23 pairs). Each chromosome consists of a huge number of genes that have control switches (called *promoters*) which will turn switch "on" and "off" in order to provide a certain body function or another... We humans are totally oblivious and do not feel the various interactions and the numerous processes that are constantly taking place inside our human bodies. These processes are compared to the work of the *binary code* inside a computer but which we also do not see (these interaction) processes in them either...except that the human body "machine" is by far the most intricate and complicated computer which God, and not human, created. (*Swt*).

For instance, the liver gene switches “on” when it wishes to provide the necessary production of the *detoxification* process in filtering blood and breaking down the proteins to carry out many biological functions of a human liver, which will then provide assistance, which will in turn allow for other organs in the entire human body to carry out their respective normal but necessary body functions. (*swt*)

It is when the “on” switch malfunctions and refuses to switch “off” and thereby remains “on” all the time that such a challenge could lead to some serious complications. Those unfortunate malfunctions will therefore cause to sanction the human cells to amalgamate and multiply thereby resulting in what we all know as “*tumour*”.

Some of these tumours can be aggressive (*khabeeth*) while others are regarded or defined as benign (*Hameed*). Therefore, the gene switch of the “on” and “off” is of supreme importance for man to constantly function properly in order to avoid the eventual unwanted consequence of “tumours”.

Other factors which might come into play, such as the hereditary aspects and the environmental influences which we get exposed to, including the diet which we consume, the daily life style which we chose to carve for ourselves and yes...the stresses that we go through and endure, knowingly or not, in our modern daily life. These factors interact with the product of our genes in one way or another; positively (in which case the body remains healthy) or negatively (where complications might occur).

In addition to the above, the chromosomes theory of “46” (known as the 23 pairs) has an exception only in the sexual cells (sperms or eggs (ova) ) which we will find that only 50% of the chromosomes come into play, i.e. 23 to be specific. It is the last and the final 23rd chromosome that will determine the sex of the baby upon fertilization of the egg. Also, at the time of the fertilization, the egg, (called *ovum*) will carry the “X” chromosome. However the man’s sperm will have in it either the “X” chromosome or the “Y” chromosome. The male’s sperm which fertilizes the egg has the “X” chromosome, this plus the female’s ovum “X” will produce, with
the will of God, a healthy baby girl. While the unification of the female’s “X” chromosomes and the male’s “Y” chromosomes will result in the birth of a baby boy. Referring also to the will of god, the sex of the baby is therefore determined by the sperm provided by the father. If the father provides a sperm with a “Y” chromosome then the baby will be a boy (XY) and if the sperm with an “X” chromosome is to fertilize the egg then the baby will be a girl (XX). The female’s ovum always and invariably has the “X” chromosome only on it.

Abnormalities in the number of chromosomes present in the fertilized ovum may cause hereditary disease. For example; Down syndrome baby results from having there rather than only two of chromosome number 21. The chance of having a Down’s baby is related to many factors, including the age of the pregnant woman at the time of the fertilization of the egg, the marriage of a couple that might have higher risk history of Down syndrome children plus other factors such as the family medical history. All of these will play a role in the outcome of the health condition of the new born.

In another condition we find two X chromosomes and one “Y” chromosome (the affected person has “XXY” and not just “XY” complement). This condition is called Klinefelter syndrome and is associated with ambiguous sex. In these two conditions the affected person has 47 rather than the normal 46 chromosomes.

By contrast there is a condition in which the cells have 45 only and not 46 chromosomes. In this condition there is only one X chromosome present and no other X or Y chromosome with it. This is called Turner’s syndrome and the female affected has short stature and is infertile.

These conditions can be discovered by a simple test, which is called Amniocentesis which is usually conducted to extract and analyze the embryonic fluids from the womb of the pregnant woman in order to determine the number and types of abnormalities in sex chromosomes present.

Because of the above factors, it is reported that the chances of having a Down Syndrome baby could be of a higher percentage risk although it might not necessarily be limited to the above factors only, especially so with reference to the age of the pregnant woman, which a lot of people might generally focus on.

This very specific subject matter might also bring about the moral issue of whether or not to terminate the pregnancy after it is found that it is likely to result in a Down syndrome baby birth. It is important to note that in Islam, and perhaps also in the case of other religions, having an abortion is totally prohibited and unacceptable (unless where the pregnant woman is at risk of death due to further serious and life threatening complications).
Generally speaking, the genes on the Chromosomes will play another vital role which might establish the appearance and personality traits of a person as well as the cause of a certain hereditary diseases. It is why doctors will normally enquire about the family medical history as a guideline and perhaps a caution to more appropriate diagnostic results.

The days are gone when humans lived and died by the sword. Our lives are now filled with toxins from various chemicals which we voluntarily or involuntarily consumed directly or indirectly. No doubt, the technological revolutionary advances might have assisted us in providing speed and comfort as well as joy to our lives...etc. Nevertheless, there is a price to be paid.

If we consider the direct impact of these daily environmental factors of toxins, chemicals, stresses... etc, to our lives and strive to avoid them, we might succeed partly in learning about them and thus become more responsive to their existence in our daily interactions as we become more conscious of the associated direct and indirect dangers, which might encompass positive or negative effects to our bodies. On the other hand, the indirect impact of these chemicals and or other environmental factors is what we should be more attentive to in order to lessen its effect(s) on our health.

Only by updating and furthering our knowledge that we might educate ourselves and others. This process might also allow us to avoid the various health hazards and the other environmental influences, including but not limited to the many awful daily human habits such as smoking, drinking, obesity, lack of regular exercise...etc. I wish I could expand on the fact that years of exposure to all these negative environmental factors might have weakened our bodies, making more common the malfunctions of chromosome. But with more education, we can learn how to avoid such exposure, and learn to lessen their shocking impact on us... etc.

To conclude, I trust that God has allowed me to deliver the small message which is intended to make others learn, appreciate and think. Above all, I felt that this subject matter is too life-size for me to compress in such a short few lines of words.

Rather than get into the Down syndrome issue, I could have perhaps elaborated or resolute a bit more (with examples) on the environmental factors causing genes and chromosome to malfunction. However, this would take volumes to write about and much research to perform. That is why, leaving it in the hands of people who are better educated than I am and superiorly informed as well as sufficiently more involved in this field, the field of the world of science and medicine, which I am not.

For comments, please write to: farook_aman@rogers.com