



# Islamic Fasting or the Right Life Style: Investigating the Biochemical Parameters of the Body Organs

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## ABSTRACT

**Context:** The history of anthropology suggests that in the past, the human being fasted to satisfy their Gods and request their wishes. Fasting is the ritual activity and is of course a unique pray. "He, who is not alike anything". Ramadan has the features regarding its time (descent of Quran), worshiping plan, the social effects, individual construction and considering health.

**Evidence Acquisition:** The results of this study suggest that induction of a one-month specific pattern can lead to the body and soul health during a year.

**Results:** The result of this research indicates that fasting in Ramadan is efficient for reaching a right pattern in life style, especially when not only Islam but also other religions emphasize on fasting. Investigating the biochemical parameters and its sufficiency from fasting suggests that balancing the neurotransmitters of brain in fasting persons lead to their tranquility. Hence, the effect of fasting on the other chemical parameters leads to the promotion of fasting persons' health.

**Conclusions:** Rectifying the life style is one of the most effective factors on the individuals' health. An important part in the life style of individuals which is related to fasting is sleeping. Early rising, in other words, the optimum time for sleeping is an aspect of fasting and it can be concluded that fasting is meaningful with early rising. Sleeping well and having enough time to sleep for having the boosted memory, the powerful immunity system and daily happiness are essential.

**Keywords:** Ramadan; Fasting; Biochemical Parameters

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►Article type: Research Article; Received: 01 Jan 2012; Revised: 14 Feb 2012; Accepted: 02 May 2012; Epub: 26 Apr 2012; Ppub: Spring 2012

►Implication for health policy/practice/research/medical education:

Islam, the holy religion has the significant instructions for body and soul health in which the holy household of the prophet of Islam accentuated on it. The body and soul of human have special needs and from the divine point of view, the Soul food and keeping its health is at the top of the agenda. Educating fasting along with early rising involves caring the body and soul. The fasting is so important that the holy prophet fasted two days a week. Fasting is recommended by all of the religions and considering it can be easy regarding the publicizing its role. Thus, the health deputy of medical policy should pay attention to this important issue and the researches should be involved in the national media regarding the goal of promoting the fasting. By this way, it can be possible to make people be interested in fasting by motivation of maintaining body and soul health, not the obligation of religion, however; fasting is publicized just in Ramadan. So, promoting the benefits of fasting including the prevention and curing the physical and psychological diseases by the experts is necessary.

►Please cite this paper as:

Zafari Zanganeh F. Islamic Fasting or the Right Life Style: Investigating the Biochemical Parameters of the Body Organs. *Quran Med.* 2012;1(4): 89-94. DOI: 10.5812/quranmed.9218

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The Translated Version of: <http://dx.doi.org/10.5812.quranmed.9218>

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## 1. Context

"Believers, fasting is decreed for you as it was decreed for those before you; perchance you will be cautious" (1). As prophet Mohammad said: "For everything is zakat and fasting is considered as zakat for body" (2). The history of anthropology suggests that in the past, the human being fasted to satisfy their Gods and request their wishes. A look at the history of religions indicates that fasting was descended before and after Islam and was oblige for Islamic community. "Every work by human is done for himself, except fasting which is for me and I gave its reward" (3, 4). This statement emphasizes that Ramadan is the month of divine banquet and that all of the people are the guest and the Prophet of Islam has stated about Ramadan and fasting as was referred to Shabanieh sermon: "Ramadan is a month in which you were invited on behalf of God" (5). Ramadan has the features regarding its time (descent of Quran), worshiping plan, the social effects, individual construction and considering health. Prophet of Islam said about the significance of this month: "If the human finds that what Ramadan is and what benefits it has, he wishes all the year be Ramadan" and also he said: "fast in order to be healthy" (6). This study aims to investigate the findings of the research from Ramadan fasting which its results can lead to prepare a right pattern for life style. This is because that not only Islam but also all of the religions consider fasting as an emphatic praying and the research evidences should submit this specific praying. This investigation can be started by the evidences of biochemical researches.

## 2. The Effect of Fasting on Biochemical Parameters

The effect of fasting on carbohydrate metabolism (sugar): first some glucose from the food includes in the body tissues which following its running out, the body has to transfer the glucose to the essential tissues of body like brain. It means post absorptive period. On the stage after the food digest, the metabolism of glucose is 2 miligram in per kg/min. In the process of metabolism, glucose does not decrease significantly, because the glycogen of liver is broken down and produces glucose. (It should be considered that the savings of liver glycogen is limited). These interactions are done along with decrease of insulin concentration and increase of serum glucagon concentration and the aggravation of sympatic activity. The process of making a new glucose which is the major stimulator for this cortisol reaction causes the protein of muscles break. This issue occurs along with decrease of insulin and increase of glucagon which results in the dissection of lipid from the fat tissues and increase of fat free acid of serum. The fat free acids are the energy-generating materials and are used instead of glucose by means of body tissues except the brain and erythrocyte (7). During fasting in Ramadan, the level of serum glucose may decrease

on the first days, but on the second decade, it will be the same as what before Ramadan was, and on the thirds decade it will increase (8). In Islamic fasting in which adequate food is eaten on the sunrise (Sahar), the consumed food and the glycogen savings and in cases when the daytime is long, little Gluconeogenesis keep the glucose serum concentration to the normal level. It is obvious that the little changes in glucose serum concentration in terms of dietary, metabolism changes and energy adjustment and the physical activity occur. It is recommended for the fasting person to eat food on dawn (Sahar), otherwise due to the long times of foodlessness, the Gluconeogenesis will occur by the muscle protein break on the last hours of the day, which is not favorable (9). The best state of fasting is a 12-hour one after which the carbohydrates should be consumed.

## 3. The Effect of Fasting on Lipid Metabolism (Fat)

The concentration of serum cholesterol may decrease at the first days (10) and increase at the last days of fasting (11). It seems that the lipid changes in Ramadan are variable and it depends on the quality and quantity of food during sunset (Eftar) or sunrise (Sahar) and the level of weight changes. In order to prevent gaining weight, it is suggested to decrease the whole calorie and the saturated lipid acids during Ramadan (9). Decreasing the received energy and triglycerides in Ramadan and increasing LDL-C lead to reducing cholesterol (12, 13) and decreasing the dangerous factors of HDL-C cardiovascular diseases (14).

## 4. The Effect of Fasting on the Body Organs

Prophet Mohammad said: "Oh, God, We fasted for you and break the fast with what you bestow. Thus Please accept it. The thirsty has gone and the vessels were fresh and the bonus remained" (15). Regarding the effect of fasting on heart, decrease of heart beat and blood pressure and also changes in electrocardiogram during a long fasting is observed, but this issue was not reported during the frequent fasting in Ramadan (16). Based on decreasing the level of blood viscosity (17), acute disease of coronary in Ramadan decreases significantly (18). Certainly the positive effect of fasting and decrease of blood viscosity on cholesterol level are the factors of preventing and controlling atherogenic (atherosclerosis or the arteries blockage by the gradual sediment of lipids in the muscular arteries) and cardiovascular diseases (19). Regarding the effect of fasting on the respiratory system, fasting in Ramadan does not change the mass activity of lungs and the amount of spirometer (20). But the reduction of body water and the dryness of respiratory mucous may aggravate the Bronchosteno in the athematic patients (7).

The effect of fasting on digestive system: fasting can be beneficial for whom that suffer from spastic or the other intestinal diseases. Patients with duodenum injuries

should abstain from fasting; but the patients who are in control and have no symptoms can fast in Ramadan by taking drugs in sunset (Eftar) and sunrise (Sahar) in case of increasing the stomach acid (9). The effect of fasting on the kidneys, osmolality, nitrogen, solid materials and pH indicates that the mass of urinary electrolytes remains normal in Ramadan fasting (21). In Islamic fasting, the concentration of sodium and potassium is normal (22). In patients with chronic renal failure, fasting may have destructive effect on the renal tube (23). Regarding the effect of fasting on eyes, no change will occur in the eye sight and the pressure inside of the eyes, so some physicians don't allow the patients who have glaucoma, even with no change in consumed drugs, to fast (24). Regarding the effect of fasting on psych, the stress in Ramadan is low compared to other days (25). Even in a research, the suicide reduction is reported (26). Increase of headache is reported in Ramadan fasting, this was found in 41 % of fasting persons and 8 % of non-fasting ones. 78 % of headaches are tensile. The most important reason of increasing the frequency of headache in Ramadan is lack of caffeine consumption (27) and thus blood pressure or hypoglycemia (28). The people who have psychological problem or the people, who have severe headache, have to consult with the neurologist about the fasting (9). Regarding the effect of fasting on the endocrine glands, need to mention that the major output of daily activity of these glands is hormones, which after releasing, they will enter into the blood circulation and transfer to entire body and place on the their receivers in the target tissues in order to manifest their physiology in body. One of these important outputs is stress hormones with the round-the-clock rhythm which, early in the morning by starting the daily activity, release from their instructive glands and enter into the blood circulation and reach to the target tissues. For instance, the time of increasing the cortisol and testosterone secretion in 24 hours, may change. Nocturnal increasing of melatonin will decrease and increasing of prolactin will be aggravated in the evening. Increasing the amount of diurnal cortisol and reducing its nocturnal concentration may be due to disorder in the sleeping plan of fasting persons and reduction of their physical activity (29, 30). Now it's time to find out about how the relation and role of these stress hormones can effect on the human behavior by early rising?

### **5. The Effect of Fasting on the Stress Hormones and the Round the Clock Rhythm and Releasing These Vital Hormones**

Today, stress is an inseparable part of life. Urgency of body physiology can react to these critical conditions. The hormones responsible for stressful conditions like adrenalin, noradrenaline and cortisol cause the pace of

heart pumping and consequently, the blood pressure rise in case of being stressful, so that the blood transference to the major organs increases. Hence, the respiration accelerates, the perspiration increases, and the digestion decreases. The blood circulation in skin and the entire surface of body will decrease and the blood will transfer to the vital organs of body. Physical activity leads to evacuation of these stress hormones from the blood circulation system. Stress causes depression, clumsiness, feeling of being disqualified, pessimism, and dissatisfying. Early in the morning, these hormones will increase and then decrease from the evening at which the daily work is ending. So releasing of these hormones is ready by round the clock rhythm or circadian or setting the time of biology of body. In contrast to other clocks which are 12 round, the biological clock is 24 round. As mentioned before, this clock is activated by light, in other words, the light has the role of battery. If we are those people who have adjusted time of sleeping and go to bed on time and get up on time in the mornings, we should be happy that the internal clock has done its job well. The fact is that, receiving the light and heat from environment in the morning, the body clock orders melatonin to secret, which its level is low in the morning and will increase gradually and we feel asleep at night. In winter, which daytimes are short and it's cold, the state of melatonin secretion is favorable and with regard to the long night, it is demanded to sleep longer than summer. For instance, the winter sleeping of animals and the life of eskimos are related to this issue. The effect of Ramadan on the round the clock rhythm of body biology during a moth, along with a discipline of diet, sleeping and behaving according to religious pattern can be effective to the type and time of food, period of awaking/sleeping (the level of melatonin secretion), the ethic and most importantly on the tranquility and lack of stress in fasting persons. In the verse of 62-64 Yunes sureh, God said: "indeed, there shall be neither fear nor sorrow upon the guided by Allah those who believe and are cautious. There is for them glad tidings in this present life and in the everlasting life. The word of Allah is unchanging, that is the mighty triumph" (31). This verse announces the faithful people that there is no fear for them in this and the other world and they live in safety. In Majma-al-Bayan, it is stated that fear is the same as fright and moan and the stress results from happening the unpleasant event which its antonym is the safety and security. In al-Mizan, it is stated as: the meaning of Quran by the word "Amanoo" (they believed in God) is that the holy people were pious before believing in God. Quran said: "Alathina Amanoo" (someone who believe in God) and then it focused on this expression and "kanoo yattaghoon" (they were pious) which is implied that the holy people were pious before believing in God. Hence, in verse 183, Bagharah Sureh, God proposes that why fasting is obliged for believers, this may proposed in or-

der to be pious: "believers, fasting is decreed for you as it was decreed for those before you; perchance you will be cautious" (1). Now by this important result, need to mention that having a right life style which means filling the hours of activity and relaxing in a disciplined manner based on the normal circadian leads to body and soul tranquility and thus one month religion-oriented fasting can insure the other 11 months of year. This tranquility results from decrease of stress hormones during Ramadan and imam Mohammad Bagher said: "Fasting and Hajj heals the hearts" (32).

## 6. Stress Hormones

### 6.1. Cortisol

Cortisol and circadian Rhythm / early rising: Today, it is proved that the level of blood cortisol reaches to its highest point (7-22 microgram per 100 mL). Cortisol is a kind of material which its rhythmic or period secretion is adjusted by suprachiasmatic in hypothalamus and under control of hypothalamus-Pituitary, adrenal is secreted from the adrenal glands. It is suggested that, cortisol plays the role of secondary message sender between the central and environmental clocks and it is significant in synchronization of circadian rhythm (33). This vital material will be increased in case of stress and leads to increasing the physical activity and the ratio of blood sugar in order to provide the necessary energy for body.

Cortisol and reaction to sleeping: About 20-30 minutes after morning awaking, the level of cortisol increases by 50 times. This cortisol reaction, in people who begin working in the morning (4-5.5) is done with more power and longer compared to the people who work later (6-9 A.M) or even at night (11-12 P.M) (34). Of course, this is the reaction to daytime stress and sleeping quality before beginning to work early (35). The new hypothesis is that this increase is due to the activation of memory system in hypo camp of brain so that the person recalls his situation, place and time. This is because the Hippocampus is responsible for boosting the long term memory and after recalling following awaking plays an important role in adjusting (36).

### 6.2. Sympathic System or Catecholamine (Adrenalin and Noradrenalin)

Catecholamine or the fright-or-flight hormones release from adrenal in reaction to the stress and enter into blood flow and includes three materials like dopamine, noradrenalin and adrenalin which function as neurotransmitter. Dopamine and noradrenalin plays an important role as neuromodulator. The highest amount of these materials is in blood in case of stress. In case of stress, the body needs the significant changes in physical activity or the fright-or-flight event. For instance, increas-

ing the heartbeat, blood pressure, blood sugar, and some reactions to the sympathetic activities (37).

Activity of sympathetic system or catecholamine and sleeping: All of the people experience sleeplessness in their life time. The chronic sleeplessness enters into the stage of pathologic which means insomnia. At first, by sleeping bad and in case of its continuing, the patient may face difficulty while sleeping such as the sleeping difficulty, difficulty in remaining in sleeping state, frequently awaking, getting up early in the morning, or the combination of these states. Inadequate sleeping, fatigue after waking, in other words, not sleeping well can cause anger, stress, and depression. The studies about the sleepiness diseases suggest that the level of two chemical materials that are cortisol and noradrenalin are high in these patients and in contrast, melatonin of brain is low and regarding that melatonin is justifier of circadian rhythm, its increase in darkness leads to sleeping. It should be considered that in persons who have not sleeping difficulty or someone who have disorders in sleeping; the level of melatonin is low. The hypnotic drugs can't be effective for these patients, since it causes addiction (38). It seems that changing the style can be good, but it should be considered that (lifestyle) sleeping difficulty is serious and changing the lifestyle needs time. One of the best lifestyles is Islamic orientation which the sleeping pattern is justified upon.

Adrenalin and circadian rhythm/early rising: Adrenalin decreases in Ramadan fasting (25) and increases in persons who have sleeping difficulty, that is why the level of catecholamine in the urine mass suggests that increasing the sympathetic activity can play critical role in pathology resulting from inadequate sleeping (quality and quantity) along with the cardiovascular and metabolic problems (39).

Adrenalin and reaction to awaking: The chronic-oriented activities of hypothalamus-pituitary-adrenalin in people, who have sleeplessness, not only make them be at risk of the neurological disorders like stress and depression, but also make these people susceptible to diseases resulting from the activities of this orientation. Thus the treatment of sleeplessness is not just improving the night sleep and it is necessary to decrease its excitements and stress (40). So the sleeplessness factor causes stress and like the defected cycle results in emotional and mental problems. The current studies suggest that adrenalin and inflammatory markers of Interleukin 6 decreases at night sleeping which results from the moral change and stress in the sleep time and it indicates the effectiveness of both catecholamine or sympathetic and the immunity system of circadian rhythm (41, 42). Thus sleeplessness can effect on the immunity system. The psychological studies suggest that religion-oriented fasting which goes along with early rising can play the role of neuro-immune medullary in fasting persons.

Sleeping and immunity system: during sleeping, our

immunity system releases proteins called cytokinins and these materials increases with factors like infection, inflammation, and stress. The increased cytokinins are needed for fighting against the infection, and adjusting the deep sleep. So our body needs sleeping to be able to fight against the infectious diseases. Now how much time is needed to meet this need? The optimal rate of sleeping for adults is between seven and eight hours and for children, up to ten hours is enough. It should be considered that in adults, the sleeping time more than 10 hours causes weight gain, heart problems, heart attack, sleeping disorders, depression and other diseases (43, 44). In Ramadan, the sleeping of fasting persons is defined as, prophet Mohammad said, the sleeping of fasting persons is praying and his breath is praising. In other words, the sleeping of fasting person leads to improving the immunity system in Ramadan (45). The question is that does the fasting person have sleeplessness due to getting up and praying early in the morning or not? The answer to this question is: the sun rises because of the sun, Ramadan, the abstaining month comes with self-discipline; thus the disciplined fasting person will not suffer from lack of sleeping so as the lack of water and food, which the above mentioned statement completed this question.

### 6.3. Opioid System in the Body or Endorphins

Endorphins and the circadian rhythm/early rising, endorphins and reaction to awaking, endorphins or body morphine are of brain neuropeptide and the body organ which in fasting period, its level is high in the morning (46).

### 6.4. Opioid System of Body

Endogenous Opioid System, the chemical material, is created in the nerve cells of brain and in most organs. Its major feature is analgesic which functions the same as opium and alkaloids. These endogenous neural products cause tranquility and have positive effect on moral. Alkaloids in the opium extracted from the opium poppy, cause euphoria or ecstasy. This good feeling leads to forgetting the problems and inclination to this opium which consequently result in the addiction. The addicted person needs to use this opium in order to get this good and ecstatic feeling and his opioid system of body will be inactivated due to abusing, stop to do activity and the endogenous Opioid System of body will be blocked. Studies suggest that early rising causes happiness and tranquility which one of its reasons is increasing beta-endorphins or endogenous opioid that the family of endogenous opium or opioids. Beta-endorphins, is a neuropeptide from the opium family with the beneficial effects like improving the immunity system, well-being, increasing the feeling of relaxing, decreasing the growth of cancer cells or analgesic with the power 60 times more than morphine

(47).

## 7. Conclusions

Although our brain is the most powerful computer on the earth, it can make errors. We, as humans, spend our times on cramming the useless things in our brain. For instance, 90 % of the data which saves in our brain disappears. The powerfulness of our brain is not important, what is significant is that we should know that this member needs to revive itself to keep its ability. Researchers propose different methods for supercharging and increasing the efficiency of brain which in this article; the easiest method is sleeping well. Sleeping well and having enough time for sleeping are essential to have boosted memory, powerful immunity system and daily happiness. Studies suggest that the long term memory improves by replaying photos experienced in daytime during sleeping. Lack of sleeping causes debilitation of immunity system. According to imam Ali; the sleeping of fasting person is pray, his silence is praise, his prayer is accepted and his good act is multiplied and the praying of fasting person is no failed by God (48). This statement is meaningful, because following the morning praying, sleep is considered as pray.

## Acknowledgements

None declared.

## Authors' contribution

Mrs. Farideh Zafari Zanganeh was responsible for writing all parts of this article.

## Financial Disclosure

None declared.

## Funding Support

None declared.

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