

About Good Breathing

Good breathing is all about efficiency and effectiveness, but what is efficiency and effectiveness in breathing? To make this clear, we can compare breathing to eating: If we eat too much of the wrong kinds of food, we will get bloated and out of shape; and if we eat healthy foods in the right amounts, we will become fitter and stronger.

Nowadays, many people are out of shape and chronically ill. Even though fit and healthy people generally have better breathing habits than sick people, it is still extremely rare to meet somebody who breathes well without having done Advanced Buteyko training. And the athletes with the best breathing habits are usually the top performers.

We don't breathe just to get oxygen: In fact, the human respiratory center isn't very sensitive to oxygen levels at all, since it primarily responds to CO₂ levels. The best breathers are those people whose breathing doesn't react strongly to minor increases in CO₂ because they breathe little and have a high level of natural CO₂ in the body. The air we breathe is so rich in oxygen that even people who breathe extremely little while at rest still get plenty and are in fact often in excellent shape. When we breathe too much and exhale too much CO₂ while being inactive, the CO₂ content of the blood drops dangerously low and strongly affects our health and performance.

10 Reasons Why We Need CO₂

"Carbon dioxide is the chief hormone of the entire body; it is the only one that is produced by every tissue and that probably acts on every organ."

Yandell Henderson, Ph.D. - Cyclopedia of Medicine (1940)

CO₂ has many important functions in the body; It is essential for oxygen delivery to cells, maintaining blood pH and much more.

Most people nowadays have very low levels of CO₂ in the body due to over-breathing while being inactive, causing *unnecessary, excessive removal of CO₂ from the blood*. This lack of CO₂ severely affects essential body processes and causes chronic diseases on the long term. Here are 10 good reasons why we need to keep adequate levels of CO₂ in the body:

1. Oxygen Distribution

CO₂ determines the strength of the bond between oxygen and hemoglobin. A low CO₂ content strengthens the bond between hemoglobin and oxygen so it is more difficult for oxygen to leave the blood and go to the body cells that need it. This principle is known as the Bohr Effect ([wiki](#)) and was first discovered in 1904 by the Danish scientist Christian Bohr (father of Niels Bohr). This principle means that when you are in a state of rest, you can **try** to get more oxygen by breathing more, but it will result in decreased oxygen release by the blood due to lower CO₂ content.

2. Compensation Mechanisms

The body may compensate for the lack of useable oxygen caused by low CO₂ by raising blood pressure and heart beat. Higher blood pressure helps push more oxygen out of the blood, while a higher heart beat pumps the blood around more quickly helping deliver a bit more oxygen, too. Obviously these 2 compensation mechanisms

create other problems on the long term.

3. Balanced Blood pH

A drop in blood CO₂ content immediately causes blood pH to become more alkaline. This change in blood pH negatively influences the activities of all 1000+ enzymes and vitamins. When the blood pH reaches 8 or higher, the organism dies. We need CO₂ to maintain balanced blood pH, which works by using the bicarbonate buffering system of the blood ([wiki](#)).

4. Constriction of Passages

When CO₂ is low, airway passages and blood vessels constrict and become narrower. With higher CO₂ content, these passages relax and increase in diameter, allowing for improved flow of air and blood. CO₂ acts as a relaxant for the smooth muscles of airway passages (bronchi) and blood vessels.

5. Metabolic Processes

A lack of CO₂ negatively influences important metabolic processes that rely on CO₂. For example, CO₂ is required for the carboxylation of pyruvate and acetyl in the metabolic pathways of gluconeogenesis and lipogenesis. Also the synthesis of the essential amino acid glutamine (and the non-essential asparagine) requires CO₂ molecules. Many other biosynthetic reactions require the involvement of CO₂ molecules and low CO₂ levels makes it more difficult for them to take place.

6. Excitability of the Nervous System

Low CO₂ levels increase nervous system excitability. Small stimuli can then easily cause a big reaction, causing the nervous system to enter a state of permanent excitement characterized by high stress, low relaxation and low ability to focus (ADHD).

7. Disorderly Synapses between Brain-cells

A lack of CO₂ negatively influences all brain function and the intellect. For neurons to synapse with brain cells in an orderly and efficient manner, an ideal level of CO₂ is needed. Low CO₂ levels make the communication between brain cells more erratic, unstable and unpredictable and thus can lower IQ and negatively influence emotional balance.

8. Excitability of the Respiratory Center

Low CO₂ levels cause an increase in respiratory center excitability. This means that your breathing will respond very quickly and strongly to even a small increase in physical activity, making you quickly feel exhausted and out of breath. With high CO₂ levels, your respiratory center will allow the breathing to stay more normal even during exercise, so you can do much more exercise, more intensely, without feeling out of breath.

9. Uptake of Glucose

Low CO₂ content causes decreased uptake of glucose from the blood and raises your blood sugar levels. The rate and efficiency at which glucose passes cell membranes and is delivered to cells is regulated by the level of carbon dioxide. If CO₂ levels are optimal, sugar can be burned more quickly and blood sugar levels are more stable.

10. Immune System

A low CO₂ level weakens your immune system by lowering the antibody-antigen affinity. This means that it becomes more difficult for your antibodies to attach to and disable viruses and bacteria.