

Hot and Cold Natures of Foods in Persian Medicine: Physiological Effects and Perspectives for Modern Medicine

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Abstract

Persian Medicine, which has been utilized and attended since ancient, includes several books about nutrition, physiology, anatomy and pharmacology, prevention and management of diseases. Persian medicine is an individualized medicine that focuses on individual and environmental features like nutrition, in order to maintain the health and treatment of the diseases. In Persian Medicine, the effects of different food products on the body are dependent on their nutrients and natures. Medicinal foods with hot or cold natures are able to change the temperament and physiology of human body. Regarding the fact that creating equilibrium in temperament is the target of prevention and treatment of disease in Persian medicine; correct nutrition from proper ingredients and additives can balance the human temper while the opposite would cause negative health effects. In this study, the physiologic, bioenergetics, hormonal, and mental impacts of hot and cold nutrients will be addressed which have potential health benefits.

Keywords: Avicenna • Individualized nutrition • Metabolism • Persian medicine • Forest laws

Introduction

The background of Persian medicine dates back to ten thousand years ago. Avicenna could be mentioned as the brilliant physicians of such school. Thousands of books about principles of medicine like nutrition, anatomy, physiology, pharmacology, as well as health maintenance and prevention have been left of this school. In this medical paradigm, whose feature is considering the individual differences, foods play a key role in maintaining the health, prevention and treatment of the diseases. Traditional Persian Medicine (TPM) offers the proper food considering the different properties of food and characteristics of the individual. One of the mostly attended properties of the foods offered by Persian Medicine is their hot or cold natures which not only affects the body temperament and physiology but also has therapeutic values. In this medical model, like the Chinese traditional medicine, the physiological impact on the body is one of the major differences between food and medicine which would be determined by their hot or cold natures. In other words, the more hot and cold nature the clearer the medicinal aspect would be and the less, the clearer the nutritional aspect.

It seems necessary that the different theories of Persian Medicine be interpreted and justified based on biology and biomedicine. A correct understanding over the impact of nature of different food on

biochemistry and human physiology in the form of integrative medicine has potential health benefits. Reviewing previous studies on the physiologic and biochemical impact of food in body, the present paper interprets theory of hot and cold nature of the food [1].

The school of traditional Persian medicine

Persian medicine is a medicinal system based on the humoral theory and has a long history. The medical documents obviously explain that ancient Persian physicians. The works and books of the Persian physicians have been attended by the west for centuries in a way that Canon of Medicine by Avicenna, the most prominent book in the same school, had deeply affected the international world of medicine from 11th to 17th centuries. The same book was also used even up to early 20th century in some European countries like Belgium.

WHO believes "Traditional medicine has a holistic approach, viewing man in his totality within a wide ecological spectrum, and of emphasizing the viewpoint that ill health or disease is brought about by an imbalance, or disequilibrium, of man in his total ecological system and not only by the causative agent and pathogenic evolution."

In Persian Medicine as a holistic approach, the illness will appear when the equilibrium of temperament is disrupted. Prevention of

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diseases is prior to treatment, as Avicenna believed that medicine is a science that maintains the health of people and returns it, if it is lost. The prevention of disease in this school of medicine is based on healthy lifestyle, especially healthy exercise, nutrition/diet and sleep. The therapeutic approaches are lifestyle modification especially dietetic interventions, medication and manual therapy in this paradigm of medicine. Therefore nutrition/diet plays a key role in prevention and treatment of disease according to TPM. Individualized diet in TPM is determined according to individual features like temperament of the body, the climate and season, the age and the quality of digestion as well as the person's medical condition.

Literature Review

To draft the present paper, Avicenna's principle book. The Canon of Medicine - has been attended. This book has been addressed considering the terms such as nutrition, nature, hot and cold nature of food, health, disease and their etiology. Also, published papers in the same area and modern medicine have been analyzed from databases such as Google scholar, Scopus, PubMed, SID, and Iran Medex with keywords like Avicenna, nutrition, Hot and Cold nature, Persian Medicine, basal metabolism and traditional medicine.

Based on Persian Medicine, foodstuffs and substances from plants and animals are divided into five categories; moderate food, medicinal food, nutritious medicine, medicinal herb and poison. Moderate foods like bread meet nutrition needs but bear no impacts on human temperament regarding their moderate nature. Medicinal foods and nutritious medicine besides supplying nutrition needs; possess hot, cold, dry, wet or a combination of the said natures that can cause a change in temperament. Medicinal herb such as pepper and other natural flavors can cause changes in temperament without supplying energy for body or causing body growth.

Bioenergetics reactions and thermogenesis

Energy expenditure includes three parts; Thermic Effect of Food (TEF), Resting Energy Expenditure (Resting EE), and non-resting energy expenditure. Resting EE own 50 to 80 percent and non-resting energy expenditure owns 10 to 40 percent of the consumed energy or EE. The thermogenesis of the body comprises almost 10 percent of EE. It seems that the TEF is under the direct impact of parasympathetic since in a study, blocking this system reduced the TEF in comparison to the control group and sympathetic system blocking group. Such expenditure of energy includes the energy required for digestion, absorption, and metabolism of the nutrients.

The thermogenesis of the nutrients is different based on the amounts of carbohydrates, lipid, and protein. The thermogenesis or TEF for protein is more than carbohydrate and for carbohydrate is more than lipid [2].

Consumption of black pepper brings about an increase in thermogenesis which is being done by interfering with bioenergetics reactions; it means uncoupling oxidative phosphorylation and increasing the use of adenosine triphosphate or increasing the ATPase activity and decreasing calcium transport. Capsaicin can cause thermogenesis by stimulating the secretion of catecholamines and accordingly increasing the activity of sympathetic nervous system. Mohammadi, it was clarified that the basal metabolism rate

increased by consumption of thyme with hot nature in a person with hot temperament during 4 hours unlike by consumption of sumac with cold nature the basal metabolism decreased in both groups during 4 hours. Such decrease was clearer in cold-natured group.

A study on temperature tropism on mice indicated that by consumption of a medicinal herb with hot nature in Chinese Medicine (rhubarb), whose nature is also hot in Persian Medicine, their tendency to a hot environment decreased and to cold environment increased. Additionally, the opposite also indicated that by consumption of a medicinal herb with cold nature (strobil), their tendency to cold environment decreased and to hot environment increased. Such temperature tropism depends on the increase in metabolism with consuming energy by hot medicines and decrease in them by consumption of cold medicine. By consumption of the first group of medicines, symptoms of hotness such as increase in movements, increase in water consumption, and low volume and dry stool developed and in the second group, symptoms of coldness such as watery stool, inattention, exhaustion and anorexia developed. Also, ATPase activity related to liver cells in the group with hot medicine consumption increased and decreased in the other group. Even the decrease in food intake indicated the symptoms of coldness and also the increase in reception of protein indicated hotness in the mice. On the other hand, the total anti-oxidant capability decreased in the group of mice which consumed the medicine with cold nature as compared to that group which did not consume such medicines. Also, decrease of oxygen consumption and ATPase activity in such mice is indicative of the decrease in energy metabolism which is related to appearance of coldness symptoms.

Impact on Body Temperature and Peripheral Blood Flow

Consumption of red pepper in individuals who are not used to it, will increase the central heat and EE. It seems that the physiological effects of such hot substance will be vanished if being consumed at least 3 times per week or longer terms. Additionally, it is less effective in fat people than thin ones. Oral consumption of red pepper in comparison to capsule forms will cause a stronger increase in central heat, EE and dermal heat. In another study, it was clarified that by consumption of Kaki, a type of Japanese persimmons with cold nature, the peripheral temperature of body and peripheral blood flow on the back of hands reduced but had no effects on the central heat measured from armpits and tympanic earpiece. However, decrease in peripheral blood flow due to vascular contraction was reported. In a study, it was indicated that consumption of Bonito in the form of dried bonito broth, the small size fish which has a hot nature in Chinese medicine, normally used to remove fatigue, has significantly increased the peripheral blood flow in comparison to placebo which has been directly dependent on dosage or the amount of consumed fish. The effective mechanism of this substance in increasing the peripheral blood flow was dilation of the vessels in a way that in one in vitro study such effect was reported about the above mentioned fish. Consumption of this food did not made any changes in heartbeat. Another probable mechanism can be due to the anti-oxidative effect of this food since has also reduced the stress oxidative markers. Chicken soup, as a hot food, has significantly increased the peripheral blood flow in single intake and also after daily intake for two weeks in comparison to placebo. The stated

increase had no relation with changes of blood pressure or cardiac output.

Impact on hormonal effects and autonomic system

The oral intake of caraway with hot nature will cause increase in thyroid hormones level. Short term intake of capsaicin (the major mixture in red pepper) will increase the activity of sympathetic system and secretion of catecholamine. It was also noticed that the heart rate and peripheral heat would increase by consumption of thyme as a hot flavoring and would decrease by consumption of sumac as a cold flavoring in both groups. If hemodynamic variables are considered as the index of sympathetic performance, thyme has increased and sumac has decreased such index [3].

Consumption of the red pepper with increase in the energy expenditure due to having capsaicin, which activates the sympathetic nervous system, causes weight loss. Black pepper also will cause weight loss due to thermogenesis. Mint causes the weight loss, too due to increasing the thermogenesis. Capsaicin, as a hot substance, in short term will cause carbohydrate oxidation and in long term and hunger (after three months) will cause fat oxidation. Increase in the metabolism of fat by this substance is due to increase in activity of sympathetic nervous system. In a study on mice, it was revealed that prescribing herbal medicine with hot nature during the first 24 hours would decrease the amount of intake in them and during 7 days would make them lose weight.

Daily intake of Bonito as a hot food is effective in betterment of the mood and will help improve symptoms such as discomfort/sadness, depression, as well as stress and tension anxiety and will increase the energy and potency which are all correlated to increase in peripheral blood flow. Therefore, betterment of the mood can be the result of increase in peripheral blood flow. Another probable mechanism can be through increasing neurotransmitter or histamine in which histidine, as the precursor, can be found and it is clear that histamine is effective in some brain functions like stimulating the sleep cycle, appetite control, body temperature, behavior and feelings. Consumption of chicken soup as a hot food for two weeks has significantly reduced the tension anxiety against placebo.

In studying the impact of foodstuff on gastric emptying, it was determined that the foods with 60 degrees' centigrade temperature clearly cause more gastric emptying which might affect the improvement of functional indigestion symptoms. Also, additives/flavors with hot nature such as cumin and piper nigrum and mint or mentha longifolia L increase the production of digestive enzymes, increase blood flow in digestive system, improve digestion and expedite gastric emptying. Consumption of red pepper after food increase plasma concentration of a digestive hormone called GLP (glucagon-like peptide) and decrease plasma concentration of ghrelin. In individuals not accustomed to hot foods containing pepper will reduce their appetite and food intake.

Discussion

Hot medicines will stimulate and cold medicines will halter the physical activity. Also, the medicines which stimulate the metabolism and energy will be categorized under hot medicines and those which

reduce the energy consumption are categorized under cold medicines.

Food products with hot nature increase thyroid hormones which cause the metabolism rate up in body. Increasing the amount of oxygen consumption by taking hot substances and its reduction by taking cold ones is indicative of shifts in basal metabolism of the body. The reduction of ATPase activity in the mice by using cold substances is also a proof. Increase in liver enzymes causes faster metabolism of food substances in body, as well.

Regarding the above-stated information, the rate of metabolism might be considered a symbol of human temperament. It means that the metabolism rate in hot-natured individuals is much faster. On the other hand, hot foodstuff will increase the peripheral blood flow and thermogenesis of the food. Increase in thyroid hormones, increase in peripheral blood flow and the thermogenesis in short term can increase the body temperature unlike foods with cold nature which decrease the body temperature. In Persian Medicine, meat (protein) has a hot nature and fat has a cold nature and in new studies, it is indicated that the TEF of protein is more than that of fat. Therefore, it may be correct that the higher TEF which brings about higher body temperature are related to hot foods like meat. In other words, it might be expected that hot substances have higher TEF [4].

Today, it is believed that increase in the core temperature of body is in reverse correlation with life span. Such issue is regarded in Persian Medicine in way that for maintaining the health, it is recommended to use the foods with moderate nature; which means they are closer to human temperament.

Such foods increase the body temperature less than hot foods. Regarding the fact that hot food products increase the activity of sympathetic system and catecholamines and also will increase the heart rate and body temperature. On the other hand, autonomic nervous system is different in individuals with hot and cold natures; it may be correct to consider the amount of activity in this system as a symbol of human temperament.

Peripheral blood flow has a key role in maintaining the function of body organs, the condition of skin, appearance and removing fatigue due to oxygen and food supply; and its next impact is balancing the heat radiation of the body which both are required for health and integrity. Insufficient blood flow will cause symptoms like neck pain, shoulder stiffness and dark rings under the eyes which are related to fatigue and on the other hand reduction of microvascular perfusion can cause and develop diseases like high blood pressure, arteriosclerosis, and thrombosis syndrome. Therefore, consumption of food with hot nature can help positively improve such symptoms and hydrate dry skin.

Impact of hot food products, in terms of temperature, on digestive system is in the form of faster gastric emptying and food products with hot nature will cause an increase in the blood flow of the digestive system and reduction of food intake. On the other hand, continuance of cold drinks can disturb the function of stomach. These two issues can be regarded in treating dyspepsia and early satiety while using hot additives can be regarded as a treatment in some cases of indigestion.

Hot foods can increase the energy expenditure by stimulating the sympathetic nervous system or increase the fat metabolism which

results in weight loss. In Persian Medicine, the weight loss due to hot food or medicinal plant is toward the dryness because of change in temperament. Therefore, it can be expected that the sympathetic system is more active in individuals with dry nature.

The mental impact of hot substances can appear by betterment of mood and reduction of depression symptoms which is accompanied by increase in peripheral blood flow as also Avicenna believed that depression was related to function of brain and vital force means function of heart and blood flow.

Animals selected the environments for living which have an optimum temperature for their biochemical and physiologic reactions. Such tendency is called temperature tropism and is under the effect of energy condition of the body. Hot medicines cause mice tend to colder environments by increasing the physical activity, stimulating metabolism and increasing energy consumption while cold medicines make them tend to warmer environments [5].

In Traditional Persian Medicine it is recommended that hot food products be consumed in cold seasons and vice-versa in order to bring more comfort for the individuals. Current findings show that the impact of different food products on the body depends on the taken amount of the food, amount of water in the food, its ingredients, and its physical conditions like viscosity, density and also time and place of its harvest and its taste.

Conclusion

Regarding the fact that basal metabolic rate, thyroid hormones, autonomic nervous system, and blood circulation parameters are major effective factors on homeostasis, it can be concluded that cold or hot-natured food products can change the homeostasis and can be considerable in health. Therefore, regarding the fact that these factors are somehow symbols of human's temperament; in individualized medicine, the nature of the food and its compliance with human's temperament can be taken into account. Thus, it seems interesting to find what Hippocrates says regarding the importance of nutrition in maintaining the health which indicates that food is the body's medicine: "let food be thy medicine and medicine be thy food". Also, the importance of what Razi says becomes clearer in that he believed as long as the patient can be treated by food; they need not to be prescribed medicine and Avicenna believed that the first step in

treating the diseases is changing the lifestyle specially the habitual diets. For better understating such information, deeper studies seem to be required.

It was briefly clarified that hot and cold food can cause physiological changes in body. Therefore, categorizing foods into hot and cold has a scientific basis. In other words, they impact on rate of metabolism, activity of the autonomic nervous system, peripheral blood flow, thyroid hormones and the digestive system and accordingly impact on homeostasis. Such impacts can be used in prevention and treatment of the diseases considering the individual temperament and traits in the individualized medicine.

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References

1. Ansaripour, Mohammad, Naseri M, Esfahani MM, and Nabipour I, et al. "Periconceptional Care and Offspring Health at Birth and Long Term, from the Perspective of Avicenna." *J Integrat Med* 17 (2019): 80-86.
2. Borhani, Mahdi, Khoshzaban F, Jodeiri B, and Naseri M, et al. "Diet and Food in Iranian Traditional Medicine: Hints for Further Research." *Int J Prevent Med* 5 (2014): 1480-1481.
3. Ghaffari, Farzaneh, Naseri N, Asghari M, and Naseri V. "Abul-hasan al-tabari: A review of his Views and Works." *Arch Iran Med* (2014): 299-301.
4. Ghaffari, Farzaneh, Naseri M, Movahhed M, and Zargaran A. "Spinal Traumas and their Treatments According to Avicenna's Canon of Medicine." *World Neurosurg* 84 (2015): 173-177.
5. Gorji, Ali, Ghadiri MK. "History of Headache in Medieval Persian Medicine." *Lancet Neurol* 1 (2002): 510-515.

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