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EFFECTS OF HIGH TEMPERATURE ON THE HUMAN AND ANIMALS' ORGANIZATION

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Abstract: High body temperature is a thermoregulatory disorder, occurring when body temperature rises above 37°C. This symptom is a protective response of the body and can be caused by various factors. It is important to distinguish between conditions such as hyperthermia (overheating) and fever, which is also accompanied by an increase in body temperature. However, its mechanism differs from that of overheating and requires different measures.

Аннотация: Высокая температура тела - это нарушение терморегуляции, когда температура тела поднимается свыше 37 ° С. Симптом служит защитной реакцией организма и может происходить под влиянием разных факторов. Обязательно следует разделять такие состояния, как гипертермия (перегревание) и лихорадка, которая тоже сопровождается повышением температуры тела, однако ее механизм отличается от перегревания и требует иных мер воздействия на организм.

Annotatsiya: Ushbu maqolada insonlarni tana harorati 37°C dan yuqori ko'tarilganda yuzaga keladigan termoregulyatsiya buzilishi zaqida ma`lumotlar keltirilgan. Bu alomat tananing himoya reaksiyasi bo'lib, turli omillar tufayli yuzaga kelishi mumkin. Gipertermiya (qizib ketish) va tana haroratining ko'tarilishi bilan birga keladigan isitma kabi holatlarni farqlash muhimdir. Biroq, gipertermiya mexanizmi qizib ketish mexanizmidan farq qiladi va turli xil choralarni talab qiladi.

High temperatures cause dehydration and cardiovascular strain due to increased sweating and heart rate. In animals, this leads to decreased appetite and productivity, and in both species, it can lead to heat exhaustion, heatstroke, organ dysfunction, and even death with severe and prolonged hyperthermia.

Possible Causes of High Temperature

Fever is triggered by external (or exogenous) pyrogens—substances foreign to the body that enter the bloodstream. These include infectious pyrogens: viral toxins and microbial metabolic products. Also included in the primary pyrogens group are non-infectious pyrogens: certain lipids, proteins, and protein-containing substances that enter the body from the external environment or are produced in the body during inflammatory processes, allergic reactions, or the breakdown of tumor tissue. Primary Pyrogens, interacting with immune system cells, initiate the production of internal, or endogenous (secondary) pyrogens—cytokines. These cytokines, acting on the thermoregulatory center in the brain, cause an increase in body temperature.

A fever has its own dynamics and includes several stages.

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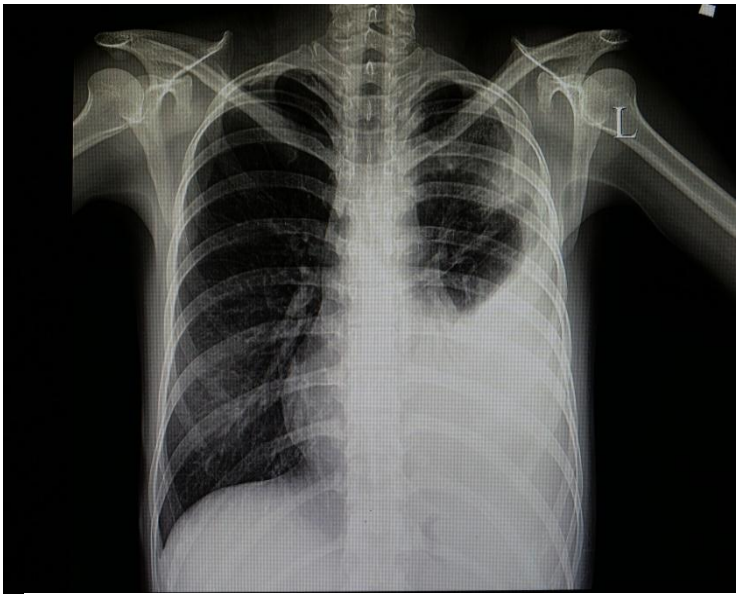
If body temperature is used as the criterion for the course of a fever, three stages can be distinguished:

Stage 1—the period of temperature rise;

Stage 2—the period of temperature maintenance, or stagnation;

Stage 3—the period of temperature decline to normal values.

Stage of Temperature Rise



The rate of temperature rise depends on the concentration of pyrogens in the blood and can serve as a diagnostic indicator.

A rapid rise in temperature to high levels is observed with influenza, lobar pneumonia, and is also possible when a foreign protein enters the bloodstream (for example, during a blood transfusion). In this case, severe chills occur, and the skin becomes cold due to spasm of the superficial blood vessels.

A slow rise in temperature is typical of adenovirus infection, typhoid fever, and brucellosis. In these cases, pronounced chills may be absent, and the first signs of the disease are fever, dry eyes, headache, and malaise. Pale skin and cold feet and palms are also possible.

What should be done?

First, it is necessary to warm the patient by wrapping them in a blanket. A heating pad applied to the feet and hands is also effective.

Temperature stagnation stage

After reaching the upper limit, the temperature remains at this level for some time. This period is called the temperature stagnation stage, when a balance between heat production and heat loss is established. At this stage of the disease, the patient feels hot and drowsy. A loss of appetite and thirst may occur. Depending on the degree of temperature increase, a distinction is made between a mild, or subfebrile, temperature of 37-38°C; a moderate, or febrile, temperature of 38-39°C; a high, temperature of 39-41°C; and a severe, temperature above 41°C.

Temperature reduction is not always appropriate.

Fever is the body's protective and adaptive response to pyrogens.

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At a temperature of 37.5-38°C, the body actively fights infection. However, each person reacts differently to elevated temperature. Therefore, when deciding whether to use medication to reduce fever, one should be guided by how they feel and accompanying symptoms. This is especially true for children. Conventionally, the threshold temperature at which increased monitoring of health and external symptoms is necessary is considered to be a temperature of 38°C or higher.

The duration of elevated temperature depends on the infectious agent, the immune system, and the treatment being administered. In normal cases, this period can vary from one to five days, but in severe cases, it can extend for several weeks.

Temperature fluctuations in a febrile patient follow a specific rhythm: peak values are observed at 5-6 PM, minimum values are around 4-5 AM, and the pattern is variable. With pneumonia, for example, the temperature can remain high for a long time. Bronchitis and tuberculosis are characterized by significant daily temperature fluctuations (1-2°C). So-called debilitating fever, characterized by sharp temperature spikes (with rapid rise and fall), sometimes recurring two or three times a day, is very dangerous. This fever occurs with sepsis, the presence of cavities in tuberculosis, and the breakdown of lung tissue.

Cardiovascular system: Heart rate increases, blood pressure rises, and arrhythmias become more frequent. Blood becomes thicker, increasing the risk of acute cardiovascular failure.
Kidneys: Increased stress on the kidneys can cause acute injury, especially in people with pre-existing chronic conditions.
Nervous system: The brain switches to energy-saving mode, causing fatigue. At temperatures around and above 10°C, chemical processes are disrupted, cellular destruction occurs, and organ failure occurs as proteins begin to denature.
General: Excessive sweating leads to a loss of fluid and electrolytes (sodium, potassium, etc.), vitamins, and trace elements. This can lead to heatstroke, heat exhaustion, and cramps.

Effects on Animals

Decreased Productivity: Increased temperature and humidity cause animals (cows, pigs, poultry) to decrease their appetite and feed intake, leading to a drop in productivity.

Dehydration: Similar to humans, animals suffer from dehydration due to excessive sweating.

Deterioration in Health: Heat stress weakens the immune system and increases the risk of various diseases.

Heat exhaustion: A condition in which the body overheats, causing severe weakness, headache, and dizziness.

Heat stroke: An extreme form of heat exhaustion in which body temperature reaches dangerous levels, potentially leading to organ failure and death.

Metabolic disorders

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Animals respond to high temperatures by increasing heat loss and decreasing heat production in an attempt to avoid elevated body temperature (hyperthermia). This is accompanied by increased sweating and respiration rate, as well as decreased feed intake. These physiological phenomena may significantly contribute to the development of metabolic disorders in animals experiencing heat stress.

Heat stress can contribute to lameness in dairy and beef cows. This may be due to acidosis or increased bicarbonate excretion. Reducing feed intake during the hot part of the day, followed by increasing it as the ambient temperature decreases (for example, in the evening or at night), can cause acidosis, which is considered a major cause of laminitis. As the ambient temperature rises, the respiratory rate increases, and panting progresses to open-mouth breathing. This leads to respiratory problems caused by the rapid loss of carbon dioxide.

During heat stress, animals lose body weight and mobilize adipose tissue. In particular, early lactating dairy cows are more likely to experience subclinical or clinical ketosis and an increased risk of developing hepatic lipidosis in the summer.

Ketosis is a metabolic disease that occurs when an animal is in a severe state of negative energy balance, undergoes intense lipomobilization, and accumulates ketone bodies formed as a result of incomplete fat catabolism.

Hepatic lipidosis is another consequence of intense fat mobilization from adipose tissue. Impaired liver function in cattle during heat stress is indicated by decreased albumin secretion and liver enzyme activity.

High temperature - causes, associated diseases, diagnosis, and treatment options.

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