



## **6. Minimising the Damaging Effects of Excess Carbon Dioxide and Acid in the Body**

As stated previously carbon dioxide is considered to be involved directly in the ageing process. It follows that neutralisation or modification of carbon dioxide concentrations may result in the slowing of the ageing process.

There are three hundred parts per million of carbon dioxide gas in the atmosphere. There are at least sixty thousand parts per million of carbon dioxide gas in each and every body cell - from brain cells to skin cells. The carbon dioxide in body cells is breathed out eventually back to the atmosphere. Any factor which increases the concentrations of carbon dioxide in body cells or any factor which interferes with the elimination of carbon dioxide from the body to the atmosphere will accelerate ageing.

Increasing the metabolism of body cells above normal levels greatly increases the production of carbon dioxide in cells and greatly increases the concentrations of carbon dioxide in cells and tissues. Conversely, decreasing the metabolism of body cells decreases the production of carbon dioxide in cells and decreases the concentrations of carbon dioxide in cells and tissues. When concentrations of carbon dioxide are decreased in cells and tissues, the damaging effects of carbon dioxide and acid in the body are minimised.

Carbon dioxide production in body cells can be decreased by diminishing the consumption of high calorie foods such as refined carbohydrates, fats and alcohol. These foods are readily absorbed into the body and are readily metabolised. They produce large amounts of carbon dioxide and other acids. Carbon dioxide production in body cells can be decreased also by increasing the consumption of high-fibre foods that are not readily absorbed into the body and are not readily metabolised. Fruits, vegetables and grains appear to be ideal foods.

Carbon dioxide production can be decreased by the avoidance of chronic stress. The daily production of stress hormone (cortisol) can rise more than ten times with severe stress. Cortisol in the body mobilises substances needed for increased cell metabolism. This increases the metabolic rate of some tissues and organs, such as the brain, which increases the production of carbon dioxide and acid. A rise in cortisol in the body also increases the destruction of peripheral tissues such as muscles, skin and peripheral fat which dramatically increases carbon dioxide and acid production. There is an increase in the blood levels of free fatty acids and amino acids. Muscle and skin destruction results in muscle weakness and thin, wrinkled skin.

Some of the hormones associated with chronic stress, such as cortisol, decrease blood vessel numbers in the body tissues. A decrease in the blood flow to cells and tissues decreases the elimination of carbon dioxide and hence greatly increases carbon dioxide concentrations. Conversely, an increase in the blood flow to cells and tissues helps to eliminate carbon dioxide and



hence decreases carbon dioxide concentrations.

The blood flow to cells and tissues can be increased by exercise. Exercise results in increases in blood vessel diameters and the opening up of dormant blood vessels. This increases the blood flow to tissues which helps to eliminate carbon dioxide. In addition, regular exercise results in an increase in the number of capillaries in tissues due to the formation of new capillaries. Increased capillary numbers supply cells and tissues with more oxygen and eliminate more carbon dioxide. Exercise increases also the respiratory rate and the respiratory volume. This increased ventilation in the lungs increases the elimination of carbon dioxide from the body. Indeed, controlled ventilation per se (conscious deep breathing) is effective also in the elimination of carbon dioxide.

The adult human body is about sixty percent water. When the body is hydrated adequately, concentrations of carbon dioxide are diluted. To hydrate the body adequately requires the consumption of at least two litres of water per day. This water should be mineralised appropriately so that body minerals (strictly, trace and other elements) are not diluted. The consumption of appropriately mineralised water hydrates body cells and dilutes intracellular and extracellular carbon dioxide and acid concentrations. This helps to minimise the damaging effects of carbon dioxide and acid in the body. When water is mineralised by magnesium bicarbonate, the magnesium and bicarbonate ions function to further minimise the damage caused by carbon dioxide and acids in body cells. The reason for this is described, in detail, in the following article.