

Concept of *Quwwat Nāmiya* (Augmentative Faculty) in Unani Medicine: An Analytical Review

Kehkashan¹, Ferasat Ali²

¹PG Scholar, ²Professor

D/o Kulliyat, F/o Unani Medicine, Ajmal Khan Tibbiya College, A.M.U, Aligarh

Corresponding Author: Kehkashan

ABSTRACT

There are three kind of faculty, and therefore of functions proceeding there from, namely; the vital faculty (*Quwā Haywāniyya*), the natural faculty (*Quwā Tabī'iyya*) and the psychic faculty (*Quwā Nafsāniyya*). Augmentative faculty (*Quwwat Nāmiya*/ power of growth) comes under the natural faculty. *Quwwat Nāmiya* is the power which is specific for the growth of the body. This power provides dimensions and shape to the body. The nutritive faculty is subservient to this augmentative faculty. *Sinn-i-Numū* is the period of growth and development. It is dominated as the early period and lasts about thirty years. The period of growth is hot and moist, in this period both *Ruṭūbat Gharīziyya* as well as *Harārat Gharīziyya* are dominant. Growth of skeleton continues up to 25 years of age, thereafter epiphyseal cartilages ossify and growth is arrested. Warathah (heredity), *Ghidhā* (food), *Ruṭubat*, *Akhlāṭ muharrikah* (hormones) are the factors that affect *Quwwat Nāmiya* and control growth. *Quwwat Nāmiya* performs their functions with the help of Growth hormone also called somatotrophic hormone or somatotropin. Growth hormone (GH) exerts its multiple effects on every cell. GH secretion is under negative feedback control. Disorders of *Quwwat Nāmiya* include acromegaly, gigantism, acromegalic gigantism, dwarfism, acromicria.

Key words: *Quwwat Nāmiya*, growth hormone, *Sinn-i-Namū*, *Ruṭūbat Gharīziyya*.

INTRODUCTION

The concept of augmentative faculty has been described in following ways.

There are different meanings of *Quwā* (power) in the literature e.g. strength, ability, not amenable to acted upon or affected i.e. not passive, efficient i.e. power of effecting others, potentiality, general energy in the form of ATP.

The concept of *Quwā* (faculties-power) is unique one in the *Tibb*. The *Quwā* (faculties) is that property of the body, with which the phenomenon of life is manifested. [1]

Faculty: The name of a property whereby the phenomenon of life is manifested.

Faculty =power =potentiality. Faculty is not force; it is potential power.

The tout ensemble of faculties is "the soul".

The tout ensemble of functions is "life".

Faculties are to be distinguished from functions. The difference is that the former originate the latter. But as each function depends on its own special faculty they can be treated together. [2] Every organ especially the *A'dā' Ra'isa* (vital organ) have to perform the functions pertaining to their respective *Quwā* (faculties). The organ, faculties and the functions are interrelated and interdependent. [1]

There are three kinds of faculty, and therefore of functions proceeding there from, namely- the vital faculty (*Quwā*

Ḥaywāniyya), the natural faculty [*Quwā Ṭabī'īyya*) and the psychic faculty (*Quwā Nafsāniyya*).^[2]

Quwā Ṭabī'īyya (natural faculties): *Quwā Ṭabī'īyya* (natural faculties) are those which are responsible for ingestion, digestion, absorption, transformation (metabolism) and assimilation of *Ghidhā* (food) and excretion of waste products; and preservation of race. The natural faculties are divisible into two groups:

(a) Dominant or directing, .

(b) Subservient or obedient.

The dominant faculties are twofold-

(i) Concerned with the preservation of the life of the individual;—the nutritive faculty (*Quwwat Ghādhiya*) and the augmentative faculty (*Quwwat Nāmiya*/power of growth).

(ii) Concerned with the preservation of the race- the generative faculty (*Quwwat Muwallida*) and the formative faculty (*Quwwat Muṣawwira*).^{[1],[2]}

Quwwat Nāmiya is the power which is specific for the growth of the body. This power provides dimensions and shape to the body. Its possible English equivalent is power of growth.^[3] It can be defined in other words as “The augmentative faculty (power of growth) is that whereby the increase in size of the body in all directions in just proportion is secured”. This is brought about by means of the substances derived from the aliments. The nutritive faculty is subservient to this augmentative faculty in so far as it enables the preparation of the requisite substances from the aliments, but growth will not occur unless more is supplied than is lost. Growth implies an increase in all directions in the proper proportions. To become fat or obese with advancing years, after being slim, is not growth.^[2] Obesity is defined as a body mass index (BMI) greater than 25, has been identified as public health threat. Obesity is a complex disease, affecting virtually all ages.^[4]

Al-Abbas named this faculty as *Quwwat Murabbiya* and asserts that it is a power which augments the organs of the foetus and transforms them from smaller to

larger size; and the function of this faculty remains continued from formation of the foetus to the end of youth; thereafter it ceases to function. He further says: *Quwwat Muwallida* (reproductive faculty) is also served by *Quwwat Ghādhiya* (nutritive), it augments the organs of the foetus and grows them in length, breadth, and depth, and *Murabbiya* continues functioning from formation of the foetus to the end of the youth.^[1]

Asnan-e-arba and their temperament:

There are four periods of life—

1. *Sinn-i-Numū*(the period of growth and development): It is dominated as the early period and lasts about twenty five years. The peoples of this period are hot and wet in temperament.
2. *Sinn-i-Shabāb* or *Sinn-i-wuqūf* (manhood/the period of stability): It is the period of youth/middle age and lasts upto thirty five or forty years depending upon the state of the health and temperament of individual. The people in this period are Motadil mail ba hararat in temperament.
3. *Sinn-i-Kuhūlat* (Aetus verelis/the period of decline with continuing vigor): It is the period of the middle age and extends to about sixty years. The people in this period are cold and dry in temperament but then old age.
4. *Sinn-i-Shaykhūkhah* (old age or Aetus cripita/the period of decline with the appearance of weakness in vigour): It is the age of the old to the end of life. They are more cold and dry in comparison to *Kuhūlat*.^[1,2,5,6]

***Sinn-i-Numū*/Period of growth:** It is further divided into five periods-

1. *Sinn-i-Ṭufūlat* (Infancy): It is upto 4 years of age. It is the period before the limbs are fitted for walking.
2. *Sinn-i-Ṣabā* (Babyhood): It is from 4 upto 7 years of age. It is the period of appearance of teeth. Walking has been learnt, but is not steady. The gums are not full of teeth.
3. *Sinn-i-Tara'ru'* (Childhood): It is from 7yers upto 14 years. The body shows

strength of movement. The teeth are fully out. Pollutions have not yet appeared.

4. *Sinn-i-murahiqaḥ* or *Sinn-i-Bulūgh* (Juvenility/puberty): it is from 14 years upto 21 years of age. The period up to the development of hairs on the face and pubes. Pollutions begin.
5. *Sinn-i-Fatā* (Youth): It is upto 30 years. It is the period up to the limit of growth of the body (to the beginning of adult life). [2,7,1]

Relation between *Ruṭūbat Gharīziyya* and Growth: The period of growth is hot and moist and in this period both *Ruṭūbat Gharīziyya* as well as *Ḥararāt Gharīziyyah* are dominant. [1] Ibn Nafees in *Kulliyat nafisi* says that hotness of sibiyan is because of their higher metabolic rate than adults and olds. [8] In this period *Ruṭūbat Gharīziyya* exceeds the quantity of sufficient for the preservation of *Ḥararāt Gharīziyyah* (normal body heat) or in the other words it is more than sufficient for various metabolic processes of the body. In this period the organs of the body continue to grow. [1,8]

In the period of *wuqūf*, the quantity of *Ruṭūbat Gharīziyya* is only equal to the quantity sufficient for the preservation of *Ḥararāt Gharīziyyah* i.e. neither it is excessive nor deficient than the quantity required for the preservation of normal heat, or for the continuance of normal metabolism. So that in this period, there is no growth or dissolution/degeneration takes place. [1,8]

In the period of *Kuhūlat*, the quantity of *Ruṭūbat Gharīziyya* is lesser than the quantity required for the preservation of *Ḥararāt Gharīziyyah* or bodily metabolism. But there is no domination of *Ruṭūbat Gharībah ballah* (abnormal metabolic compounds). In this period the powers and faculties begin to deteriorate but there is no marked dissolution.

In the period of *Shaykhūkhah*, the quantity of *Ruṭūbat Gharīziyya* is deficient and lesser than the quantity required for the preservation of *Ḥararāt Gharīziyyah* and to

continue the bodily normal metabolism and super added with and dominated by *Ruṭūbat Gharībah ballah* (abnormal metabolic products). In this period deterioration in the powers and faculties of the body is marked. *Ruṭūbat Gharīziyya* and *Ḥararāt Gharīziyyah* are markedly reduced. Hence the *Mizāj* becomes *Bārid* (cold) and *Yābis* (dry). [1,8]

Rate of growth at different phases of *Sinn-i-Numū*: Growth of the body does not proceed at a uniform rate. At different age it shows different rate of growth. During infancy, especially in the first year growth is very rapid. Between three and twelve years, growth proceeds at a lower rate. At puberty growth again becomes very rapid. After puberty the rate slows down. Growth of skeleton continues upto 25 years of age, thereafter epiphyseal cartilages ossify and growth is arrested. [1]

Regarding this Ibn Sina says in his book "Alqanoon Fit Tib" that, the temperament during the whole of this period of life (period of growth) is almost equable as regards "heat", but "moisture" is in excess. There has been not a little controversy among older writers about the degree of heat during the period of juvenility as compared with that of youth. Some argue that the heat is greater in the former than the latter, and that this accounts for their growth, Others argue that the innate heat of youth is far greater than that of juvenility, and the process of growth, greater in juveniles, requires adequate moisture rather than heat. These then are the two theories and the facts on which they are based.

1. **Galen s teaching:** Galen is opposed to both. In his opinion the heat is actually the same in each. The difference is that in puberty its quantity is great but its acuity is less. In youth the heat is less in quantity but greater in acuity. At the outset of life, the innate moisture suffices for the two requirements-maintenance of innate heat and growth. But there comes a time when one or other or both must fail. Innate heat must

be adequate to enable growth to take place, yet the basis of growth (innate moisture) is failing, so that growth must be cease. [2]

2. **As regards the second theory:** During juvenility growth is in virtue of moisture rather than in virtue of heat. This cannot be true because moisture is the material cause of growth and moisture does not unfold or construct itself. It is not a self created, it only changes in virtue of a formative power acting upon it. As a matter of fact this formative power is F-the "soul" or "nature "-that which is in the decree of Allah('Umr-i-Allah). This "nature" requires an instrument where with to work, and this instrument is the innate heat.

This completes Galen's teaching about the temperaments of juvenility and youth. The temperament of youth is nearer to equipoise than that of juveniles but compared with them, its temperament is dry and compared with the third and fourth periods of life, the temperament of youth is moist. [2]

Factors affecting *Quwwat Nāmiya*: Following factors affect *Quwwat Nāmiya* (faculty of augmentation) and controls growth of the body.

1. **Warathah** (heredity): As a result of transmission of hereditary character of parents to their off springs, children of tall person usually grow tall and so on. The internal and external environments also play their role in affecting *Quwwat Nāmiya* in stimulating or retarding growth.
2. **Ghidhā** (food): Ibn Sina says that *Quwwat Nāmiya* (augmentative faculty) is served by *Quwwat Ghādhīya* (nutritive faculty) and growth is possible only when it supplies food exceeds the *Tahallul*.
3. **Ruṭūbat**: Factors producing *Ruṭūbat* (moisture) in the *Mizāj* of internal environment of the body enhance growth, and effect of *yubusāt* (dryness) is contrary to this.

4. **Akhlāṭmuḥarrikah** (hormones): Hormones which exert strong effect on the *Mizāj* (temperament) of the internal environment of the body and thereby affect growth, are the following:

- a) Growth hormone of the anterior pituitary, thyroid hormones and insulin help in the replacement of wear and tear and enhancement of growth. Thus, the *Quwwat Nāmiya* takes its work from these hormones.
- b) Growth of the gonads and secretion of sex hormones is controlled by *Quwwat Nāmiya* through the gonadotropic hormones of the anterior pituitary. Sex hormones are required for the development of secondary sex characters with the growth of the *A'ḍā'* *Ṭanāsulliyya* (accessory sex organs).
- c) Growth of the thyroid and adrenal cortex and their functions are controlled by the thyrotrophic hormones and ACTH, respectively.
- d) Growth of bones is controlled through the parathyroid hormones. [1]

Mechanism of *Quwwat Nāmiya*-This can be understood by the mechanism of bone growth as an example.

During embryonic development most bones of the body are first seen in the form of cartilage. The replacement of these cartilages by bone is called ossification. [9] Most bones are formed by a process of Endochondral ossification, in which performed cartilage templates (models) define their initial shapes and positions, and their cartilage is replaced by bone in an ordered sequence. Bones such as those in the cranial vault are laid down within a fibro-cellular membrane, by a process known as intra-membranous ossification. [10]

1. In most bones, ossification begins during intrauterine life at an area called the primary centre of ossification.
2. The part of the bone formed by extension of bone formation from the primary centre is called the diaphysis.
3. However, the ends of long bones are still cartilaginous at birth. These are ossified

from secondary centers that (as rule) appear after birth.

4. Each part ossified from a secondary centre is called an epiphysis.
5. For many years after birth, the bone of epiphysis and diaphysis is separated by a plate of cartilage called epiphyseal plate.
6. This plate is a site of active bone growth. Growth in length of a bone is possible only as long as the plate exists.
7. When a bone has attained its full length the epiphyseal plate disappears and the diaphysis and epiphysis fuse with each other. This is referred to as fusion of the epiphysis. ^[9]

Fusion of epiphysis and diaphysis starts at puberty and is complete by the age of 25 years, after which no more bone growth take place. Bone grows in length by multiplication of cells in the epiphyseal plate of cartilage and in the thickness by multiplication of cells in the deeper layer of periosteum. Bone grows by deposition of new bone on the surface and at the ends. This process of bone deposition by osteoblast is called oppositional growth or surface accretion. ^[11]

GROWTH HORMONE- A basic tool of *Quwwat Nāmiya*: *Quwwat Nāmiya* performs their functions with the help of Growth hormone also called somato-tropic hormone or somatotropin. It is a peptide hormone synthesized by somato-tropic cells within the lateral wings of the anterior pituitary and stored in very large amount in pituitary gland. It is Single un-branched polypeptide chain containing 191 amino acid and of molecular weight-22,005 Daltons. ^[12]

Metabolic effects of human growth hormone: Growth hormone (GH) exerts its multiple effects on every cell. The metabolic actions of human growth hormone may be considered in four broad categories:

1. Anabolic effects: i.e. effects which may be considered reflections of an increase in protoplasmic mass. It causes growth of all tissues of the body that are capable of growing. It enhances almost all facets

of amino acid uptake and protein synthesis by cells, while at the same time reducing the breakdown of proteins.

2. Skeletal effects-bone growth and development.
3. Effects on carbohydrate and fat metabolism: It enhances body protein, uses up fat stores and conserves carbohydrates.
4. Miscellaneous effects: It increase glomerular filtration rate and renal plasma flow and also increases tubular reabsorption of phosphate. ^[12,13]

Mode of Action of GH: GH acts on bones, growth and protein metabolism occurs through somatomedin secreted by liver. GH stimulates the liver to secrete somatomedin. Somatomedin is defined as a substance through which growth hormone acts. It is a polypeptide with the molecular weight of about 7,500. Somatomedins are of two types: first one is Insulin-like growth factor-I (somatomedin C), and other one is Insulin-like growth factor-II. ^[14] The insulin like growth factors (IGFs) are members of the family of insulin related peptides, which includes insulin, IGF-I and IGF-II. The IGFs are potent mitogens for many different cell types, including those of the immune system, and these factors play a central role in growth and development. ^[15]

Regulation of growth hormone secretion: GH secretion is under negative feedback control. Hypothalamus releases GHRH and GHRP, which in turn promote the release of GH from anterior pituitary. GH acts on various tissues. It also activates the liver cells to secrete somatomedin C (IGF-I). Now, the somatomedin C increases the release of GHIH from hypothalamus. GHIH, in turn inhibits the release of GH from pituitary. Somatomedin also inhibits release of GHRP from hypothalamus. It acts on pituitary directly and inhibits the secretion of GH. GH inhibits its own secretion by stimulating the release of GHIH from hypothalamus. This type of feedback is called short-loop feedback

control. Similarly, GHRH inhibits its own release by short-loop feedback Control. [14]

Pathways of GH: Growth hormone signalling in a cell is characterized mainly by two pathways:

1. MAPK/ERK pathway

2. JAK-STAT signalling pathway

These pathways regulate basal cellular functions including target gene transcription, metabolic transport and enzymatic activity. [16]

1. MAPK/ERK pathway: GH binds to receptors on target cells and activates the MAPK/ERK pathway. Through this pathway GH directly stimulates division and multiplication of chondrocytes of cartilage. [17] In this pathway growth factors induce the synthesis of specific nuclear transcription factors essential to the production of the enzymes of DNA synthesis. Growth factors trigger phosphorylation of the nuclear proteins Jun and Fos, transcription factors that promote the synthesis of variety of gene products, including cyclins, CDKs, and E2F. In turn, E2F controls production of several enzymes essential for the synthesis of deoxynucleotides and DNA, enabling cells to enter the S-phase. [18]

2. JAK-STAT signalling pathway: GH also stimulates, through the JAK-STAT signalling pathway. [17] This pathway is a chain of interactions between proteins in a cell, and it is involved in processes such as cell division, immunity, tumour formation and cell death. There are three key parts of JAK-STAT signalling: Janus kinases (JAKs), Activator of Transcription proteins (STATs) and signal transducer, and receptors (which bind the chemical signals). [19] When JAK2 is activated by GH, it phosphorylates multiple proteins on tyrosine residues, including JAK2 itself, the growth receptors, and SHC proteins. These signals lead to phosphorylation and activation of the extracellular signal regulated protein kinase (ERKs) -1 and -2, phosphorylation of the insulin

receptor substrates that have been implicated in regulation of glucose metabolism, and phosphorylation and activation of signal transducers and activators of transcription (STATs) -1, -3, -5a and -5b, which have been implicated in the expression of a variety of growth hormone sensitive gene. In vivo studies have shown that GH phosphorylates STAT5a and STAT5b in many tissues, including the immune system. Furthermore, it has been demonstrated that GH up-regulates the transcription of STAT5 gene in lymphoid organs, including the thymus and peripheral blood and in cell lines transfected with the GHR cDNA. [15]

Disorders of Quwat-e-Namia: Weakness of faculty corresponds to "hypofunction" Plethora of faculty corresponds to "hyperfunction". [2]

Hyper-secretion of Growth hormones leads to gigantism, acromegaly, acromegalic gigantism.

Hypo-secretion of Growth hormones leads to dwarfism, acromicria. [14]

ACROMEGALY: In adults growth hormone hypersecretion causes acromegaly which is characterized by local bone overgrowth. It is severe systemic disease, because the GH/IGF-I excess causes impairment of cardiac and respiratory functions, which contribute to increased mortality and morbidity. [15] It is more common than gigantism. There is enlargement of hands and feet, prominent supraorbital ridges. And other features include enlargement of the tongue and lips, thickening of the skin and kyphosis. [20]

GIGANTISM: In children and adolescents Growth hormone hypersecretion leads to gigantism because of the associated secondary hypogonadism which delays epiphyseal closure, thus allowing continued acceleration of linear growth. [15] It occurs in prepubertal boys and girls and is much less frequent than acromegaly. The main clinical feature in gigantism is the excessive and proportionate growth of the child. There is enlargement as well as thickening of the

bones resulting in considerable increases in height and enlarged thoracic cage. [20]

ACROMEGALIC GIGANTISM: Acromegalic gigantism is a rare disorder with symptoms of both gigantism and acromegaly. Hypersecretion of GH in children, before the fusion of epiphysis with shaft of the bones causes gigantism and if hypersecretion of GH is continued even after the fusion of epiphysis, the symptoms of acromegaly also appear. [14]

DWARFISM: Severe deficiency of GH in children before growth is completed results in retarded growth and pituitary dwarfism. Most commonly, isolated GH deficiency is the result of an inherited autosomal recessive disorder. Less often it may be due to a pituitary adenoma or craniopharyngioma, infarction and trauma to the pituitary. The clinical features of inherited cases of pituitary dwarfism appear after one year of age. These include proportionate retardation in growth of bones, normal mental state for age, poorly developed genitalia, delayed puberty and episodes of hypoglycaemia. [20]

ACROMICRIA: Acromicria is a rare disease in adults characterized by the atrophy of the extremities of the body. [14]

Factors affecting Growth: There are various efficient and coefficient factors that affects growth including especially environmental factors. The ways to increase human growth hormone naturally are- lose body fat, try an Arginine supplement, fast intermittently, reduce sugar intake, take a GABA supplement, exercise at a high intensity, don't eat a lot before bedtime, take a melatonin supplement, take beta-alanine and/or a sports drink around your workouts, try other natural supplements including- glutamine, creatinine, ornithine, L-dopa, glycine, Optimize your sleep. [21]

Specific exercises which help in maintaining the normal functioning of the pituitary gland are- Triangle pose, Pushups, Seated wide leg forward bend, Childs pose. [22] Pituitary gland can also be activated through Yoga. In yoga, the third-eye chakra governs the pituitary gland. This is Located

in the middle of the eye brows. Yoga poses, mantras and breath work stimulate this third eye. [23]

CONCLUSION

Quwwat Nāmiya is responsible for overall human body growth. Function of this faculty remains continued from formation of the fetus to the end of youth. The nutritive faculty is subservient to this augmentative faculty. Growth is only possible only when this nutritive faculty in so far as it enables the preparation of the requisite substances from the aliments, but growth will not occur unless more is supplied than is lost. Sometimes *Quwwat Ghādhiya* supplies food equal to the amount of *taḥallul* (dissolution), sometimes less than that and sometimes more than that. But growth is possible only when food exceeds the *taḥallul* (dissolution). To become fat or obese with advancing years, after being slim, is not growth. Among the four periods of life, *Sinn-i-Numū* is the period of growth. It lasts upto thirty years of age. The period of growth is hot and moist and in this period both *Ruṭūbat Gharīziyya* as well as *Ḥararāt Gharīziyya* is dominant. In this period the organs of the body continue to grow. [1],[8] But with advancement of age, rutubate *Ruṭūbat Gharīziyya* decreases in quantity and growth ceased after reaching 25 years of age. *Quwwat Nāmiya* performs their functions with the help of Growth hormone also. Growth hormone (GH) exerts its multiple effects on every cell & hypothalamus regulates the secretion of growth hormone. So we can say that Centre of *Quwwat Nāmiya* is present within the hypothalamus and its Receptors found in every cell surface of human body. Efficient and coefficient factors play an important role to stimulate pituitary gland and promote augmentation.

REFERENCES

1. S.I. Ahmed, "Al-U Moor-Al-Tabi'yah", Principles of human physiology in Tibb, 1980, pp 182-185, 162, 163, 44, 46

2. Gruner OC (1973). A Treatise on the Canon of Medicine of Avicenna, AMS Press, New York; Pp 68-75, 107, 112, 123
3. Standard Unani Terminology published by Central Council for Research in Unani Medicine printed at India Offset Press A-1, Mayapuri Industrial Area, Phse-1, New Delhi – 110 064 (India); 2012, P32
4. J.-P. Bourguignon B. Jegou, B. Kerdelhue (eds.). Multi-system endocrine disruption (research and perspectives in endocrine interactions), Springer Heidelberg Dordrecht London New York. P-102
5. Qarshi, A. Ifade kaeer. Idara Kitabus Shifa, pp32-33
6. Azmi HAA, “Mubadyate Tibb”, 1991. Pp-127,129
7. Sina I. al-shaykh al-Rais Abu Ali al-Husayn ibn AbdAllah (2010). Al-Qanun fit Tibb (Urdu Translation by Kantoori GH), Idara Kitabal-shifa, New Delhi. P-44
8. Kirmani Brhanuddin Nafis bin Aud. Kulliyat Nafisi (Urdu translation by Hakeem Mohammad Kabiruddin), Idara Kitab-al-Shifa, New delhi, YNM.;pp-42-44, 50
9. Singh I., Textbook of anatomy, volume-I, 1996, Jaypee brothers medical publishers (p) LTD, New Delhi. Panama city. London. pp13,14
10. “Publisher’s page for Gray’s Anatomy. 39th edition (US). 2004. ISBN 0-443-07168-3” Archived from the original on 9 February 2007. Retrieved 27 march 2007, P-97
11. Chaurasias BD. Handbook of general anatomy, fourth edition, 2009, edited by Krishna Garg, CBS publishers & distributors Pvt. Ltd. P-46
12. Hall, JE. 2011. Guyton and Hall Textbook of Medical Physiology, 12ed, Elsevier, New Delhi PP553,554
13. Human Growth Hormone edited by A. Stuart Mason, M.D., F.R.C.P. - William Heinemann medical books limited, 1972, R.J. Axford Ltd., industrial estate, Chichester, Sussex. Pp 25-30, 39
14. Sembulingam, K. Sembulingam, P. Essential of Medical Physiology” pp 377-379, 384-386
15. Berczi I., Szentivanyi A., Growth and lactogenic hormones- neurobiology, volume 2, edited by Lina Matera and Robert Rapaport, first edition-2002, Elsevier, Amsterdam-london-newyork-oxford-paris-singapore-tokyo pp14, 12, 247, 248
16. Zych S., Szatkowska I., Czerniwska-Piatkowska E. “Growth hormone signalling pathway” – a review article. 2006; 52 (4): 367-72—[https://www.ncbi.nlm.nih.gov. > pub...](https://www.ncbi.nlm.nih.gov/pub...)
17. https://en.wikipedia.org/wiki/Growth_hormone
18. Nelson D.L., Cox M.M. Lehninger Principles of Biochemistry. 3rd edition. Macmillan worth publishers. P-472
19. https://en.wikipedia.org/wiki/JAK-STAT_signaling_pathway
20. Mohan H. Textbook of pathology. 6th edition. New Delhi: Jaypee brothers: (2013), pp557, 793-795.
21. <https://www.healthline.com/nutrition/11-ways-to-increase-hgh>
22. <https://www.livestrong.com/article/413779-exercises-for-pituitary-gland/>
23. <https://www.livestrong.com/article/386570-how-to-activate-the-pituitary-gland-through-yoga/>

How to cite this article: Kehkashan, Ali F. Concept of *quwwat nāmiya* (augmentative faculty) in unani medicine: an analytical review. Int J Health Sci Res. 2019; 9(10):157-164.
