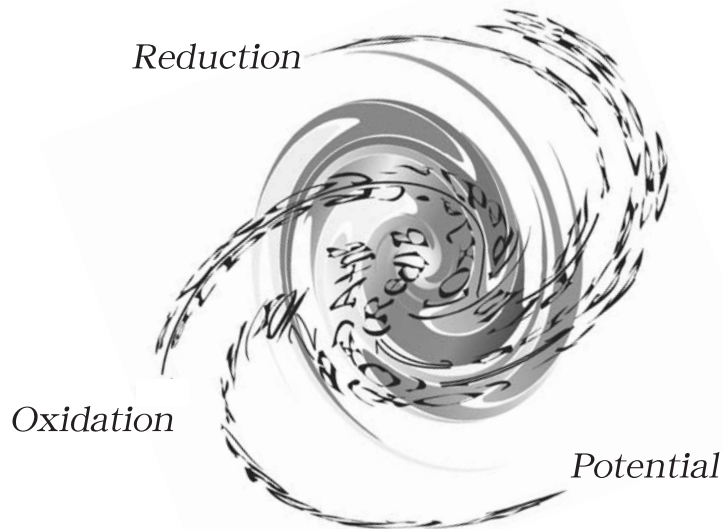


Heavenly Providence

Chapter 7

Quantification of Stress Levels Using Saliva ORP



Saliva ORP Measuring Device For Humans Has Materialized Three Quantitative Judgments

Medical Equipment
Wellness Index Meter
ORPreader®



26.5 (H) × 24.5 (D) × 40 (W) cm 10 kg

(1) Quantification of Wellness Index Using Saliva ORP

- ★Oxidation of body indicates a poor physical condition. It means overwork, stress and aging.
- ★Reduction of body indicates a good physical condition. It means relief of fatigue and stress, and stronger immune system.

(2) Quantification of Stress Levels Using Saliva ORP

- ★It makes it possible to make quantitative judgment of mental stress and depressive symptom levels that are invisible.

(3) Quantification of Stress Levels Deriving from Chemical Using Saliva ORP

- ★For an example, quantitative judgment of stress level can be made after eating produce that used agricultural chemical, processed food additives and food with artificial coloring.
- ★Another example, making quantitative judgment to screen stress deriving from drug usage.
- ★It uses the mechanism of the body producing a large amount of free radicals when artificial chemical substances enter a human body.

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- Confirmation of body's information (wellness degree) of an infant to elderly can be made by using non-invasive method of soaking small amount of saliva on a cotton swab.
 - Unlike blood tests, there isn't any infection risks for both measurer and examinee. Confirmation of stress level can be done within a minute.
 - It makes it possible to make self-evaluation of efforts that were done to improve the lifestyle habits in the area of "food, clothing and shelter" and mental aspects.
 - Candidates for measurement : infants to elderlies and the individuals who have handicap to express their will easily.
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The consumers are waiting for the products that make their body well. Until now, the degree of our body feeling well after we wore a clothing, after we ate something, after we lived at a place or after we experienced joy, surprise and sadness, can only be recognized by our senses.

Upon realizing the necessity of a method that can measure psychological stress level in real-time, we, ORP Research Consortium has succeeded in developing a device that can measure (1),(2)and(3)by making quantitative judgment of stress levels: comparative verification of saliva oxidation and reduction potential (ORP), which can be done within one minute and has been approved by the Ministry of Health and Welfare of Japan as a medical device.

ORP Quantitative Judgment of Progress and Completion of Treatment of Diseases Caused By Decline of Biological Activities

In order for the index to be useful to develop body that does not get sick, we have found a usage of ORP quantitative judgment measuring device to measure human saliva components that are secreted in large amount from the three major salivary glands, the parotid glands, the submandibular glands and the sublingual glands.

(1) Quantification of Wellness Index Using Saliva ORP

Oxidation of body indicates a poor physical condition. It means overwork, stress and aging.		Reduction of body indicates a good physical condition. It means relief of fatigue and stress, and stronger immune system.	
Voltage (mV)	Physical Condition	State of Oxidation-Reduction	
+300	Oxidative Outside of healthy level group	Extremely Oxidative	
+200			
+180			
+160			
+140			
+120	Bordering level group	Oxidative	
+100			
+80			
+60			
+50	Borderline		
+40	Healthy level group Fully healthy level group	Fairly Reductive	
+30		Reductive	
±0			
-20			
-40		Very Reductive	
-60			
-80			
-100			
-120		Extremely Reductive	
-140			
-160			
-180			
-200	Reductive		
-300			

The measurement of saliva oxidation and reduction potential (mV) is the scale to measure the oxidation power and reduction power of the saliva. It measures the oxidation and reduction potential of complex material of the oxidizing agents and reducing agents. On the other hand, pH measurement uses pH as scale to measure acidity and alkalinity, and the characteristic of acidity and alkalinity quantitatively is a measurement potential of a single hydrogen ion (H⁺). Saliva oxidation and reduction potential calculates the multiple potential of all the saliva components with the tolerance of one thousandths of 1mV to acquire a value that reflects the subtle changes in time, but in the case of pH value, it is difficult to grasp the measuring value of the subtle changes in time since the buffering action of the biofunction constantly works to keep the neutral pH7 within the range of pH4 to pH9. Much more, it is difficult for the general public to conclude what the changes of pH values imply.

The quantitative assessment of the saliva components by using the oxidation and reduction potential measuring device that did not exist in the past becomes indispensable to prevent someone who disguises as a patient that makes a self-assessment of their depression symptoms. There are certain conditions for collecting saliva: the subject must not drink any beverages and carry mobile phone before 40 min. of the saliva collection time, and the collection of the saliva cannot be done under the environment where the strong electromagnetic emitting equipment are turned on. These fundamental saliva collection rules are prerequisite to ascertain the delicate oxidation and reduction potential responses that appear in the saliva that is secreted inside the oral cavity.

Making ORP Quantitative Judgment Whether the Condition Indicates That the Multiplication of Reactive Oxygen Has Been Curbed and the Carcinogen Has Been Suppressed

We have strived to realize to use the saliva ORP quantitative judgment as a scientific and objective quantitative data that replaces the experiential, or subjective assumptions of stress and mental aspect that was formerly used.

Although the local saliva components that are secreted from the parotid glands, submandibular glands and the sublingual glands are more or less overlapping, the authors have observed that the primary components of each of the local saliva is clearly different from each other.

The saliva component that has a larger secretion ratio secreting from the parotid glands is amylase, a saliva component with low viscosity, which is a type of serous fluid that has a function to decompose starch. There is an autoimmune disease called, Sjögren's syndrome that raises the amylase of the salivary glands and it has been confirmed that the saliva ORP measurement of the patients with Sjögren's syndrome have strong oxidative saliva.

Also, it has been a common knowledge in the field of dentistry that dry eyes and dry mouth are prognosticated among the patients with Sjögren's syndrome. The oxidation of saliva amylase is an indication of high stress load, and when the symptoms of Sjögren's syndrome become severe, there will be more complaints typical of depressive symptoms, such as, loss of appetite, decline of energy, decline of thinking power and concentration, not feeling well, decline of interest in things and difficulty in falling asleep.

Parotin is a type of growth hormone that plays a major role in metabolic activities of nutrition and growth, and at the same time, it has an anti-aging function to keep one's youth. Therefore, we can suggest that the oxidation of saliva parotin is an indication that the function of the anti-aging has been suppressed.

I will describe now about the saliva components that have a larger secretion ratio secreting from the submandibular glands. Albumin has an effect to prevent drying and it has a role to make the inside of the mouth smooth to help the speech. The oxidation of saliva albumin decreases the secretion amount of the saliva that has the effect of lubrication and accelerates the drying of the

oral cavity. Also, cortisol has a function to regulate the physical and psychological stress load by the reduction of the cortisol quantity, and the oxidation of cortisol in the saliva means that the stress load in the autonomic nerve is in the high condition, and this condition will be burdensome to the stomach and to other organ functions. Lactoperoxidase resists bacteria and has a function to consume free radicals and attenuate the carcinogenic substances, which is well known in the world of dentistry.

Further, studies have shown that the oxidation of saliva lactoperoxidase is indicative of the condition that the strength to suppress the growth of free radicals and carcinogenic substances is weakening, and the oxidation of saliva histatin indicates that the protective effect of teeth is weakening.

Ptyalin is an enzyme that can be found in saliva and it has a function of changing the starch of the food into maltose when the food that contains a large amount of carbohydrate, such as steamed rice is consumed, and gives the sweetness as one chews it well. The oxidation of saliva ptyalin weakens the effect of changing starch into maltose and weakens the effects of sensing the savory of the food, which is well known in the world of dentistry as well.

Now I will be discussing about the condition of having too much saliva accumulating in the mouth and bad breath. The components of saliva, that have a larger secretion ratio secreting from the sublingual glands, have a larger quantity of high viscosity mucous called, mucin. Mucin is protein in structure, and as a response to the flow of substance and has a characteristic of its molecules to form a line along the flow; and it has a function to make it easy to swallow food because of its lubricating ability, which is done by keeping a certain distance between things that it interacts. However, the oxidation of saliva mucin will increase the secretion of sticky saliva, and when the quantity of mucin increases, it becomes the food source for bacteria and causes bad breath and hinders swallowing.

ORP Quantitative Judgment of Depressive Condition Improvement by Looking at Parasympathetic Nerve Becoming Dominant

In the recent years, in the treatment of the depressive symptoms, there was a lack of objective ways to see the improvement result that compared the before and after of the treatment. According to the Ministry of Health, Labor and Welfare of Japan, as of June 2013, "Standard of Judgment on Depression", by using medical examination by interview, indicates that the criteria used are, (1) depressed mood, (2) the loss of interests and joy, (3) loss of appetite and weight loss, (4) sleeping disorder, (5) failure of psychomotor functions (strong frustrations or conversely, suspension of psychomotor functions), (6) get easily tired and decline of energy, (7) strong sense of guilt, (8) decline of thinking ability and concentration and (9) suicidal thoughts. When more than five items among the nine on the list continue for more than two weeks, it is judged as depression.

Many psychiatric diseases are difficult to make judgment according to objective indicators. There are said to be at least few hundred types of human saliva components, but if the activity value of biomarker such as amylase and cortisol among the saliva components were used to acquire objective indicator for psychiatric disease, because it is based on the activity value of